Abstract book
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ISBNPA 2016 is very grateful for the contributions from our conference partners and sponsors

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Lorna Jane Active Living Room
Welcome to the 15th scientific annual meeting for the International Society of Behavioral Nutrition and Physical Activity. We are very excited to be holding our conference in the continent of Africa for the first time. I would like to acknowledge and thank Dr Catherine Draper (Chair, Local Organising Committee), Professor Greet Cardon (Chair, Scientific Organising Committee) and their committees for doing such an outstanding job in creating an exciting meeting that I believe covers the breadth of research interests of ISBNPA members and delegates, as well as some novel disciplines/research areas not previously offered.

It has been a busy 12 months since our meeting in Edinburgh last year. A successful webinar series has attracted many hundreds of attendees online; please keep an eye out for upcoming events later in the year. Special Interest Group (SIG) membership is going very well; there should now be a SIG of interest to most members. Please come along to one or more of the SIG meetings during the conference. Thanks to the generosity of the Society’s Fellows we have been able to offer 11 scholarships to delegates from low- and middle-income countries to attend this year’s conference.

We have also been working hard on sponsorship issues to ensure a transparent society. As a not-for-profit society funding can be tight at times, but it is critical we don’t compromise our values and accept funding from sources that would be at odds with the health and wellbeing of the population. We believe it is also important for delegates to declare funding sources and/or potential conflicts of interest. We therefore have a new system in this year’s meeting for the first time to ensure full transparency.

As you can see ISBNPA has a lot to be proud of and I would like to acknowledge our entirely voluntary Executive Committee (who also cover their own registration fees, flights and accommodation costs to attend the meeting) and our wonderful Executive Director Dr Antonio Palmeira for their tireless work to ensure we have a viable professional society that allows us all to come together with common interests and goals and share our passion for behavioural nutrition and physical activity.

I wish you all a wonderful meeting and hope that you learn something new, meet someone new and most importantly, have a great time.

Warm wishes,

Prof Jo Salmon
President, ISBNPA
Welcome from ISBNPA Executive Director

ISBNPA is thrilled to have its first annual meeting in Africa!

Our on-going efforts to advance and disseminate behaviour change science, reached one of the overarching goals set forward by the Executive Committee a couple of years ago: to bring our Annual Meeting to other continents.

As always for ISBNPA, this is a result of a teamwork, but it would be unfair not to recognise the passion and efficiency (a set of variables not usually correlated...) of Catherine Draper, as the leader of the Local Organising Committee, and Greet Cardon, as the Chair of Scientific Committee. Both big and small decisions were made and completed in a mix of smooth and intense processes.

I truly believe that "smooth and intense" are also words that express the experience I hope you have in Cape Town’s ISBNPA Annual Meeting; an intense networking and learning experience that flows as the richness of wildlife in South Africa.

To fully experience the ISBNPA Annual Meeting, make sure you work the Scientific Program in advance — “there is an app for that”...— and all the social activities designed to complement your experience. As Mother Nature has taught us so evidently in South Africa, every member plays an important role to fulfil an ecosystem’s potential.

I thank you in advance, confident that you will play your part in another unforgettable ISBNPA Annual Meeting.

Prof Antonio Palmeira
Executive Director, ISBNPA
Welcome from ISBNPA 2016 Scientific Program Committee Chair

On behalf of the 2016 ISBNPA Scientific Program Committee I would like to welcome you to Cape Town. I’m very proud that we were able to bring ISBNPA to the African continent for the first time. We did not strive for a record number of abstract submissions but we succeeded in reaching new delegates and we were able to compile a fantastic program.

This year the Scientific Program Committee comprised Benedicte Deforche, Catherine Draper, Vicki Lambert, Jo Salmon, Ryan Rhodes, Greet Cardon, Wendy Van Lippevelde, Huijan Wang, Knutt-Inge Klepp and Ralph Madisson. Along with the Local Organising Committee we attracted world leading keynote speakers and we are proud of our invited lectures from four of the Society’s best and brightest Student and Early-Career researchers.

Although we have less parallel sessions than last year, there is plenty to choose from during each day of the conference. Next to symposia and oral sessions, please ensure you take time to participate in the interactive sessions, lead by the Special Interests Groups and in the poster sessions, which are of high quality and were given prime time slots and a beautiful location.

Furthermore, we have innovative workshops and training opportunities to explore.

I was lucky to visit Cape Town previously and found it to be a fantastic city – I am sure you will too. Enjoy the conference and everything that Cape Town has to offer. And last but not least, make sure you join us for the charity run or walk!

Prof Greet Cardon
Scientific Chair, ISBNPA 2016
Welcome from ISBNPA 2016 Local Organising Committee Chair

It is a great privilege to welcome you to ISBNPA 2016 in Cape Town, the first ISBNPA Annual Meeting in Africa! Preparations have been underway for some time, and we wouldn’t have everything together if it wasn’t for the combined efforts of the ISBNPA Executive Committee, the UCT Conference Management Centre team, the student volunteers, and the Local Organising Committee. Special mention must go to Prof. Antonio Palmeira (ISBNPA Executive Director), Prof. Greet Cardon (ISBNPA 2016 Scientific Chair), Prof. Jo Salmon (ISBNPA President), Kathy McQuaide (LOC member) from the Sports Science Institute of South Africa, Belinda Chapman from the UCT Conference Management Centre, and Simone Tomaz (coordinator of the volunteers) – thank you for all your assistance and support, and I promise to stop emailing you all so much! Thanks also go to all our sponsors and partners, as well as the Cape Town and Western Cape Convention Bureau, who played an important role in putting our original bid together.

In Cape Town, we like to believe that we live in one of the world’s most beautiful cities. Ok, the most beautiful city... We are excited for the chance to show it off, and for you to experience a little of our somewhat complicated yet amazing country. While you are at ISBNPA 2016, I hope that you get to soak up the sights of Cape Town, taste some of our delicious local cuisine, enjoy some top-class South African wine and craft beer, experience the warmth of our people, and leave planning to come and visit again.

Enjoy Cape Town and the conference!

Dr. Catherine Draper
Local Organising Committee Chair, ISBNPA 2016
Local Organising Committee

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Susan Bassett – Department of Sport, Recreation and Exercise Science, University of the Western Cape
Sharmilah Booley – Division of Human Nutrition, University of Cape Town
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Christelle Crickmore – Heart and Stroke Foundation South Africa
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Ralph Madisson – National Institute for Health Innovation, University of Auckland, New Zealand (ISBNPA EC member)
Huijun Wang – Institute of Child and Adolescent Health, Peking University, China
Abstract reviewers

Thank you very much to all our abstract reviewers!

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**Note about the content of the abstract book**

The scientific programme and abstract review committees have not made any edits to the content of the abstract. The abstracts are, therefore, presented as they were submitted by the authors.

**Note about the conflict of interest statements**

The conflict of interest statements are available on the meeting app eventmobi.com/isbnpa16 or in the app stores (search for ISBNPA 2016)
Keynotes

Vicki Lambert - ‘Structure and Agency’: Can we really make the healthy choice the easy choice? A regional perspective for physical activity and healthy eating

Prof Vicki Lambert is head of the Division of Exercise Science and Sports Medicine (ESSM), in the Department of Human Biology, at the University of Cape Town. She is a National Research Foundation B2 rated scientist, and is the author or co-author on over 175 peer-reviewed scientific publications. She is actively involved in research on physical activity and obesity and health, particularly in the Global South, and more underserved communities. Prof Lambert has acted as a consultant to the CDC and WHO on issues related to the Role of Diet and Activity in the Prevention of Non-Communicable Diseases, and Developing a Global Policy for Promoting Physical Activity for Health. She currently serves on the executive council of the International Society for Physical Activity and Health, and was a member of the Scientific Advisory Council for the International Obesity Task Force (2009-2014). At present, she is the chairperson of the global advocacy movement for physical activity, Agita Mundo, and the first chairperson of the African Physical Activity Network (2007-2013). She is the in-country principal investigator for South Africa for the Modelling the Epidemiological Transition study, was the co-principal investigator for WDF-funded, school-based intervention, Health Kick, as well as the South African principal investigator for the International Study on Childhood Obesity, Lifestyle and Environment. She is presently the principal investigator of the STOP-SA Study (Slow, Stop or Stem the Tide of Obesity in the People of South Africa). Prof Lambert recently served on the South African Department of Health National Obesity Task Force, the end result of which was the Strategy for the Prevention and Control of Obesity in South Africa, 2015-2020. She is also the lead researcher for the Healthy Active Kids South Africa Report Card consensus and advocacy initiative, having produced a report card in 2007, 2010, 2014 and now 2016. Her current area of research focus is the nexus between obesity and food insecurity, and factors that shape health decisions in choice-constrained settings.
Adele Diamond - What characteristics does physical activity need for it to improve cognition, including executive functions?

Adele Diamond was educated at Swarthmore (B.A., Phi Beta Kappa), Harvard (Ph.D.), and Yale Medical School (postdoc). Dr. Diamond is the Canada Research Chair Professor of Developmental Cognitive Neuroscience at the University of British Columbia in Vancouver, a member of the Royal Society of Canada, and was recently listed as one of the 15 most influential neuroscientists alive today. One of the founders of the field of Developmental Cognitive Neuroscience, Dr. Diamond is at the forefront of research on executive functions and on the brain’s prefrontal cortex on which they depend. Executive functions include ‘thinking outside the box’ (cognitive flexibility), mentally relating ideas and facts (working memory), and giving considered responses rather than impulsive ones, resisting temptations and staying focused (inhibitory control, including selective attention). Dr. Diamond has made discoveries that have improved treatment for two different medical disorders and discoveries that have impacted education, improving the lives of millions of children. Recently she has turned her attention to the possible roles of activities such as music-making, dance, circus, and martial arts in improving executive functions, academic outcomes, and mental health. Dr. Diamond takes a markedly different perspective from mainstream education in hypothesizing that focusing exclusively on training cognitive skills is less efficient, and ultimately less successful, than also addressing youths’ emotional, social, and physical needs. The hypothesis is that besides training the skills of interest, it’s important to support those skills by lessening things that impair them (like stress or loneliness) and enhancing things that support them (such as joy and physical vitality).
**Phil Morgan - The invisible parent: Targeting fathers in family-based nutrition and physical activity research**

Prof Philip Morgan is Deputy Director of the Priority Research Centre for Physical Activity and Nutrition at the University of Newcastle, Australia. He graduated from the University of Newcastle with a Bachelor of Education (Health and Physical Education) and the University Medal in 1997 and completed his PhD in 2003. Prof Morgan’s research programme focuses on the design, evaluation and translation of targeted interventions to promote physical activity and nutrition in men, fathers and children in school, community and workplace settings. Professor Morgan is the lead investigator on a number of community-based health education programmes for men including Healthy Dads, Healthy Kids, DADEE (Dads And Daughters Exercising and Empowered), SHED-IT (Self-Help Exercise and Diet using Information Technology) and Workplace POWER (Preventing Obesity Without Eating like a Rabbit). These gender-tailored interventions have been highly successful and are now being rolled out in national and international translation trials. His research has demonstrated the unique influence of fathers on children’s dietary and physical activity behaviours. Healthy Dads, Healthy Kids and DADEE were the first family-based programmes that have targeted dads and have showcased novel strategies to engage and motivate fathers to optimise family health. In 2014, Healthy Dads, Healthy Kids won national awards for ‘Excellence in Obesity Prevention’ and ‘Community Engagement’. Prof Morgan has published more than 200 peer reviewed journal publications, and served as an invited expert on multiple government and non-government committees focusing on obesity, physical activity and physical education. His contributions to research, teaching and community service have been recognised with prestigious national and international awards including the Scopus Young Researcher of the Year Award for Australasia and the Australian Award for University Teaching Excellence from the National Office for Learning & Teaching.
Harry Dugmore has a PhD in History from the University of Witwatersrand, and is the Director of the Centre for Health Journalism at Rhodes University’s School of Journalism and Media Studies in Grahamstown, South Africa. Harry has had a long-standing interest in the media’s ability to influence health behaviours and shape health identities. In the 1990s, Harry co-wrote the first four seasons of the Soul City TV series and was, from 2001 to 2006, a manager of Khomanani, the then South African government’s HIV, AIDS and TB national mass media–based behaviour change campaign. Harry’s current health-related research and teaching interests include media representations of obesity and NCDs, digital health journalism, participatory journalism, and the media’s role in shaping sexualities and sexual identities. He was lead author of The Academy of Science of South Africa (ASSAf) consensus study Diversity in Human Sexuality: Implications for Policy in Africa, published in 2015. Harry is the South African research coordinator the Journalism Students across the Globe (Professionalization, Identity and Challenges in a Changing Environment) project that is examining the views of journalism students in a large variety of political, economic, social and cultural contexts across 30 countries. Harry was the MTN Chair of Media and Mobile Communication at Rhodes before starting the Centre for Health Journalism at Rhodes in 2011. He currently coordinates Digital Media programmes at the JMS, including the recently launched Masters degree programme in Digital Journalism Studies. Harry supervises PhD and Masters research in the fields of digital journalism, digital media economics, health communication and health journalism. Harry is currently on the steering committee of the Highway Africa conference, the largest annual conference of African Journalists. He is deputy Chair of the Board of Grocott’s Mail, South Africa’s oldest independent newspaper.
Gerard Hastings is Professor of Social Marketing at Stirling University, the Open University and L'École des Hautes Etudes en Santé Publique, Rennes. His academic career has focused on researching the impact of marketing on society – both for good and ill. To this end he founded and ran the Institute for Social Marketing. This has involved him in advising government and working with policy makers and civil society nationally and internationally. He has also acted as an expert witness in litigation against the tobacco industry. He was awarded the OBE for services to health care in 2009. In 2014, he was appointed as an expert member on the WHO Ad Hoc Working Group on Science and Evidence for ending childhood obesity and joined the British Medical Association Board of Science. He also accepted the Queen’s Anniversary Prize for Higher and Further Education on behalf of the University of Stirling for the ground-breaking critical marketing research conducted by the Institute for Social Marketing. In 2015 he was appointed as one of the 23 Commissioners on the Lancet Commission on Obesity.
**Student Invited Lectures**

**Student1**

**Dietary and lifestyle practices in rural and urban South African adolescents**

Heather Sedibe

**Objective:** To investigate the dietary and lifestyle practices of adolescents in rural and urban South Africa.

**Methods:** Employed mixed methods study design. Exploratory qualitative research on narratives pertaining to dietary and physical activity practices. Duo-interviews (pairs of best friends) of: 29 pairs of high school girls (mean age =18 years) in urban Soweto, and 11 pairs of high school girls (aged 16-19 years) in rural Agincourt Health and Socio-demographic Surveillance System (AHDSS). Thematic content analysis was used. Retrospective cross-sectional data where dietary habits, eating practices, and anthropometric measurements were performed on rural (n=392, mean age=13 years) and urban (n=3098, mean age=14 years) adolescents from The Birth to Twenty (Bt20) cohort, and the AHDSS site, respectively. Logistic regression was employed to examine the associations between dietary habits and eating practices, with obesity risk.

**Results:** Among urban girls majority purchased locally prepared convenience foods instead of home-prepared breakfast. Most preferred to purchase food from the school tuck shop. Lunch choices were influenced by affordability, convenience, and popularity. Physical activity engagement was limited due to lack of facilities and safety concerns. Among rural girls, for majority, the consumption of locally grown and traditional foods considered as healthy, was limited due to availability. Availability of food for breakfast and limited accessibility to healthy foods limited healthy eating. They engaged in various physical activities within the home, community, and schools. Similarities and differences in dietary habits and eating practices between urban, rural adolescents within the home, community and school were identified. Being male and residing in a rural setting were associated with reduced risk of being overweight and obese. After adjusting for gender, site, dietary habits and eating practices within the three different environments, the frequency of meals consumed with family and frequency of breakfast consumed were associated with risk of being overweight and obese.

**Conclusion:** Findings highlight the critical role that understanding the family and community environments can play in interventions aimed at improving urban and rural adolescents dietary and physical activity practices to reduce the increasing prevalence of overweight and obesity.
Understanding adults’ eating patterns: definitions, methodology and associations with diet and health.

Rebecca Leech

Traditionally, nutrition research has focused on individual nutrients, and more recently, dietary patterns. However, little is known about dietary intake at the level of an “eating occasion (EO)”, which includes meals and snacks. Current dietary advice is framed around the amount and types of food populations should consume, rather than through a consideration of eating patterns. Emerging evidence suggests that eating patterns, including the frequency, skipping and timing of meals and snacks, are important determinants of adults’ energy and nutrient intakes, diet quality and cardiometabolic health. However, most research in this field has focused on breakfast skipping; evidence for the nutritional and health impacts of EO, meal and snack frequency and meal timing (e.g. the times across the day when EOs are consumed) is inconclusive.

One reason for the inconsistent findings across studies on eating patterns is the lack of a standard research definition of an EO. To date, many definitions have been put forward. Different definitions may affect how eating patterns are characterised which, in turn, may affect the direction and magnitude of associations with diet quality and health outcomes. An evidence-based definition of an EO is needed.

This presentation will commence with a critique of the state of the science concerning eating patterns’ research, focusing on their definitions and associations with nutrient intakes, diet quality and health outcomes. Data from the most recent Australian Health Survey will be presented to illustrate 1) the influence of different definitions of EOs on the characterization of eating patterns, 2) development of a novel approach to examining meal timing and 3) associations of different eating patterns with nutrient intakes, diet quality and health outcomes. Finally, the implications and significance of these research findings for future research and nutrition promotion and translation will be discussed.

Funding: Australian Postgraduate Award Scholarship
Access is not usage: Designing more engaging e&mHealth behaviour change interventions
Camille Short

The internet has great potential as a public health tool for promoting health behaviour change. Internet access is high and relatively equal across groups; public interest and investment in behaviour change technology is increasing (e.g., fitbit); our digital footprints are continuously growing and can be analysed to better understand our behaviour; and there is a wealth of existing evidence from multiple disciplines about how to design persuasive and engaging online systems.

However, despite this there have been few e&mHealth interventions for physical activity and nutritional behaviour that have been very successful in the long-term. This is owing at least in part to poor user engagement— with most studies reporting much lower usage of the intervention platform (be it web- or app-based) than intended by intervention developers. If e&mHealth interventions are to ever be as promising as we hope we need research on how we can make them much more engaging.

My presentation will focus on how we can (and should) build a science of user engagement in order to improve the public health impact of e&mHealth behaviour change interventions. I will present an overview of our recently developed model of user engagement, and present findings from two recent experimental studies, which highlight how intervention design influences user engagement and behaviour change outcomes. In doing so, I hope to highlight the importance of considering factors associated with engagement in the design of all interventions, and encourage discussion, debate and future research in the area.
Humans are social beings. Our identities are, for an important part, shaped by the different social groups we belong to. Each social group has its own standards for behavior, based upon what is considered good or correct behavior within that social group. Such socially shared norms are usually not made explicit, but become apparent through observing the actual behavior of the group members (called descriptive norms) and through understanding the expectations the group members have for how others in their social group should behave (called injunctive norms). The influence that social norms exert over an individual may be most pronounced in young people, who are still looking to establish their social identity and are especially sensitive to group influences.

I will present research examining how the social norms that exist in young people’s peer groups influence eating behavior. Young people’s eating behavior often does not meet dietary guidelines, and has deteriorated in recent years. The typically rather unhealthy social norms governing eating behavior among young people mirror this development. Knowing the serious implications of an unhealthy diet for young people’s short- and long-term mental and physical health, it is of critical importance to find effective tools for intervening in their eating behavior.

The overarching aims of this line of research are to improve understanding of how and when social norms influence eating behavior in young people, and to determine whether social norms can be effectively used to promote healthy eating behavior among young people.
Symposia

S15

Cooking interventions: Development, Implementation Evaluation and Outcomes

Convenor:
Moira Dean, Queen’s University Belfast, Belfast, UK

Discussant:
Monique Raats, University of Surrey, Guildford, UK

Description:
Purpose: This symposium will compare and contrast novel cooking interventions targeting cooking skills or diet quality in the home-setting. It will present results from three intervention studies designed to change behaviour through the use of strategies such as targeted parenting practices for parent/child dyads, after-school cooking classes for parents and children, and experimental cooking classes for adults.

Rationale: Diet quality is suboptimal worldwide, leading to numerous chronic illnesses such as cardiovascular disease, cancers, and diabetes. Multiple factors influence food choice and thus diet quality on a number of levels (socio-economic and individual) e.g. budget, resources, household structure, food attitudes, nutritional knowledge and habitual behaviour. A series of recent reviews have suggested a role for individually-modifiable factors such as cooking and food skills in diet quality, indicating that greater cooking and food abilities are typically associated with increased diet quality (i.e. fruit/vegetable intake). However, to advance the research field in this area there is a pressing need for greater understanding of the design, implementation and evaluation of such interventions.

Objectives: To: (1) investigate which behaviour change techniques (BCTs) are most effective in enhancing adults intention to cook a meal from basic ingredients at home in the UK (2) explore if a short cooking intervention for parent/child pairs improves parenting practices to increase child vegetable intake in the USA and (3) evaluate the short and long term impact of implementing the B2B after-school program across primary schools in Australia.

Summary: This symposium will include results from three novel cooking interventions. Lynsey Hollywood will present findings from a cooking intervention undertaken by 141 female participants aged 20-39 years from the Island of Ireland randomly assigned to one of four BCT-mapped conditions where varying guidance was given on how to cook a lasagne from scratch. Marla Reicks will present results from a 6-week (2 hrs/wk) cooking intervention adapted from the Cooking Matters for Families program implemented with 45 parent/child (9-12 yrs) pairs to increase children’s vegetable intake. Clare Collins will present outcome and process measures from a B2B program assessed by trained programme facilitators, parents of children and the children themselves (5-12 years) which included 5 x 90mins after-school cooking sessions, during one school term.

Format: The three talks will present the protocol, design and outcomes of the cooking interventions followed by a discussion where the intervention studies will be compared, contrasted and critically evaluated on their design, samples, process, results and outcomes.
The design and effectiveness of a cooking skills intervention to enhance consumers’ home cooking intentions: a comparison of different Behaviour Change Techniques

Laura McGowan¹, Michelle Spence¹, Martin Caraher², Monique Raats³, Lynsey Hollywood⁴, Amanda McClact⁵, Moira Dean¹

¹Queen’s University Belfast, Belfast, UK, ²City University, London, UK, ³University of Surrey, Guildford, UK, ⁴Ulster University, Coleraine, UK, ⁵St Angela's College, Sligo, UK

SIG: Children and families

Awards:

Purpose: There’s concern in recent years that opportunities to learn how to prepare and cook food are in decline, leading to reduced skills, knowledge and confidence. In order to address this, several community-based educational initiatives have been developed, however, these seldom specify which behaviour change techniques (BCTs) are used, making it difficult to assess which educational ingredients are successful. Therefore the purpose of this study was to: (1) design a cooking skills intervention with four conditions which incorporate the use of relevant BCTs, and, (2) determine, via a cooking skills intervention with adults, which BCTs are most effective in enhancing their intention to cook a meal from basic ingredients.

Methods: The intervention design was underpinned by Social Cognitive Theory, systematic instruction and Bloom’s Taxonomy Revised. 141 female participants aged 20-39 years from the Island of Ireland were randomly assigned to one of four conditions in which they were given varying guidance on how to cook a lasagne from scratch. Condition 1, ‘recipe only’, mapped onto the ‘providing instruction on performance’ BCT; Condition 2, ‘video demonstration (plus recipe)’, mapped onto the ‘provide instruction’ and ‘model/demonstrate behaviour’ BCT’s; Condition 3, ‘video segments (plus recipe)’, mapped onto the ‘provide instruction’, ‘model/demonstrate behaviour’ and ‘set graded tasks’ BCT’s; and Condition 4, ‘free access to video segments (plus recipe)’ mapped onto all the aforementioned BCTs plus the ‘behavioural practice/rehearsal’ BCT. Pre- and post-intervention data was collected on the participants’ likelihood of cooking the meal from scratch together with their confidence, enjoyment and perceived difficulty in cooking.

Results: Pre-intervention measures were not significantly different between conditions. Significant increases in both the likelihood of cooking and confidence in cooking occurred in all conditions (P<0.05), with no differences between conditions (P>0.05). Regression showed that pre-intervention measures accounted for 32% of the variance in likelihood of cooking post-intervention, and that the addition of post-intervention measures (i.e. confidence, enjoyment and perceived difficulty) explained an additional 10%. Post-intervention enjoyment and confidence in cooking were positively associated with likelihood of cooking.

Conclusions: Providing opportunities to learn how to prepare and cook food are vital for increasing cooking intentions at home.
Enhancing parenting practices to improve child dietary behavior through a joint parent/child cooking intervention

Marla Reicks, Allison Ritter, Francine Overcash, Zata Vickers

University of Minnesota, Minnesota, USA

SIG: Children and families

Awards:

Purpose: Cross-sectional studies have linked food-related parenting practices with dietary intake and weight status among early adolescent children (9-14 yrs). The purpose of this study was to determine if a 6-lesson cooking intervention for parent/child pairs could improve parenting practices to increase child vegetable intake.

Methods: A 6-week (2 hrs/wk) cooking intervention adapted from the Cooking Matters for Families program was implemented on 45 parent/child (9-12 yrs) pairs. During the intervention, parents were encouraged to employ a new behavioral strategy each week at home to enable increased child vegetable intake. Strategies included having the child help prepare vegetable dishes, using a plate allocating vegetable placement, strategically placing vegetable serving dishes at the table, etc. These strategies were modeled during shared meal times at the cooking intervention classes. A weekly questionnaire was used to assess habitual use of the strategies at home and analyzed with paired t-tests.

Results: Parents were primarily women (97%), with 50% having a high school diploma, between 30-39 years old, 95% non-white, and all using public food assistance programs. Difficulty ratings for performing the strategies ranged from 1.3 to 2.0 (1 = not hard, 2 = a little bit hard). Scores on items assessing habitual use of the strategies improved slightly over time. Barriers to use of the strategies included lack of time, lack of availability of vegetables at home, children not liking vegetables, fear of wasting food, and that some suggested strategies atypical practices for families.

Conclusions: Overall, the strategies employed were easily integrated into the cooking classes and provided opportunities to model use in the home. Parents felt the strategies were easy to use; however some parents reported barriers to using several strategies. Cooking intervention programs may be a useful medium for education and promotion of parenting practices to improve child food intake behaviors.
The Back-to-Basics after-school cooking skills program: Using a train-the-trainer approach to support parents to improve child fruit and vegetable intakes

Clare Collins, Hannah Lucas, Tracy Burrows
The University of Newcastle, New South Wales, Australia

SIG: Children and families

Awards:

Background: The Back to Basics Cooking Club and Healthy Lifestyle Program (B2B) is an evidence-based, family focused, healthy lifestyle program designed for conduct as an after-school activity such as a cooking club for children. Initial pilot testing found B2B to be feasible to be conducted after-school in a community setting for primary school aged children. Through the development of a train-the-trainer supporting program, B2B was implemented across a number of schools in areas of socio-economic disadvantage in the Hunter region of NSW Australia.

Aim: The current evaluation describes the impact of implementing the B2B program across five primary schools (n=77 children) in Canberra, ACT, Australia during 2 school terms at three time points, baseline, immediately post-program (after 10 weeks) and a further 3 months after completion. In addition process evaluation results are reported.

Method: B2B program outcome measures were assessed through standardised evaluation questions modified to suit the purpose of ACT Health. The outcomes were assessed by three groups: trained programme facilitators, parents of children and the children themselves, through fixed and open ended questions. B2B targeted children (5-12 years) and their parents/guardians and included 5 x 90mins after-school cooking sessions, during one school term.

Results: Overall facilitators felt well prepared for sessions, and found it easy to conduct the program having participated in the face-to-face training and by following the detailed session outlines. Parents and carers of children felt B2B was valuable and that having their children participate in B2B led to a positive impact on their family eating habits, enjoyment of family meals and their subsequent efforts to involve their children in cooking at home. The B2B program achieved a sustained increase in self-reported vegetable intake in primary school aged children, up to three months after participating in the program.

Future recommendations included additional website resources to support practical cooking skills, additional parent activities, more frequent classes and potential modifications for schools with limited space.

Conclusion: The B2B Program when conducted within the after-school care environment had a major impact on improving children’s vegetable intakes up to three months after completing the program and was considered enjoyable.
Innovating computer-tailored interventions targeting energy-balance related behaviours: physical activity, sedentary behaviour and diet

Convenor:
Corneel Vandelanotte, Central Queensland University, Rockhampton, Australia

Discussant:
Camille Short, Adelaide University, Adelaide, Australia

Description:
Purpose:
Given the high prevalence of physical inactivity, sedentary behavior and unhealthy diets, we need interventions that can reach large numbers of people at an acceptable cost. Contemporary computer-tailored interventions provide participants with instantaneous personalized feedback about a given health behavior and its correlates. This feedback is based on answers provided on an online survey and through applying IF-THEN algorithms to select relevant advice from a database. While the use of computer-tailored interventions has shown to increase the efficacy of web-based interventions across a range of health behaviours, the way people use information technology keeps changing rapidly due to technological advances. Therefore, there is a need for computer-tailored interventions to apply innovative approaches to attract, engage and interact with participants. This symposium will explore the efficacy of video-tailoring (personalized videos), video-coaching (standard computer-tailoring additional with online video-coaching sessions) and computer-tailored interventions delivered through smartphones. Furthermore, while computer-tailored interventions have frequently been applied to physical activity and dietary behaviours few have examined their effectiveness for reducing or interrupting sitting time. Therefore, innovative computer-tailored interventions focusing on sitting time will also be included in the symposium.

Rationale:
Computer-tailored interventions are effective and frequently used in health behavior change interventions, and the proposed presentations address the full spectrum of health behaviours addressed by ISBNPA: physical activity, sitting time and dietary behaviors. Previous symposia addressing computer-tailored interventions at ISBNPA conferences have always attracted a lot of attendees and sparked lively discussions.

Objectives:
- Demonstrating innovative uses of computer-tailored interventions
- Demonstrating efficacy of computer tailoring in RCTs across different health behaviours.
- Exploring and discussing areas of improvement and future innovations for computer-tailored interventions.

Summary:
The session will start with an introduction provided by the symposium chair to provide background to the audience with regards to what computer-tailoring is, how it works and how effective it has been to date. As such, individual presentations will be able to focus solely on the research findings. The first presentation will address the innovative component of video-tailoring for a dietary intervention; the second presentation will address the added effect of video-coaching to computer-tailoring in a physical activity intervention; the third presentation will address the use of computer-tailoring in an intervention to reduce or interrupt occupational sitting; the fourth presentation will compare innovative delivery-modes for computer-tailored interventions (video vs. text; desktop vs. smartphone). A discussant who has experience with development and evaluation of computer-tailored interventions will present some key observations from the presentations in light of future research (they will NOT summarize the session). The session will finish with a Q&A with the audience.

Format (total time available 75 minutes):
- Introduction – Corneel Vandelanotte (Symposium chair) – 3 minutes
- Presenter 1: Kim Gans (USA) - Innovative video tailoring for dietary change: Final results of the Good For You!
cluster randomized trial – 12 minutes (+ 2 minutes for questions)

- Presenter 2: Stephanie Alley (Australia) - A randomised controlled trial examining the effectiveness of video-coaching to assist a computer-tailored physical activity intervention – 12 minutes (+ 2 minutes for questions)
- Presenter 3: Katrien De Kocker (Belgium) - The effect of computer-tailored advice targeting occupational sitting on psychosocial correlates and the mediating role of these factors – 12 minutes (+ 2 minutes for questions)
- Presenter 4: Hein De Vries (The Netherlands) - The influence of delivery-mode (video vs. text; desktop vs. smartphone) on the efficacy of computer-tailored obesity prevention and physical activity interventions – 12 minutes (+ 2 minutes for questions)

- Discussion – Camille Short (Discussant) – 5 minutes + 10 minutes of questions from the audience
Innovative video tailoring for dietary change: Final results of the Good For You! cluster randomized trial.

Kim Gans, Patricia Risica, Akilah Dulin-Keita, Jennifer Mello, Mahin Dawood, Leslie Strolla, Ofer Harel

Brown University, Rhode Island, USA, University of Connecticut, Connecticut, USA

SIG: E- & m-health

Awards:

Purpose: Effective, low-cost approaches are needed to enhance dietary behavior change. While both video and tailoring technology have been effective interventions to improve diet, these approaches have not been combined to study the effectiveness of tailored videos. The purpose of this paper is to discuss the results of Good For You!, a randomized trial that tested the efficacy of innovative, individually tailored videos in helping worksite employees decrease dietary fat and increase fruit and vegetable (F&V) intake.

Methods: Worksites were matched on approximate size, type of company and workforce composition. Employees were randomized to one of three experimental conditions: Non-Tailored written information (NT), Tailored Written information (TW), or Tailored Written + Tailored Video (TW + TV). Evaluation was conducted at baseline, 4 and 7 months. We used the NCI Fat Screener and an adapted Food Habits Questionnaire (FHQ) to estimate fat intake and fat-related behaviors, the NCI F&V Screener and F&V Habits Questionnaire (FVHQ) to measure F&V intake and behaviors. Generalized linear models were examined for all outcome measurements.

Results: 2525 worksite employees were randomized. At 4 months, dietary fat intake decreased significantly more for TW (-2.65%) and even more for TW+TV (-2.98%) compared with NT (-2.12%). FHQ scores decreased significantly more for TW+TV. Fruit intake increased the most for TW+TV (1.35 cups) and TW+TV (1.65 cups) increased F&V intake significantly more than NT (0.80 cups). TW+TV showed the largest increase in F&V behaviors on the FVFQ. At 8 months, dietary fat change continued to be better for TW+TV (-3.29%) than NT (-2.83%). F&V intake changes were no longer significant, but the trend indicated higher increases for the TW+TV group compared to the TW and NT groups based on both the screener and FVHQ measures.

Conclusions: The tailored intervention participants were more likely to decrease fat and increase F&V intake. The TW+TV group was generally the stronger of the two tailored interventions, demonstrating the promise of tailored video as an intervention to change eating habits. Future studies should explore "third generation" channels for delivering tailored video interventions including the internet and smart phones in addition to DVDs.
**S02.2**

**A randomised controlled trial examining the effectiveness of video-coaching to assist a computer-tailored physical activity intervention.**

Stephanie Alley\(^1\), Cally Jennings\(^2\), Ron Plotnikoff\(^3\), Corneel Vandelanotte\(^2\)

\(^1\)Central Queensland University, Rockhampton, Australia, \(^2\)University of Alberta, Edmonton, Canada, \(^3\)University of Newcastle, Newcastle, Australia

**SIG:** E- & m-health

**Awards:**

**Purpose:** The internet provides a good platform to deliver physical activity interventions to large numbers of people at low cost. Computer-tailored advice in web-based physical activity interventions has shown to improve engagement and behavioural outcomes, but does not provide participants with accountability or social support. It is unknown whether additional video calls with a behavioural expert would improve the effectiveness of computer-tailored advice. The purpose of this study was to determine the effectiveness of a web-based and computer-tailored physical activity intervention with and without the addition of a brief video-based coaching session in comparison to a control group.

**Methods:** A total of 240 participants were randomly assigned to one of three groups (tailoring + coaching, tailoring-only and wait-list control). The tailoring + coaching participants received an 8 week computer-tailored web-based physical activity intervention ('My Activity Coach') with four 10 minute coaching sessions with a behavioural expert over an online video calling program (e.g. Skype). The tailoring-only participants received the same intervention without the coaching sessions. An intention-to-treat linear mixed model analysis was conducted to compare self-reported physical activity from pre to post intervention (week 9) by group.

**Results:** Overall retention was low (55%) and a low percentage of tailoring + coaching participants completed a coaching call (21%). Physical activity in minutes per week improved from pre to post intervention in all groups (tailoring + coaching, M=150, SD=240, tailoring-only, M=123, SD=242, wait-list control, M=34, SD=172). There was a significant interaction between group and physical activity outcomes F=(2,88) 3.02, p=.05. The physical activity increase in the tailoring + coaching group in comparison to the control group was significant (p=.02), and the physical activity increase in the tailoring-only group in comparison to the control group was approaching significance (p=.06). No significant difference was found between the tailoring + coaching and tailoring-only groups.

**Conclusions:** Findings support the effectiveness of providing online coaching and computer-tailored advice in a web-based physical activity intervention. However, future studies with larger sample sizes and which promote a higher participation in the coaching sessions are required to determine whether online coaching can improve intervention effectiveness over computer tailored advice only.
The effect of computer-tailored advice targeting occupational sitting on psychosocial correlates and the mediating role of these factors

Katrien De Cocker¹, Ilse De Bourdeaudhuij¹, Greet Cardon¹, Corneel Vandelanotte²
¹Ghent University, Ghent, Belgium, ²Central Queensland University, Rockhampton, Australia

Purpose: A recently developed theory-driven, web-based, interactive computer-tailored intervention aimed at changing sitting at work was found to be effective in decreasing self-reported occupational sitting compared to a generic advice and no advice group. The aims of the present study were to examine 1) the effect of the intervention on psychosocial factors and 2) whether changes in these psychosocial factors and the completion of an action plan mediated the effect of the intervention on occupational sitting.

Methods: A randomized controlled trial examined the effects of computer-tailored advice based on different aspects of the Theory of Planned Behaviour, Self-Determination Theory and Self-Regulation Theory among Flemish employees (n=213). At baseline and 1-month follow-up, participants self-reported their sitting time at work, and their knowledge, attitudes, self-efficacy and social support to change occupational sitting. Website statistics provided data on the completion of an action plan among intervention participants (yes/no). The intervention effect on psychosocial factors was examined conducting a repeated measures MANOVA. The mediating role of the changes in these psychosocial factors and action planning was examined using the product-of-coefficients test of MacKinnon based on multiple linear regressions. All analyses were controlled for age, gender, education, hours spent at work, employment duration, BMI and physical activity.

Results: The intervention was successful in increasing knowledge about health-related aspects of sitting (p=0.037), but had no effect on the other psychosocial factors. The increase in knowledge was however not found to be a mediator of the effect of the advice on occupational sitting. Fifty-four intervention participants (69.2%) completed an action plan. The completion of an action plan was found to be a significant mediator of the intervention effect on occupational sitting (85.4% mediation; p<0.05).

Conclusions: This computer-tailored advice targeting occupational sitting seems to be a successful strategy to increase knowledge about health-related aspects of sitting. In terms of behavioral change, the use of action planning in this computer-tailored intervention has shown to be important, as this was found to be a significant mediator.
**S02.4**

**The influence of delivery-mode (video vs. text; desktop vs. smartphone) on the efficacy of computer-tailored obesity prevention and physical activity interventions.**

Hein De Vries¹, Michel Walthouwer², Stefanie Gomez Quiñonez³, Anke Oenema¹, Lilian Lechner², Daniella Schulz²

¹Maastricht University, Maastricht, The Netherlands, ²Open University of The Netherlands, Heerlen, The Netherlands

**SIG: E- & m-health**

**Awards:**

**Purpose:** Computer tailoring is a technique that provides highly personalized information to respondents in order to adopt a healthy behavior. Yet, most of the studies have used only text based feedback using PC's. This presentation we will outline the effects of two innovative studies comparing: 1. The efficacy of text-based and video based computer tailoring on obesity prevention (study 1) and 2. The efficacy of a computer tailored eHealth and mHealth interventions on physical activity (study 2).

**Methods:** Both studies were developed on the basis of the I-Change Model that acknowledges the importance to raise awareness about one's own health behavior, to develop positive attitudes, social support and self-efficacy and to enhance self-regulation via the development of action plans. Study 1 (N=1419) is a RCT in which both the video and text based version (with 6 weekly sessions) were compared to a control condition. Study 2 (N=372) is a RCT in which the effects of physical activity tailored program delivered via 5 sessions using eHealth (the PC) or mHealth (smartphones) were compared with a control condition.

**Results:** For study 1 only the video version resulted in significant changes after 6 months on BMI, whereas the video version and the text version influenced daily energy intake. No effects on physical activity were found. The video version had the best appreciation. For study 2 the results show that the eHealth condition had the lowest drop-out, the highest level of use, a better appreciation and a borderline higher level of physical activity in comparison to the other conditions.

**Conclusions:** The video version of the web-based computer tailored program aimed at obesity prevention was the most effective program, and the best appreciated. mHealth programs are not necessarily better than eHealth programs, and future research needs to identify the condition under which selection of a specific modality is indicated.
**S03**

**Intervention studies targeting energy balance-related behaviours in preschool children: new strategies to reach this target group**

**Convenor:**
An-Sofie Pinket, Ghent University, Ghent, Belgium

**Discussant:**
Jayne Fulkerson, University of Minnesota, Minneapolis, USA

**Description:**

**Purpose:** This symposium focuses on intervention studies targeting energy balance-related behaviours (EBRBs) in preschool children (aged 3-5.5y) through different levels of the socio-ecological model (i.e., kindergarten, family, community) in order to discuss successful strategies to reach this understudied age group and their parents and to improve their health behaviours and prevent obesity at an early age.

**Rationale:** Preschoolers are an understudied target group in intervention research. However, the importance of a healthy lifestyle already starts early in life since EBRBs are formed at a young age and track into adolescence and adult life. Therefore, intervention studies focusing on EBRBs in these young children are an important strategy to tackle overweight and obesity and their complications. Nevertheless, preschoolers are a complicated target group and it is still unclear how preschool children and their parents can be reached. So, new strategies in intervention studies targeting preschool children should be studied.

**Objectives:**
- To learn more about the effectiveness of innovative studies targeting EBRB’s in preschoolers -till now an understudied target group in health promotion- through different levels of the socio-ecological model
- To learn more about different ways to reach preschoolers and their parents
- To discuss effective strategies to reach/involve preschoolers and their parents
- To discuss pitfalls in the implementation of intervention studies focusing on preschoolers

**Summary:**

Preliminary research, process and effect evaluation studies using different strategies (i.e., an intervention study implemented at home and in the community, kindergarten-based interventions and a mHealth intervention) will be combined to provide insight in strategies to change EBRB’s in preschoolers in order to prevent obesity. By using a mix of intervention studies in different stages (from development to completed studies), different aspects of intervention studies targeting preschoolers will be addressed, which can lead to interesting discussions on new ways to target these young children.

**Format:**

Chair: An-Sofie Pinket

Presenter 1: Simone Tomaz; Factoring in home and contextual factors for the development of a physical activity intervention for preschool children

Presenter 2: Rachel Jones; Jump Start – a physical activity intervention for Early Education and Care Settings in areas of disadvantage in Australia

Presenter 3: Cristine Nyström; A mobile phone-based intervention to prevent obesity in 4-year-olds (MINISTOP): results from a population-based randomized controlled trial

Presenter 4: An-Sofie Pinket; Effect and process evaluation of a kindergarten-based, family involved intervention on water intake and beverage consumption in preschoolers from six European countries: the ToyBox-study

Discussant: Jayne Fulkerson
Factoring in home and contextual factors for the development of a physical activity intervention for preschool children

Simone Tomaz¹, Trina Hinkley², Rachel Jones³, Catherine Draper²

¹University of Cape Town - Division of Exercise Science and Sports Medicine, Department of Human Biology, Cape Town, South Africa, ²Deakin University - Centre for Physical Activity and Nutrition Research, Burwood, Victoria, Australia, ³University of Wollongong - Early Start Research Institute, Wollongong, Australia

SIG: Early care and education

Awards:

Objective: This study aimed to obtain insight into the influence of the home and community environment on preschool children's physical activity (PA), from the perspective of parents/caregivers. The results of this study are being used in the development of an intervention to promote PA and gross motor skills in South African (SA) preschool children.

Methods: 198 parents/caregivers (aged 39.2±12.7y) of preschoolers (aged 4.8±0.7y) were recruited from 10 urban (n=55) and rural (n=143) preschools in SA. Parents were asked to complete an adapted questionnaire based on the Healthy Active Preschool Years (HAPPY) and the Preschool-aged Children’s Physical Activity Questionnaire (Pre-PAQ).

Results: Mothers (69%) and grandmothers (24%) made up most of the sample. 50% of participants agreed that preschool children should be active for 3 hours daily, while 34% reported that 3 hours of PA is ‘too much’. 77% reported that they were satisfied with their child's current PA levels, and 81% reported that their children are sufficiently active for their health. 76% of participants disagreed that television viewing could have an effect on their child's health, although 52% were not confident in saying 'no' to children's requests to engage in screen time. 81% of participants felt that their children's energy levels were not a barrier to PA, and 87% reported that they believe that their children enjoy being active. A small number of participants (8%) felt that their children were too overweight to participate in PA, and only 9% reported a lack of 'skills' as a barrier to PA. 66% of participants reported that there were insufficient play areas in their community, with 65% of parents did not feel existing facilities were safe. Neighbourhood safety was a concern for 62% of the parents.

Conclusions: Parents/caregivers have generally positive perceptions regarding their preschool child's PA, which indicates that PA could be an acceptable vehicle for the promotion of a broader range of developmental outcomes (e.g. cognitive development) with parents/caregivers. From the perspective of parents/caregivers, there appear to be relatively fewer barriers to PA in the home environment, compared to the community context. These community barriers should be addressed in the intervention.
Jump Start - a physical activity intervention for Early Education and Care settings in areas of disadvantage in Australia


*Early Start Research Institute, University of Wollongong, Wollongong, Australia, Queensland University of Technology, Brisbane, Australia, Centre for Physical Activity and Nutrition, Deakin University, Melbourne, Australia

SIG: Early care and education

Awards:

Objective: To report on process data collected from a large scale randomised controlled trial implemented in Early Childhood Education and Care settings located in areas of disadvantage.

Methods: An 18-month randomised controlled trial is currently being conducted in 43 low-income Early Childhood Education and Care services (children aged 3-5 years) throughout New South Wales, Australia. Services randomised to the intervention group participate in a five-component intervention, designed to be incorporated into their daily routine. It includes structured physical activity lessons (20 min, 5 per week), unstructured physical activity sessions for children, energy breaks (3 min, 10 per week), integrated curriculum activities (10 per week) and a home component. Ongoing and bespoke professional learning is offered to all educators. The primary outcome is time spent in physical activity (accelerometry). Process data are collected on a rolling basis and comprise one-day independent observations (3x throughout intervention) and accountability sheets completed daily by educators. Independent observations focus on the length and number of components facilitated, equipment used and educator behaviours.

Results: Process data to date indicates differing degrees of implementation. Independent observations show that approximately 45% of services are implementing the intervention with a moderate to high degree of fidelity, approximately 30% of services are implementing some components of the intervention and 25% of services are implementing few or no components of the intervention. In services where fidelity of implementation is moderate to high, the intervention is embedded into the service daily routine and educators report increased confidence in children in physical activity-related experiences. A number of challenges have been identified by educators including time, space, educator resistance and educator confidence. Differences have been observed between accountability sheets completed by educators and independent observations. A complete analysis of the process evaluation will be presented.

Conclusions: The collection and reporting of process data is important to understand the fidelity of large interventions and inform ongoing professional learning for educators. Support for educators throughout the second half of the intervention will focus on educator's resistance and educator confidence.
A mobile phone-based intervention to prevent obesity in 4-year-olds (MINISTOP): results from a population-based randomized controlled trial

Christine Nyström¹, Sven Sandin², Elisabet Forsum², Ylva Trolle-Lagerros³, Christel Larsson⁴, Ralph Maddison⁴, Francisco Ortega⁵, Jonatan Ruiz⁵

¹Karolinska Institutet, Stockholm, Sweden, ²Linköping University, Linköping, Sweden, ³University of Gothenburg, Gothenburg, Sweden, ⁴University of Auckland, Auckland, New Zealand, ⁵University of Grenada, Grenada, Spain

SIG: Early care and education

Awards:

Objective: To evaluate a 6-month mobile phone-based dietary and physical activity parental intervention on: a) body fatness and energy intake b) time in sedentary behaviour, moderate and vigorous activities, intakes of fruits and vegetables, snacks, soft drinks, and candy.

Methods: MINISTOP is a two-arm, parallel design randomized controlled trial that has been conducted in 315 healthy Swedish 4-year-olds. After baseline measures, parents were allocated into either the intervention- or control group. A 6-month mHealth intervention consisted of a mobile phone based application (MINISTOP App) to help parents promote healthy eating and physical activity in children. The app is based on the Social Cognitive Theory and involved the delivery of a comprehensive program of information and text messages based on existing guidelines for healthy eating and activity in pre-school children. Parents registered physical activity and intakes of candy, soft drinks, and fruits and vegetables for their child and received feedback through the application. Primary outcomes were body fatness and energy intake, while secondary outcomes are time spent in sedentary, moderate, and vigorous physical activity, physical fitness and intakes of fruits and vegetables, snacks, soft drinks and candy. Food and energy intake (Tool for Energy balance in Children, TECH), body fatness (pediatric option for BodPod), physical activity (Actigraph wGT3x-BT) and physical fitness (PREFIT battery) have been measured at baseline, after the intervention (six months after baseline) and at follow-up (12 months after baseline).

Results: Recruitment was initiated in January 2014 and data collection was finalized October 10th, 2015. Two hundred and eighty-seven (91%) and 280 (89%) completed the first and second follow-up measurements, respectively. We experienced no technical problems, mothers (77%) primarily reported to register behaviors, and 69% reported to use the app at least every third day. We are currently analyzing the intervention effect results and the results will be presented at the ISBNPA conference.

Conclusion: This novel study will evaluate the effectiveness of a mHealth program for mitigating gain in body fatness among 4-year-old children. If the intervention proves effective it has great potential to be implemented in child-health care to counteract childhood overweight and obesity.
**Effect and process evaluation of a kindergarten-based, family-involved intervention on water intake and beverage consumption in preschoolers from six European countries: the ToyBox-study**

An-Sofie Pinket¹, Wendy Van Lippevelde¹, Ilse De Bourdeaudhuij², Benedicte Deforche¹,²,³, Greet Cardon², Odysseas Androutsos⁴, Berthold Koletzko⁵, Marieke De Craemer²

¹Ghent University - Department of Public Health, Unit Health Promotion, Ghent, Belgium, ²Ghent University - Department of Movement and Sport Sciences, Ghent, Belgium, ³Vrije Universiteit Brussel - Department of Human Biometry and Biomechanics, Brussels, Belgium, ⁴Harokopio University - Department of Nutrition and Dietetics, School of Health Science and Education, Athens, Greece, ⁵Ludwig-Maximilians-University of Munich, Dr. von Hauner Children’s Hospital, Munchen, Germany

**SIG: Early care and education**

**Awards:**

**Objective:** The ToyBox-study developed a kindergarten-based, family-involved intervention to prevent overweight and obesity in European preschool children, targeting four key behaviours related to early childhood obesity, including beverage consumption. The present study aimed to examine the effect of the ToyBox-intervention on water intake and beverage consumption in preschoolers of six European countries and to investigate if the effects of the intervention differed by implementation score of the kindergartens and the parents.

**Methods:** A sample of 4964 preschoolers (4.7±0.4 years; 51.5% boys) from six European countries (Belgium, Bulgaria, Germany, Greece, Poland, Spain) was included in the data analysis. A standardized protocol was used and parents/caregivers filled in socio-demographic data and a semi-quantitative food-frequency questionnaire. To assess intervention effects, multilevel repeated measures analyses were conducted for the total sample and for the six country-specific samples. To assess differences in water intake and beverage consumption by implementation score in the total sample, multilevel repeated measures analyses were performed.

**Results:** Limited intervention effects on water intake and beverage consumption were found. However, important results were found regarding prepacked fruit juice consumption, with a larger decrease in prepacked fruit juice consumption from baseline to follow-up in the intervention group compared to the control group. Also a steeper increase in plain water consumption was found in some country-specific samples of the intervention group compared to the control group. However, this was compensated by a decline in plain milk consumption. Implementation scores were rather low in both kindergartens and parents. Nevertheless, better effects were found in preschoolers whose parents had higher implementation scores compared to low implementation scores.

**Conclusion:** The water component of the ToyBox-intervention can be used to target beverage choices in preschoolers. However, future interventions should create new strategies to improve implementation of interventions.
**S04**

**Physical activity and nutrition in the first 1000 days of life**

**Convenor:**
Lisa Micklefield, University of the Witwatersrand, Johannesburg, South Africa

**Discussant:**
Lisa Micklefield, University of the Witwatersrand, Johannesburg, South Africa

**Description:**

**Purpose:** This symposium aims to address the impact of physical activity and nutrition in the first 1000 days of life, as well as to highlight recent findings and potential research gaps.

**Rationale:** The link between the first few years of life and later health outcomes has been well established. However, there remains very little information on physical activity in these early years. Furthermore, the effect of maternal physical activity during pregnancy, on later infant development needs to be considered. Research has been done regarding the impact of nutrition on health outcomes in the early years and during pregnancy, yet the link between nutrition and physical activity in the first 1000 days should be investigated. This symposium aims to discuss what is already known, as well as to highlight what remain to be elucidated regarding physical activity and nutrition in the first 1000 days, with a focus on taking a holistic approach that considers all of the above aspects in future studies and interventions.

**Objectives:** This session aims to: inform the audience about the effect and levels of physical activity during pregnancy and infancy, inform the audience about the effect of nutrition during pregnancy and infancy, explore the link between physical activity and nutrition during pregnancy and infancy, and to highlight the gaps in the literature regarding physical activity and nutrition during the first few days of life.

**Summary:** This session will examine existing literature on physical activity as well as nutrition in the first 1000 days of life. Furthermore, this session will present novel data on physical activity during pregnancy and postpartum, physical activity during infancy, as well as nutrition during pregnancy and infancy; and examine the effects that all of these factors may have on growth and development in the early years.

**Format:** Speaker 1 – Associate Professor Mirielle Van Poppel (VU University Medical Centre, Amsterdam), Speaker 2 – Dr Alessandra Prioreschi (DPHRU, South Africa), Speaker 3 – Professor Shane Norris (DPHRU, South Africa), Speaker 4 - Ms Stephanie Wrottesley (DPHRU, South Africa)
**S04.1**

**Physical activity and dietary intervention in pregnancy: Results of DALI put in a wider context - Mirielle Van Poppel**

Mirielle Van Poppel\textsuperscript{1,2}, Anneloes Ruifrok\textsuperscript{2}, Willem van Mechelen\textsuperscript{2}

\textsuperscript{1}Institute of Sport Science, University of Graz, Graz, Austria, Graz, Austria, \textsuperscript{2}Department of Public and Occupational Health, EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, the Netherlands, Amsterdam, The Netherlands

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Objective** Physical activity (PA) in pregnancy has been shown to be associated with birth weight, but results of previous studies were inconsistent. Some reported a higher birth weight whereas others a reduction in birth weight of babies of more active women. No previous results were available for associations of sedentary behaviour with birth weight. Maternal weight might also be influenced by PA and sedentary behaviour. We aimed to evaluate the relationship of objectively measured PA and sedentary behaviour with maternal weight gain (GWG) and birth weight.

**Methods** Data from two prospective studies were combined, resulting in a cohort of 111 pregnant women who were followed from around 15 weeks till 32 weeks of pregnancy. PA and sedentary behaviour were measured with an accelerometer around 15 weeks gestation and in the third trimester. Regression analyses were performed determining the association between time spent in moderate-to-vigorous PA (MVPA) and in sedentary activities with GWG and birth weight. Main outcome measures were GWG between 15 and 32 weeks of gestation, average GWG per week, and birth weight.

**Results** Early in pregnancy, 32% of women spent ≥ 30 minutes/day in MVPA versus 12% in late pregnancy. Women spend 65% of their time sedentary throughout pregnancy. No significant associations were found between time spent in MVPA or sedentary behaviour with GWG or birth weight.

**Conclusions** We found no relation between MVPA and sedentary behaviour with GWG or birth weight. The small percentage of women meeting the recommended levels of PA indicates the need to inform and support pregnant women to maintain regular PA, as there seems to be no adverse effect on birth weight and maintaining PA increases overall health.
A scoping review examining physical activity measurement and levels in the first two years of life - Alessandra Prioreschi

Alessandra Prioreschi, Lisa Miclesfield
MRC/Wits Developmental Pathways for Health Research Unit, Faculty of Health Sciences, University of the Witwatersrand, South Africa, Johannesburg, South Africa

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: The first five years of life have been identified as a critical stage in the development of activity behaviours, which have been shown to track into later life. This scoping review aims to assess the literature reporting on physical activity levels in the first two years of life in order to answer two main questions: 1) How is physical activity measured in this age group?; 2) how active are infants and toddlers in the first two years of life?

Methods: A search strategy was employed using PubMed with restrictions only on age and language. After applying exclusion criteria, 20 papers were included in the results.

Results: Seventeen studies used some form of objective assessment of physical activity (accelerometers, actometers, direct observation, doubly labeled water, or a metabolic chamber); while the remaining three relied on subjective assessments (parent reported questionnaires or interviews, and activity diaries). Nine studies exclusively assessed infants (<12 months), and five exclusively assessed toddlers (>12 months). Only six studies reported physical activity levels and patterns specifically; most included studies measured activity as a covariate or correlate. Therefore much of the reported data was difficult to assess, as results were vague or incompletely described. Where data was reported sufficiently for analysis, results were equally conflicted regarding whether toddlers were meeting recommended physical activity guidelines.

Conclusions: This scoping review re-iterates the fact that more studies need to be conducted which focus primarily on measuring and reporting physical activity levels and patterns in this age group in a comprehensive and standardised way, so that more informed guidelines can be devised and interventions can be designed and implemented where necessary.
The importance of infant nutrition for later adult health in low- or middle-income countries: role of maternal behavioural nutrition interventions - Shane Norris

Shane Norris

MRC/Wits Developmental Pathways for Health Research Unit, Faculty of Health Science, University of the Witwatersrand, Johannesburg, Johannesburg, South Africa

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: To review data and discuss the importance of infant nutrition in relation to later adult outcomes, and the role of maternal behavioural nutrition interventions to optimise infant growth.

Method: Review of the literature and pooled data from COHORTS (Consortium for Health Orientated Research in Transitioning Societies)-a collaboration of five birth cohorts from LMICs (Brazil, Guatemala, India, the Philippines, and South Africa), in which mothers were recruited before or during pregnancy, and the children followed up to adulthood. We examined associations between maternal and delivery factors and infant nutrition and adult height, body composition (body-mass index, waist circumference, fat, and lean mass), and cardiometabolic risk factors (blood pressure and fasting plasma glucose concentration).

Results: Children of young mothers in LMICs are disadvantaged at birth and in childhood nutrition. Efforts to prevent early childbearing should be strengthened. After adjustment for confounders, children of older mothers have advantages in nutritional status. Extremes of maternal age could be associated with disturbed offspring glucose metabolism. Delaying complementary foods until 6 months, as recommended by the World Health Organization, may reduce the risk of adult overweight/adiposity.

Conclusions: The importance of maternal factors and its relation to infant nutrition is paramount to reduce metabolic disease risk in later life. Addressing these maternal nutrition through pre-pregnancy and pregnancy interventions may successfully improve infant nutrition and growth.
**S04.4**

**Review of the importance of nutrition during the first 1000 days: maternal nutritional status and its associations with fetal growth and birth, neonatal and infant outcomes among African women - Stephanie Wrottesley**

Stephanie Wrottesley, Cynthia Lamper, Pedro Pisa

MRC/Wits Developmental Pathways for Health Research Unit, Faculty of Health Sciences, University of the Witwatersrand, South Africa, Johannesburg, South Africa

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Objective:** Maternal nutritional status (MNS) is a strong predictor of growth and development in the first 1000 days of life and may influence susceptibility to non-communicable diseases in adulthood. However, the role of nutrition during this window of developmental plasticity in Africa is unclear. This paper reviews published data to address whether maternal nutrition during the first 1000 days is important for Africa, with a focus on MNS and its associations with fetal growth and birth, neonatal and infant outcomes.

**Methods:** A systematic approach was used to search the following databases: Medline, EMBASE, Web of Science, Google Scholar, Science Direct, SciSearch and Cochrane Library. Various search terms and combinations were used to select all available studies of any design that described MNS in Africa and/or how it associates with outcomes of interest.

**Results:** Twenty-six studies met the inclusion criteria for the specific objectives. MNS in Africa showed features typical of the epidemiological transition: higher prevalences of maternal overweight and obesity and lower underweight, poor diet quality and high anaemia prevalence. Maternal body mass index (BMI) and greater gestational weight gain (GWG) were positively associated with birth weight; however maternal overweight and obesity were associated with increased risk of macrosomia and intrauterine growth restriction. Maternal anaemia was associated with lower birth weight. Macro- and micronutrient supplementation during pregnancy were associated with improvements in GWG, birth weight and mortality risk.

**Conclusions:** Data suggests poor MNS in Africa and confirms the importance of the first 1000 days as a critical period for nutritional intervention to improve growth, birth outcomes and potentially future health risk. However, there is a lack of data beyond birth and a need for longitudinal data through to two years of age.
**S05**

**Adolescent physical activity promotion: challenges, lessons learnt and future directions**

**Convenor:**
Kirsten Corder, University of Cambridge, Cambridge, UK

**Discussant:**
Kirsten Corder, University of Cambridge, Cambridge, UK

**Description:**

**Purpose:**
To explore interventions to increase adolescent physical activity with speakers reporting on their experiences from recently conducted studies.

**Rationale:**
Physical activity declines during adolescence; developing strategies to prevent this is an important public health priority. Systematic reviews show the narrow range and limited effectiveness of adolescent physical activity promotion strategies, and highlight the urgent need for successful interventions.

This symposium on adolescent physical activity promotion includes a breadth of presentations allowing discussion of key issues among intervention researchers including the targeting, content, context and delivery of interventions. More specifically, presenters will discuss interventions targeting specific population subgroups, in addition to those aimed at whole populations. We will cover different contexts including within school versus beyond-school activity, and curricular (e.g., physical education) versus non-curricular approaches and explore intervention content (e.g. sports promotion versus lifelong and lifestyle physical activities). A range of intervention delivery modes will also be examined; adolescents themselves, smartphones and teachers and various theoretical frameworks including socio-ecological, social cognitive and integrated approaches. The importance of participant involvement throughout the intervention development and evaluation process will be addressed. This symposium will provide a unique opportunity to discuss key issues facing researchers and practitioners aiming to increase adolescent physical activity.

Given the personal accounts offered by our speakers, this symposium will be of interest to a range of attendees of the ISBNPA meeting; those conducting intervention research, and those working in policy and practice. The discussant will consolidate material from the presentations, and discuss theoretical and methodological considerations for future studies including targeting, content, context and delivery of interventions aiming to promote physical activity among adolescents.

**Objectives:**
This symposium will aim to:
- Provide insight into the experiences of specialists in adolescent physical activity promotion by reflecting on challenges, lessons learnt and recommendations for future research
- Inspire and inform attendees needing to make decisions on the targeting, content, context and delivery of adolescent physical activity promotion strategies, further increasing our efforts to increase adolescent physical activity
- Evoke discussion and open dialogue between those conducting similar research and encouraging future collaboration

**Summary:**
The symposium will feature three presentations of 12 minutes each, with an additional five minutes allocated for clarifying questions:
- Dr Sarahjane Belton
- Dr Helen Elizabeth Brown
- Professor David Lubans

The discussant, Dr Kirsten Corder, will then comment on the presented interventions in light of development strategies, evaluation and comparative efficacy issues, and lead audience discussion.

**S05.1**

*Understanding our situation, and using what we have: The case of the Y-PATH intervention.*

Sarahjane Belton, Bronagh McGrane, Wesley O’Brien, Catherine Woods, Sarah Meegan, Danielle Powell, Johann Issartel

*Dublin City University, Dublin, Ireland*

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

Purpose: The need for intervention in youth to improve physical activity (PA) levels is very well established, what is less clear however is how to structure such intervention to really meet the needs of the cohort in question. The purpose of this presentation is to highlight how the Y-PATH (Youth-Physical Activity Towards Health) research informed how an evidence based intervention was developed in response to this question.

Methods: Students from four Irish schools (N=256, 12-14 years) were involved in the initial exploratory phase of research, to inform Y-PATH intervention development. Subsequently, an effectiveness trial was carried out (n=174, 12-14 years) to determine effect of the intervention, and to identify aspects for refinement. Finally a one-year cluster randomised controlled trial (RCT) involving 20 schools (n = 524, 12-14 years) was carried out to formally evaluate the intervention. Data collected include PA level (accelerometer and self-report), psychological correlates of PA, BMI, and fundamental movement skill (FMS) ability.

Results: The exploratory phase showed the need for targeting low levels of PA in youth (12% meeting minimum 60 minute guideline), through addressing poor Health Related Activity knowledge and low FMS proficiency. Schools were acknowledged as the most logical environment to access the majority of adolescents, with the PE teacher identified as a trained health professional, available in most schools, that could play a central role. From the literature the need for the intervention to be multi-component, reaching beyond the PE class was also recognized. Results of the RCT showed a significant interaction effect between the Y-PATH intervention and time (p=0.025), with children in the Y-PATH schools recording an increase (10%) in minutes of accelerometer measured moderate-to-vigorous PA (MVPA) over the one year period, while children in the control school recorded a decrease over the same period.

Conclusion: In order to develop effective interventions researchers need to first understand the context and environment in which they are hoping to intervene, and the cohort they hope to target. Y-PATH is one example of how such a strategy can be effective, though future research must look to establishing the benefits of the intervention more longitudinally.
Pilot cluster randomised trial of the GoActive Intervention aiming to promote physical activity among adolescents: outcomes and lessons learnt

Helen Brown, Annie Schiff, Esther van Sluijs, Kirsten Corder
Centre for Diet and Activity Research at the MRC Epidemiology Unit, Cambridge, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose:
To assess the feasibility of implementing the GoActive intervention to whole school year groups, to test recruitment and measurement procedures, to determine preliminary effectiveness to increase moderate-to-vigorous physical activity (MVPA) and to inform power calculations to establish programme effectiveness.

Methods:
Pilot cluster randomised controlled trial with 2 intervention and 1 control school(s); participants were 460 adolescents (46.6% female; 13.2(0.4) years-old). The 8-week intervention supported by Self-determination Theory and Social Cognitive Theory involved: Tutor groups choosing 2 weekly activities with participation encouraged by mentors (older adolescents) and in-class peer-leaders. Students gain points for trying activities; points are entered into an intra-mural competition. Outcomes were assessed at baseline and follow-up (week 8) and included: (primary outcome) ActiGraph-assessed MVPA; adolescent-reported activity type, peer-support, shyness, sociability. Quantitative (questionnaire) and qualitative (focus groups) process evaluation addressed enjoyment, confidence, participation and suggested improvements. ANCOVA was used to assess preliminary effectiveness as change adjusted for baseline.

Results:
All Year 9 students in both intervention schools were exposed to the GoActive intervention; 77% of invited students were measured. Results indicate potential effectiveness (adjusted mean difference MVPA (mins (SE) p-value)) 5.1 (2.1) p=0.014) and suggest the need to recruit 16 schools (2400 adolescents) for a full trial. Compared to control, intervention students reported greater peer support 0.5 (0.2) p=0.03, but no difference in shyness or sociability; participation in activity types approached significance (intervention group 2.3 (1.3) p=0.07 more activity types). 71% boys and 74% girls found GoActive ‘fun’; 38% boys and 32% girls said it increased confidence and 64% boys and 59% girls said they would continue with an activity they tried during GoActive. Focus groups revealed occasional sex-imbalance in activity choices, and with that differential motivation to participate. Suggested programme changes included increased emphasis on mentorship, more initial training (mentors and teachers) and improved points recording systems.

Conclusions:
Results provide an indication of the potential effectiveness of GoActive to increase MVPA in large groups of adolescents and support the need to formally establish effectiveness and cost-effectiveness. Process evaluation data was used to refine GoActive prior to a full trial, currently underway.

Trial Registration: ISRCTN registry ISRCTN31583496.
**S05.3**

**Sustained Impact of a School-Based Obesity Prevention Intervention Incorporating Smartphone Technology: The ATLAS Cluster Randomized Controlled Trial**

David Lubans1, Jordan Smith1, Kerry Dally1, Ronald Plotnikoff1, Anthony Okely2, Jo Salmon3, Philip Morgan1

1University of Newcastle, New South Wales, Australia, 2University of Wollongong, New South Wales, Australia, 3Deakin University, Victoria, Australia

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

Purpose: Innovative interventions are required to address the prevalence of obesity and physical inactivity among youth in low-income communities. We aimed to evaluate the sustained impact of a school-based obesity prevention program incorporating smartphone technology among adolescent boys.

Methods: A cluster randomized controlled trial involving 14 secondary schools from low-income communities in New South Wales, Australia. Participants were 361 adolescent boys (12-14 years-old) ‘at-risk’ of obesity. The 20-week intervention was guided by Self-Determination Theory and Social Cognitive Theory and involved: teacher professional development, provision of school fitness equipment, face-to-face physical activity sessions, lunch-time student mentoring, researcher-led seminars, smartphone app and website, and parental strategies for reducing screen-time. Primary outcomes were body mass index (BMI) and waist circumference. Secondary outcomes were BMI z-score, physical activity (accelerometers), screen-time, sugar sweetened beverage (SSB) intake, muscular fitness, resistance training skill competency, autonomous and controlled motivation for school sport. Baseline data were collected November/December 2012 and follow-up data 18-months later. Data analyzed July 2015. Pre-specified subgroup analyses were conducted for boys overweight or obese at baseline. Process evaluations were conducted to determine students’ and teachers’ satisfaction with the program.

Results: After 18-months, there were no intervention effects for the primary outcomes BMI and waist circumference in the full sample. Intervention effects for physical activity, muscular fitness and SSB were not statistically significant. There were significant group-by-time interactions for screen-time, resistance training skill competency, autonomous and controlled motivation for school sport in the full sample. Student (mean: 4.5, scale of 1 = strongly disagree to 5 = strongly agree) and teacher (mean: 4.4) satisfaction with the ATLAS intervention was high.

Conclusion: After 18-months, there were no clinically meaningful intervention effects for body composition, physical activity or fitness in the full sample. There were significant intervention effects for screen-time, resistance training skill competency and motivation for school sport. ATLAS was rated highly by students and teachers; further development is needed to increase efficacy and potential scalability. Targeted programs such as ATLAS may assist in preventing physical activity decline among adolescents if delivered within a broader socio-ecological framework.

Trial Registration: Australian New Zealand Clinical Trials Registry No: ACTRN12612000978864.
New Frontiers in Assessing Built Environment Impacts on Physical Activity and Health

Convenor:
Lawrence Frank, University of British Columbia, Vancouver British Columbia, Canada

Discussant:
James Sallis, University of California at San Diego, San Diego California, USA

Description:
This symposium convenes a range of new research topics to investigate and monetize the health impacts of land use and transportation investment actions. Physical activity and obesity relationships with land use and transportation investments has been heavily researched in recent years. Most of the research has been cross-sectional and focuses on home or residential environments and does not delve into ways in which work settings also shape travel and activity patterns. Paper I will present a novel new study linking objectively measured physical activity with a detailed set of work site features while controlling for home environment features and demographic factors. Very few studies currently exist that are longitudinal documenting changes in behavior and health related outcomes before and after a change is made to the environment. Paper II presents a new study based in the Vancouver Region that assessed the causal effect of the new Comox Corridor Urban Greenway corridor on physical activity and sense of community. While evidence is improving our understanding of ways in which home and work settings and other features of the environment impact health, there is a need to understand the nature and extent to which the market supports and wants different types of home and community environments. Paper III presents the first study to connect evidence on underlying preferences for community environment and how well preferences align with current home environment features and health outcomes. The symposium concludes with an in depth discussion around the state of the practice in monetizing the health benefits of a walkable urban form. Paper IV presents a state of the practice review of evidence and new methods applied in the field in the Los Angeles Region to capture the health care cost savings of investments in transit and non-motorized infrastructure. This work includes the adaptation of a cost benefit model used to make transportation prioritization decisions to account for the health care cost savings, land value increases, and job creation that stems from investments in active transportation infrastructure that is being applied in the Los Angeles Region.


**S06.1**

**Linking Place of Employment and Healthy Living: The Impact of the Built Environment near Worksites on Physical Activity, Body Mass Index & Sedentary Driving Time**

Eric Fox¹, Lawrence Frank², James Sallis³, Brian Saelens¹, James Chapman⁴, Kelli Cain⁴, Terry Conway⁴

¹Urban Design 4 Health, Inc, Seattle Washington, USA, ²University of British Columbia, Vancouver British Columbia, Canada, ³UC San Diego, San Diego Ca, USA, ⁴University of Washington, Seattle, WA, USA

**SIG: Policies and environments**

**Awards:**

Objectives: Many studies have explored the relationships between health and the built environment for neighborhoods around residences. Few have analyzed urban form near workplaces and analyzed built environment measures around participants’ worksite locations and examine them in relation to participants’ activity levels, weight, and sedentary time spent in vehicles.

**Method**

The study examined adult participants (n = 2,199) ages 18 to 66 in two large U.S. metropolitan regions from the Neighborhood Quality of Life Study. Participants were recruited using a walkability by income matrix. Outcomes were objectively measured MVPA using accelerometers and self-reported BMI and sedentary time. Utilizing a geographic information system (GIS), objectively measured built environment values were calculated around participants’ worksites using three buffers - 500 m, 1 km and 15 minutes on transit or by foot. Hierarchical multivariate linear regression and binary logistical regression models were developed to test the isolated explanatory power of worksite built environment to predict health outcomes while controlling for demographics and home built environment characteristics.

**Results**

The walkability index within a 15 minute transit travel time around workplaces was found to be positively associated (p < 0.05; OR = 1.148) with MVPA whereby a 7 unit increase in walkability doubled the likelihood of achieving the recommended daily ≥30 minutes of MVPA while controlling for home walkability (NR² = 0.263). Home-work trip distance (p < 0.001; OR 1.000) and transit travel time to regional activity centers from work (p < 0.05; OR 1.000) were statistically significant with the likelihood of ≥ 30 minutes of sedentary time in vehicles per day attributing to a 3.9% increase in predicted outcomes above home walkability (NR² = 0.156). Retail floor area ratio (FAR) around the workplace was a significant predictor (p < 0.05; OR = 0.405) of sedentary vehicle time.

**Conclusions**

Worksite built environment measures and travel patterns, including the walkability index, home-work distance and transit time to regional activity centers, are important predictors of MVPA and sedentary time. Participant catchment areas based on 15 minutes on transit or by foot were found to be valid for measuring the impact of built environment exposure at places of employment on health outcomes.

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**S06.2**

**A pre-post assessment of physical activity benefits of the downtown Vancouver Comox-Helmcken Greenway Corridor**

Lawrence Frank¹, Victor Ngo¹, Douglas Scott², Dale Bracewell²

¹University of British Columbia, Vancouver British Columbia, Canada, ²City of Vancouver, Vancouver British Columbia, Canada

**SIG: Policies and environments**

**Awards:**

**Objectives:**

Researchers have documented positive associations between built environment and travel patterns, including health-related outcomes such as physical activity (PA). There is limited evidence to date of a causal impact of land use and transportation investments on PA. Most studies remain cross-sectional. This study is amongst the first pre-post assessment of an urban greenway in Canada, and is among the world’s first studies within an emerging PA research agenda. The study examines the Comox-Helmcken Greenway in downtown Vancouver’s West End, a highly diverse community home to people of all ages, incomes, ethnicities, and sexual orientations.

The study investigated the physical activity impact of constructing a greenway, a dedicated pedestrian and cyclist route, on travel patterns and PA among residents in a highly walkable, mixed-use urban neighbourhood.

**Methods:** In 2012, residents living within a kilometer of the forthcoming Greenway were recruited and completed a survey capturing physical activity, sense of community, perceived built environment, and a two-day trip diary. In 2013, participants were re-recruited and repeated the data collection.

**Results:**

N=524 - Average total bicycle trips increased (p=0.075). Average total auto trips per person had a statistically significant decrease (p=0.048). Average total daily distance decreased (p=0.062). Average total daily travel time decreased (p=0.021). Self reported physical activity had a statistically significant increase (p=0.075). Time spent sitting within the past week had a statistically significant decrease (p=0.016). Days of poor physical and mental health had a statistically significant decrease (p=0.03).

**Conclusions:** The greenway intervention demonstrated beneficial sustainable mode share and PA changes for residents, even within a dense environment that ranks highly on standard measures of neighbourhood walkability [4] and bikeability [5]. Conducted in partnership with the City of Vancouver, the evidence will directly inform future transportation improvement projects in Vancouver, and help promote PA among local residents. Future analyses of the collected data will employ more sophisticated statistical models, including regression models, to explore the complex relationships between the built environment and PA.
The unmet demand for walkability: disparities between preferences and actual choices for residential environments in Toronto and Vancouver

Suzanne Kershaw¹, Lawrence Frank¹, Monica Campbell²

¹University of British Columbia, Vancouver British Columbia, Canada, ²Toronto Public Health, Toronto Ontario, Canada

SIG: Policies and environments

Awards:

Objectives: The aims of this study were to gauge support for walkable neighbourhoods by reporting on neighbourhood design characteristics that people are willing to “trade-off” to live in a more walkable place. It also investigates demand for more walkable neighbourhoods among those who live in areas with low walkability. Finally, it reports on how travel behaviour and weight status are related to objectively measured walkability after adjusting for socio-demographic characteristics and stated neighbourhood preferences.

Methods: A web-based stated preference survey was conducted with 1,525 adults in the Greater Toronto Area and 1,223 adults in Metro Vancouver. Participants indicated their neighbourhood preference in seven different illustrated trade-off scenarios contrasting walkable vs. auto-oriented neighbourhood design features. The survey also captured information about walking behaviour, public transit and vehicle use, and height/weight.

Results: Depending on the neighbourhood design attribute, between 45-64% of residents in the Cities of Toronto and Vancouver strongly prefer living in walkable settings, even if it means giving up desirable aspects of auto-oriented places such as larger lots and quieter streets to do so, compared to just 6-15% who strongly prefer auto-oriented places. Unmet demand for environments where shops and services are within a ten minute walk was observed for 20% of individuals in Greater Toronto suburban areas and 24% in Metro Vancouver suburban areas who perceive their neighbourhood as very unwalkable. After adjusting for stated neighbourhood preference and socio-demographic characteristics, residents of highly walkable neighbourhoods in both regions were over 2.5 times more likely to walk for transportation, and nearly twice as likely to make a public transit trip than those living in low walkable areas. Metro Vancouver residents living in highly walkable areas were 38% less likely to be overweight or obese (BMI ≥25) than their counterparts in low walkable areas (OR: 0.62, 95% CI: 0.40-0.92) after adjusting for neighbourhood preference and socio-demographics.

Conclusions: Strong preferences for walking and transit-supportive neighbourhoods exist in two of Canada’s largest metropolitan regions, with considerable unmet demand observed for such environments. Providing increased opportunities for active transportation can have positive impacts on health-enhancing behaviours and contribute to lower incidence of overweight/obesity.
Monetizing Public Health Benefits of Active Transportation

Nicole Elardo Iroz, Lawrence Frank, Rye Baerg

1 Urban Design 4 Health, Inc, Seattle, USA, 2 University of British Columbia, Vancouver, Canada, 3 Southern California Association of Governments, Los Angeles, USA

SIG: Socio-economic inequalities

Objectives

This study reports on the first real world effort to monetize health benefits of active transportation investments within an established cost benefit framework whose results will be directly applied to transportation funding decisions in the Los Angeles region.

Methods

The academic literature was systematically reviewed for active transportation and monetization. This was augmented by searching the gray literature for any state or regional reports on the economic benefits of walking, biking, and trails. The cost-of-illness literature was also searched for diseases commonly prevented by physical activity related to active transportation (physical inactivity, body-weight, diabetes, cardiovascular and stroke, and cancer) and air quality from secondary effects of reduced VMT (respiratory and cardiovascular).

The study applied projections about active transportation in the Los Angeles region to estimate changes in disease prevalence and costs from contrasting transportation investment packages while controlling for projected changes in demographics and built environment features. Specifically, the public health modeling uses the new California Public Health Assessment Model (C-PHAM) - a new scenario-planning model being used in regional transportation planning in California. Finally, the monetized public health benefits are compared to other benefits (consumer, economic development, events and tourism, and real estate) and costs and integrated into a regional economic input-output model (REMI).

Results

Monetizing public health benefits of active transportation requires understanding several linkages. First, researchers must model how transportation and land use affect public health outcomes via healthy behavior and exposure. Second, the change in health outcomes have to be translated into expected changes in health care expenditures. Researchers and practitioners are modeling public health morbidity benefits from epidemiological relative risks and then pivot into monetization by applying cost-of-illness information sourced elsewhere.

Conclusions

Challenges remain with characterizing active transportation infrastructure; modeling public health morbidity; applying cost-of-illness information to public health morbidity; and reallocate reduced healthcare expenditures to other sectors in an input-output model. However, monetized public health benefits are possible and facilitate comparing public health benefits to other costs and benefits. Doing so supports elevated consideration of active transportation in regional decision-making and in local project-level planning activities.
Development and relevance of multidisciplinary frameworks of determinants of dietary behaviour, physical activity and sedentary behaviour across the life course and in vulnerable groups – A DEDIPAC Knowledge Hub output.

Convenor:
Nanna Lien, Department of Nutrition, University of Oslo, Oslo, Norway

Discussant:
Stef Kremers, University of Maastricht, The Netherlands

Description:

Purpose:
To present three dynamic and evolving frameworks for determinants of dietary, physical activity and sedentary behaviours across the life course developed within the Determinants of Diet and Physical Activity (DEDIPAC) Knowledge Hub of the European Joint Programming Initiative ‘A Healthy Diet for a Healthy Life’ (JPI HDHL), and to discuss their relevance in social inequalities and the possibility to integrate across behaviours.

Rationale:
There is a growing interest and need for a multidisciplinary approach to investigate determinants of dietary behaviours and physical activity throughout the life course in order to prevent non-communicable diseases and social inequalities in health. Therefore, as part of the JPI HDHL the DEDIPAC Knowledge Hub, Thematic Area 2 (TA2) has developed multidisciplinary frameworks of determinants for each of three behaviours and for social inequalities in these behaviours. The frameworks were systematically developed within DEDIPAC, before obtaining feedback from external experts and working this into the frameworks. The usefulness of the frameworks depends on their ability to further develop research on understanding and changing these three behaviours in order to address major public health problems – such as non-communicable diseases and social inequalities in health - across the life course.

Objectives:
(1) To present three frameworks of determinants of dietary behaviour, physical activity and sedentary behaviour
(2) To present opportunities and challenges of integrating the frameworks across the life course and among ethnic minorities within each behavior
(3) To discuss opportunities and challenges of integration across behaviours and the relevance to social inequalities.

Summary:
The symposium will open with an introduction on the rationale and purpose of developing the frameworks and their potential for further use. The introduction will be followed by three presentations of the behavioral frameworks with the forth work package on “Social inequalities in determinants of dietary, physical activity and sedentary behaviours” integrated in each of the following work packages:
WP21: Determinants of dietary behaviours across the life course
WP22: Determinants of physical activity behaviour across the life course
WP23: Determinants of sedentary behaviour across the life course

Format:
After a general introduction, each framework will be presented and discussed in light of integration across the life course and ethnic minorities. Afterwards there will be a discussion about opportunities and challenges of integration across behaviours and the relevance to social inequalities for addressing major public health challenges.
0-5 min: Introduction (Professor Nanna Lien, Norway)
5-20 min: Determinants of nutrition and eating across the life course (Post Doc Marijn Stok, Germany)
20-45 min: Use of concept mapping to develop a European framework of physical activity behaviours across the life course: results from the DEDIPAC Knowledge Hub (post doc Giancarlo Condello, Italy)
45-60 min: International consensus system-based framework and research priorities for the study of determinants
of sedentary behaviour across the life course: a DEDIPAC study (Professor Greet Cardon, Belgium)

60-75 min: Wrap up and discussion (Senior Research Fellow Melody Ding, Australia)

S07.1

Determinants of nutrition and eating across the life course

Marijn Stok¹, Britta Renner¹, on behalf of all DEDIPAC Task 2.1.1 leaders²
¹University of Konstanz, Konstanz, Germany, ²DEDIPAC, Knowledge Hub, The Netherlands

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: The question of what impacts human nutrition and eating is key in many branches of science. Although great progress has been made within each discipline in conceptualizing models and measures for nutrition- and eating-related determinants, development of integrated frameworks across disciplines enabling a “common language” is comparably sparse. In addition, integrated frameworks can only capture a snapshot of the current state-of-the-art and thus, are often quickly outdated or too generic to guide empirical research. Therefore, we suggest an approach for creating, evaluating and updating an interdisciplinary framework “2.0” of determinants of nutrition and eating (DONE). The framework aims to cover determinants that are relevant to a wide range of target groups, including ethnic minorities and low income groups. Data visualization allows for an interactive and dynamic representation of the DONE framework and the areas of research priority identified by partners and external experts.

Methods: The framework was developed in three phases: (1) mind mapping of outcomes; (2) systematic nomination of determinants per age group; (3) integration and categorization of determinants in one life course framework. The framework was subsequently evaluated in three phases: (1) internal rating of the determinants on the dimensions modifiability, relationship strength and population-level effect; (2) rating of determinants by external experts; (3) evaluation by external experts of the usefulness, completeness and applicability of the DONE framework. A similar procedure was concurrently followed by a working group focusing on ethnic minorities.

Results: Determinants from both groups are integrated in a final framework comprising 50 categories and over 400 determinants. Research priorities were identified based on partners’ and experts’ ratings. Expert evaluation of the framework was predominantly positive. The framework was visualized in an interactive and dynamic manner using the software Tableau.

Conclusion: The framework is meant to serve as a starting point for interdisciplinary discussion, understanding and research. The interactive and dynamic nature of the visualizations allows for continued updating of the framework according to new insights. The systematic and structured nature of the framework makes it a useful tool to assist in the development of multilevel (system-based) interventions.
Use of concept mapping to develop a European framework of physical activity behaviours across the life course: results from the DEDIPAC-KH project.

Giancarlo Condello1, Ciaran MacDonncha2, Greet Cardon3, Sylvia Hansen4, Angela Polito5, Holger Schulz6, Camille Perchoux7, Laura Capranica2

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Within the DEDIPAC-KH, a multidisciplinary team addressed the theoretical and practical challenges related to the determinants of physical activity (PA) behaviours in the life course. The aim of the present work was to describe the concept-mapping procedure to develop a European Framework of Determinants of PA Behaviours and identify priorities for future research.

Methods: Partners of the DEDIPAC-KH established a consensus on common nomenclature for PA before generating pictures/maps of organised systems including 183 factors associated with PA behaviour. These 180 factors were further condensed in 106 factors during a focus group meeting. Seventy-nine European experts clustered the 106 factors based on their similarity and rated them by mean of a 5-point likert scale. The factors were rated on modifiability at any point across the life course, and the expected impact of the factor on PA behaviour among the youth, adult, and older adult at the population-level. The DEDIPAC-KH partners analyzed the concept mapping clusters and estimated priority for research for each factor by pondering the grading scores of modifiability (50%) and the sum of population level effects (50%). Priority between clusters was established based on the mean values of their pondered grading. Results of the analysis were submitted to the participating EU experts to reach a final consensus on the concept mapping process.

Results: A 6-cluster arrangement has been identified as the agglomeration best representing the data. Five clusters have been labelled “Policy and provision”, “Intra-personal context and wellbeing”, “Cultural context and media”, “Family and socio-economic status”, and “Social support and modelling”, whereas one remained unlabelled due to the presence of 6 factors making it difficult to parse out their distinct relationship. A consensus was obtained for the labels of the clusters (range 83-100%) and for the priority for research of factors within each cluster (83-98%). Priority between clusters received 35% approval.

Conclusions: Findings suggest that the European Framework of Determinants of PA Behaviours may be useful in developing collaborative research in health enhancing PA to move forward at theoretical and applied levels.
International consensus system-based framework and research priorities for the study of determinants of sedentary behaviour across the life course: a DEDIPAC-study

Greet Cardon\textsuperscript{1}, Sebastien Chastin\textsuperscript{2}, Marieke De Craemer\textsuperscript{1}, Christoph Buck\textsuperscript{3}, Grainne O’Donoghue\textsuperscript{4}, Claire Bernaards\textsuperscript{7}, Jeroen Lakerveld\textsuperscript{5}, Jean-Michel Oppert\textsuperscript{6}

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: The purpose of this study was to develop a consensus system-based framework for the study of determinants of sedentary behaviour across the life course and to define priorities for research.

Methods: The consensus process followed a structured protocol based on concept mapping. The preparation and generation phase were conducted by the DEDIPAC Knowledge Hub (KH) team and consisted in establishing the protocol, defining a common terminology and a comprehensive list of factors to be ranked and sorted. The list was informed by three systematic literature reviews and expert opinion from the DEDIPAC KH, including the team working on social inequality and migrant populations. The sorting, ranking and utilization phase of the concept mapping process took place during a two day consensus meeting hosted at Glasgow Caledonian University (Scotland) as a satellite meeting of ISBNPA2015. Factors were sorted into clusters and ranked according to four criteria (modifiability, population effect size in youth, adults and older adults) using the ARIADNE software (Minds21). The results of sorting and ranking were analyzed using multidimensional scaling statistics to generate a concept map which was used to define systems and set priorities via a Delphi process.

Results: 80 experts from 12 different countries with background ranging from epidemiology and statistics to economics and anthropology took part in the consensus. The concept map captured 74% of the variance in opinion (Stress test). A 89% consensus emerged that determinants of sedentary behaviour could be defined by a framework mapping the interaction of six systems; 1) Institutional settings, 2) Psychology and behaviour, 3) Build and natural environment, 4) Physical health and well-being, 5) Social and cultural context and 6) Politics and economy. Priorities for research were set in this order at a 92% agreement.

Conclusion: The framework provides a novel system-based approach to gather and analyze epidemiological data, define policy and intervention. Future work should focus on providing empirical evidence to map the interactions between these systems and between factors contained in these systems and on operationalisation to specific groups; youth, older adults, minorities and specific settings.
**S08**

**Food environment associations with socioeconomic status, dietary behavior, and body weight: Classic and contemporary designs**

**Convenor:**

Maartje Poelman, Utrecht University, Utrecht, The Netherlands

**Discussant:**

Nanna Lien, Institute of Basic Medical Sciences, University of Oslo, Norway

**Description:**

**Purpose:** This symposium aims to illustrate the potential of classic and innovative designs to understand the role of the food environment in dietary behavior and body weight outcomes.

**Rationale:** The food environment is seen as an important driver of the obesity epidemic. Extant research, however, is often cross-sectional and/or only focused on the residential food environment. More research is needed to understand change over time in the food environment and its impact on diet and weight, as well as independent and joint associations between residential and non-residential food environment on these outcomes.

**Objectives:**

- To illustrate use of classic and contemporary designs and methodologies to study the food environment and their potential for future research;
- To provide a better understanding of: 1) food environment changes over time, 2) how healthy food initiatives (stricter nutrition standards) impact exposure to food environmental factors (e.g. food marketing), 3) associations between exposure to marketing and diet/body weight, and 4) associations between residential and/or non-residential fast food restaurant accessibility and food behaviors/body weight;
- To share results of cutting-edge research on the food environment and its association with socio-economic status, dietary behavior, and health outcomes.

**Summary:** This symposium will cover methods and findings on the food environment from studies with classic and contemporary designs. Dr. Maartje Poelman (NL) will present longitudinal data on changed fast food restaurant availability over the past decade in the Netherlands, using different geospatial approaches. Prof. Lisa Powell (USA) will present evidence on changes in children’s exposure to food and beverage advertising pre-post the adoption of stricter nutrition standards and the impact of exposure on diet and body weight. Dr. Martine Shareck (UK) will present the separate and joint associations of the home- and school food environments on adolescents’ fast food intake. In conclusion, Dr. Shannon Zenk (USA) will present results of a nationwide, longitudinal study on relationships between fast food restaurant accessibility and BMI. Prof. Terry Huang (USA) (discussant) will summarize the main issues, and facilitate a discussion on the outcomes and future directions for food environment research.

**Format:** Four presentations will be held (each of 15 minutes, including time for one or two questions afterwards). The presentations cover data on both changes in the food environment (Poelman and Powell) and food environment-diet/weight associations (Powell, Shareck and Zenk). After the four presentations, The discussant (Huang) will summarize the important outcomes which will be discussed with the audience.
Availability of fast food outlets in high and low socioeconomic areas of Amsterdam between 2002 and 2014

Maartje Poelman, Marco Helbich, Carlijn Kamphuis, Martin Dijst
Utrecht University, Utrecht, The Netherlands

SIG: Policies and environments

Awards:

Objective It is assumed that the prevalence of fast food outlets in the United States has increased over the past decades, and is more pronounced in areas with low than high socio economic status (SES). Evidence for this issue is lacking for the Netherlands. Moreover, longitudinal research on fast food availability is scarce. This study aimed to map the fast food-availability over a 12-year period for the city of Amsterdam, in the Netherlands.

Methods The geographic area of Amsterdam was divided into 500 m² cell sizes. The SES-level of each cell was based on the average housing value and on the income levels of its residents. The exact locations of fast food outlets were provided by Locatus, maintaining a retail database for 2002, 2008 and 2014. The number of fast food outlets within each cell (density), the distance to the nearest outlet from the geographic centre of each cell (proximity), and the mean distance to the three nearest different types of fast food outlets from the geographic centre of each cell (variety) were calculated. Descriptive statistics and multi-level longitudinal regression analysis were conducted.

Results Preliminary analysis indicated that, overall, the mean density of fast food outlets increased over the last 12 years from 5.6 (2002), to 5.8 (2008), to 6.2 (2014) outlets per cell. The average 12-year increase in density of fast food outlets was larger for low SES cells (M=1.28, SD=4.43) than for high SES-cells (M=0.53, SD=2.76). The outcomes for proximity and variety will be presented at the conference.

Conclusions This study provides the first preliminary evidence that fast food availability has increased over the past decades in the Netherlands. Strengths of this study were the use of a time series of individual fast food outlets and data describing SES on a detailed scale. A next step will be the investigation of the relative increase of fast food outlets compared to changes in availability of healthier food outlets (e.g. greengrocers). Also, associations between the fast food exposure and individual food intake will be determined. These insights will allow policy makers to target efforts that contribute to healthy diets.
S08.2

Tracking the Nutritional Content of Food and Beverage Product Advertising Seen by Children on Television and Assessing the Impact of Exposure on Consumption and Body Weight

Lisa Powell\(^1\), Sherry Emery\(^1\), Zeynep Isgor\(^2\), Tamkeen Khan\(^1\), Rebecca Schermbeck\(^1\), Roy Wada\(^1\)

\(^1\)University of Illinois at Chicago, Chicago, USA, \(^2\)American Medical Association, Chicago, USA

SIG: Policies and environments

Awards:

Purpose: This presentation examines changes in children’s exposure to food and beverage advertising pre-post the December 2013 adoption of stricter nutrition standards by the Children’s Food and Beverage Advertising Initiative in the US. Further, it provides evidence on the relationships between advertising exposure and fast-food consumption, soda consumption, and body weight outcomes among children.

Methods: National data on children’s exposure to food and beverage advertising and its nutritional content of saturated fat, trans fat, sugar and sodium are assessed for 2013 and 2014. To assess advertising impacts on consumption and body weight, data on young adolescents are drawn from the Early Childhood Longitudinal Study, 1998-99 Kindergarten Cohort and combined with designated market area (DMA) Nielsen media advertising ratings data by interview dates and zip code-level geographic identifiers. Fixed-effects and random-effects longitudinal regression models are estimated to account for unobserved individual-level and DMA-level unobserved heterogeneity.

Results: In 2013, children saw approximately 13 food, beverage, and restaurant advertisements on television per day. More than 8/10 ads were for products high in saturated fat, trans fat, sugar, or sodium. Analyses reveal limited improvements in nutritional content of food and beverage product advertisements seen by children following the introduction of stricter industry guidelines. Regression analyses show that exposure to soft drink, sugar-sweetened beverage, and regular soda advertisements are economically and statistically significantly related to higher frequency of soft drink consumption among youth even after controlling for unobserved heterogeneity, with respective elasticity estimates of approximately 0.2, 0.5 and 0.2. The association between fast-food advertising exposure and fast-food consumption disappears using fixed effects methods to control for unobserved heterogeneity. Examining body weight outcomes, we find that exposure to cereal, sweets and snack advertising is significantly associated with youth’s body mass index percentile in longitudinal models but exposure to fast-food and soft drink ads is not.

Conclusions: The study results suggest that continued monitoring of advertising targeted to youth is important and policy debates regarding the regulation of youth-directed marketing are warranted.
Are the home and school food environments separately and jointly associated with adolescents' fast-food intake? Findings from The ORiEL Study

Martine Shareck¹, Daniel Lewis¹, Neil Smith², Steven Cummins¹
¹London School of Hygiene and Tropical Medicine, London, UK, ²National Centre for Social Research, London, UK

SIG: Policies and environments

Purpose: The settings where young people live, study, and play may contribute to shaping their food behaviours. Research on the link between the availability of stores selling nutrient-poor, calorie-dense foods and young people's food behaviours has focused on either the home or school environment. However, these settings should be studied in tandem since youth experience them concomitantly. We examine the distinct and joint association between the availability of fast-food restaurants around home and school, and young people's fast-food intake.

Methods: Baseline data from the Olympic Regeneration in East London (ORiEL) study were analysed. 1,535 youth (11-12 years-old) from four disadvantaged boroughs of London, UK, self-reported the frequency with which they consumed fast-food. Intake frequencies were dichotomised into "2-3 days per week or more" versus "Less than one day per week". Food business addresses collected from local authority registers were used to derive absolute and relative measures of the availability of fast-food restaurants within 800 meters from home and school. Log-binomial regression models will assess the association between fast-food intake and home and school food environments considered separately, and then jointly in a combined measure of food store exposure. Fast-food consumed at home and away from home will be examined separately.

Results: In an initial complete case descriptive analysis, 28.2% and 23.9% of youth consumed fast-food at least 2-3 days per week at home and away from home respectively. The availability of fast-food restaurants in the home and school environments varied considerably, with up to 40 fast-food restaurants present in the home vicinity, 27 in the school area, and 56 in the combined area. Fast-food outlets accounted for up to 100%, 44%, and 46% of all food outlets in the home, school, and combined areas respectively.

Conclusions: Creating healthy environments requires a better understanding of how the availability of unhealthy food stores in the various settings where young people spend time influences their food behaviours. This study provides needed evidence on two important such settings: the home and school areas. Further longitudinal analyses will assess how the food environment-food behavior associations evolve as youth grow older and become more independent.
Geographic accessibility of fast food restaurants and 6-year change in BMI in a nationwide, metropolitan sample of over 2.6 million U.S. adults

Shannon Zenk1, Elisabeth Tarlov1, Lisa Powell1, Stephen Matthews2, Coady Wing4, Kelly Jones1, Hao Tong3
1University of Illinois at Chicago, Chicago, USA, 2Pennsylvania State University, University Park, USA, 3Hines VA Hospital, Hines, USA, 4Indiana University, Bloomington, USA

SIG: Policies and environments

Awards:

Purpose. Despite considerable research on the food environment and obesity, few studies are longitudinal or nationwide and policy-relevant questions remain regarding the role of fast food restaurant (FFR) accessibility. The Weight And Veteran Environments Study (WAVES) is a retrospective longitudinal study of adults nationwide followed over 7 years that will determine environmental attributes that help individuals maintain a healthier BMI. In this analysis, we examined cross-sectional and six-year longitudinal associations between chain FFR accessibility and BMI.

Methods. The sample is 2,480,319 male and 198,341 female U.S. military veterans aged 20-85 who received VA healthcare between 2009 and 2014 and lived in a metropolitan area. We linked annual data on number of chain FFR near individuals’ homes (within 1 mile and 3 miles) to electronic health record data on BMI. Gender-stratified OLS regression estimated cross-sectional associations, adjusting for individual- and neighborhood-level (e.g., food store accessibility, demographics) characteristics. Gender-stratified panel data models incorporating person and time fixed effects estimated the impact of changes in FFR accessibility (based on quartiles of distributions), controlling for individual- and neighborhood-level time-varying factors. Changes in FFR accessibility reflect both restaurant openings/closings as well as residential moves over time.

Results. The study cohort is 22.9%/36.6% black or Hispanic (male/female, respectively), and mean 59.6/45.6 years old. Mean BMI is 29.9/29.5 kg/m². One-third moved at some point over the six years. In preliminary analyses, individuals, on average, had 3.6 FFR within 1 mile. In cross-sectional multivariable analyses, for both 1 mile and 3 miles, there was a positive, gradient association between FFR and BMI in women. For example, compared with having no chain FFR within 1 mile, having a “high” number of chain FFR (>=6) was associated with a 0.39-unit higher BMI. In men, there was a small, negative association between having a high number of FFR within 1 mile and BMI (-0.07 BMI units). In panel data models, change in FFR accessibility was generally not associated with BMI change over time.

Conclusions. Preliminary findings suggest potentially different relationships by gender, but provide little evidence that policies aimed at reducing FFR accessibility would help individuals maintain healthier weights over time.
Health promoting responses to climate change: Dietary and Physical Activity Opportunities

Convenor:
Ralph Maddison, University of Auckland, Auckland, New Zealand

Discussant:
Hayley Christian, University of Western Australia, Western Australia, Australia

Description:
Purpose: To present a call for new research targeting health and climate change co-benefits, specifically targeting physical activity and diet.

Rationale: Climate change and non-communicable diseases (NCDs) share a mutual theme – excessive energy use. This suggests opportunities for mutual solutions, interventions that reduce both greenhouse emissions and simultaneously lower the risk of NCDs (e.g., getting people out of their car is beneficial for their carbon footprint, but also for their health). We know a good deal about these relationships; however significant gaps in the research evidence exist. Studies of ways to reduce greenhouse emissions have focused on high-level modulations of potential policy changes (e.g., carbon trading schemes), but there has been a dearth of studies focussed at the individual level. There is a clear need for individual behaviour change, including ‘simple’ steps such as leaving the car at home, and eating less meat. The impact on the individual level might be relatively small, but the combined impact on population level is substantial.

Objectives:
1) Outline a research framework for addressing health and climate change co-benefits;
2) Describe the scope of research on potential effective interventions that have health and climate change co-benefit,
3) To present findings from a study investigating perceptions of active transport, which is also associated with climate change benefit
4) Present a case study using modeled data from Canada on health and climate change co-benefit

Summary: This symposium aims to encourage physical activity and nutrition researchers to consider both health and environmental issues when conducting future research. The Chair Ralph Maddison, (University of Auckland, NZ) will set the scene. Oral 1: Professor Michelle Holdsworth (Sheffield University, UK) will outline a framework for investigating diet, physical activity, health, and greenhouse gas emissions. Oral 2: Professor John Spence (University of Alberta, Canada) will present a scoping review outlining existing research on potential effective diet and physical activity interventions that have co-benefit. Oral 3: Dr Ying Zhang (University of Sydney, Australia) will present findings from a study to determine community and individual perceptions of promoting active transportation, an effective measure to bring co-benefit in responding to climate change. Oral 4: Professor Amit Kumar (University of Alberta, Canada) will present modelled data to determine the impact of physical activity change on health and climate change. Discussant, Dr Hayley Christian (University of Western Australia) will facilitate discussion on this topic.
S09.1

Framework for developing interventions to address health and climate change co-benefits

Michelle Holdsworth¹, Angie Clonan¹, Ralph Maddison²

¹University of Sheffield, Sheffield, UK, ²University of Auckland, Auckland, New Zealand

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose- To map the interactions between dietary change, physical activity patterns and their impact on greenhouse gas emissions (GHGEs) and non-communicable diseases (NCDs), particularly in high income countries and urban settings in low and middle income countries. Potential opportunities for interventions with co-benefits to improve diet/physical activity and reduce both GHGEs and NCDs are explored.

Methods- An evidence based framework map was produced to explore the interactions between diet and physical activity with GHGEs and NCDs. We applied the Nuffield Intervention ladder to identify potential interventions that could improve both diet/physical activity patterns, as well as reduce GHGEs.

Results- Shifts in the structure of the diet towards a higher intake of ultra-processed energy-dense convenience foods (especially from fat and added sugars), animal protein, and an increase in the quantity of food eaten contribute to a diet that yields more GHGEs and increases the prevalence of obesity and NCDs in populations. A more sedentary lifestyle, with greater reliance on transport also contributes. The framework highlights that co-benefits would arise from population shifts towards a healthier diet and physical activity patterns, resulting in a reduction in both NCDs and GGHEs. The need for interventions at different levels, including those at the individual, household, community and macro/policy level are crucial. For example, individual behaviour change could include ‘simple’ steps such as leaving the car at home, and eating less red meat.

Conclusions- The findings from this framework have identified key modifiable factors to guide the development of interventions and/or policies at different levels (from the individual through to the macro/policy level), and with varying degrees of intrusion into people’s lives, from simply providing information through education to eliminating choice (e.g. removing red meat from public catering settings).
Interventions that have health and climate change co-benefits: A scoping review

John C Spence¹, Michelle Holdsworth², Samantha Marsh³, Ralph Maddison³,⁴

¹University of Alberta, Alberta, Canada, ²University of Sheffield, Sheffield, UK, ³University of Auckland, Auckland, New Zealand, ⁴Deakin University, Melbourne, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Findings from a scoping review will outline the scope of existing research on potential effective interventions that have co-benefit for reducing non-communicable diseases (NCDs) and mitigating climate change effects. Before developing and evaluating interventions that have likely co-benefit, a scoping review was conducted to determine the potential breadth of available research literature. The review provided a unique opportunity to assist in the development of new health-related knowledge, and set the agenda for future research opportunities.

Methods:

The central research question for the review was: What is known from the existing literature about the effectiveness of interventions to reduce individual carbon footprints but prevent NCDs? The following sub-questions guided our review:

- a) How change to a more 'localized diet' could impact on climate change (with GGEs as a proxy measure of climate change)?
- b) How promoting physical activity through active forms of transport can mitigate climate change (reducing GGEs)?

A comprehensive search strategy using MEDLINE (Ebisco), SportDiscus, Physical Education Index (1970-), Emerald Fulltext, CINAHL Plus, Global Health, Web of Science Core Collection, and Scopus was conducted. Unpublished (“grey”) literature was also searched. The article titles and abstracts were scanned by two research assistants (RA)s before full titles were retrieved. Inter-rater agreement for eligible articles identified at the title and abstract screening and full article screening stages were estimated using percent of overall agreement and Cohen Kappa Coefficients.

Results: A wide range of studies were identified, that focussed predominantly on individual physical activity levels rather than individual dietary change. For both climate change and health co-benefit, research studies promoting active transport and reducing motorised transport were the most frequent. For diet, research studies focussed on comparisons between traditional versus globalised diets. We will present a host of metrics from the scoping review outlining the types of studies conducted, outcome measures and associated metrics.

Conclusions: Findings from this scoping review highlight potential areas of interest for future research investigating health and climate change co-benefits. Future research possibilities will be outlined.
Encourage individual behaviour change to promote active transportation: community’s perspective and policy implications to reduce health impacts from climate change

Ying Zhang\textsuperscript{1}, Ting Xia\textsuperscript{2}, Annette Braunack-Mayer\textsuperscript{2}, Shona Crabb\textsuperscript{2}, Pushan Shah\textsuperscript{3}

\textsuperscript{1}University of Sydney, New South Wales, Australia, \textsuperscript{2}University of Adelaide, South Australia, Australia, \textsuperscript{3}South Australian Environmental Protection Authority, South Australia, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: This study investigated community and individual perceptions of behaviour change in promoting active transportation (AT), an effective measure to bring co-benefit in responding to climate change. It aimed to find out what attitudinal factors could lead to successful behaviour changes to provide evidences for interventions and policies.

Methods: Both quantitative and qualitative approaches were applied in Adelaide, South Australia, as a case study. Using a CATI system, a cross-sectional survey with interviews of randomly selected 381 local residents was conducted to collect individual data. Statistical analyses included factor analysis, Pearson's correlation, and multiple logistic regressions. Stakeholders from transport, health, environment and private sector were recruited for the qualitative study, using a snowballing approach. Thirteen face-to-face in-depth interviews were conducted. The thematic analysis approach was applied.

Results: Four factors were yielded from the factor analysis, including: (1) awareness of benefit of AT; (2) awareness of the problem of traffic; (3) safety and comfort of a travelling mode; (4) negative emotion towards public transport. Both factors 1 and 2 were positively associated with the acceptance of AT measures ($r=0.35$ and $r=0.13$, $p<0.05$). Participants who had high scores on awareness of benefits (OR = 2.12) and awareness of the problem (OR = 2.12) were more likely to shift travel mode towards AT. Moreover, bicycle usage was found as a significant predictor of intention to change (OR = 7.29). Barriers to promote AT included a lack of balanced policy, limited shared ownership, gaps in knowledge, and culture /beliefs.

Conclusions: Our study reports on people’s attitudes towards different transport modes, reveals some possible barriers to AT, and generates findings about significant indicators of people’s intention to reduce their car use. Results have implications for designing and implementing sustainable transport policies and promoting behaviour changes in responding to a changing climate. Future studies may include a multinational project that allows comparisons among countries with various cultural and urban settings.
Assessment of Impacts of Increased Physical Activity on Greenhouse Gas Emissions in the Transport Sector

Md Ahiduzzaman, Amit Kumar, John C Spence
University of Alberta, Alberta, Canada

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose - Increased physical activity could result from greater adoption of public transport as well as active transport (cycling), a potential model to assess the impact of increased physical activity on overall greenhouse gas emissions (GHGs) from the transportation sector will be outlined.

Methods - The Long-range Energy Alternative Planning System (LEAP) model was used to assess the impact on the transportation sector. LEAP consists of detailed energy consumption data for the transportation sector, including details on passenger transport. It is an energy planning and forecasting model, which can be used for the assessment of energy planning scenarios. The model is focussed on western Canada, and involved the development of a reference scenario of the transportation sector and various GHG mitigation scenarios, which would include the impact of decreased energy in the transportation sector due to increased physical activity. This would in turn be used to calculate reduction in GHG emissions and the associated impacts on climate change.

Results - Potential scenarios from LEAP model will be presented, detailing the quantifiable GHGs reduction (tonne of CO$_2$ per year) due to the intervention of behavioural changes in passenger transport system. Modelled outcomes will also exhibit the magnitude of reduction in personal car use that would be an indirect reflection on reduction in GHGs from the manufacturing and production sectors. A comparative assessment of GHG mitigation options in terms of GHG mitigation cost ($/tonne of CO$_2$ mitigation) will also be presented.

Conclusions - The LEAP model can be used to assess the impacts of changes in transportation mode and GHGEs. Quantifiable results obtained from the developed scenario could help guide the formulation and development of future policy. Shifting from sedentary, motorised transport to active transport could help to maximize the co-benefits of health and climate change.
Impact of multi-level, multi-component interventions to improve food intake and active living and decrease prevalence of obesity: Process evaluation and preliminary results

Convenor:
Rachel Novotny, University of Hawaii, Honolulu, Hawaii, United States

Discussant:
Boyd Swinburn, University of Auckland, Auckland, New Zealand

Description:
This is the third in a series of ISBNPA symposia on the development, implementation and evaluation of multi-level, multi-component (MLMC) community-based interventions for obesity prevention. MLMC programs that combine individual, social, environmental and structural changes show great promise as a means of reducing risk for chronic disease among population groups. This symposium will present preliminary results from three such programs (B'More Healthy Communities for Kids (BHCK) from Baltimore, Maryland, USA; SOL from Denmark; and CHL from the US Affiliated Pacific region). The symposium will highlight process evaluation findings, methods for community preparedness assessment and preliminary results of these programs. BHCK seeks to increase access to healthy foods, improve adult food selection and preparation behaviors and improve child food purchasing, consumption and obesity risk in low income areas of Baltimore City. The program works at the policy, wholesaler, corner store, carryout, recreation center, interpersonal (social media, youth leaders) and child levels. The SoL program seeks to improve eating behavior and reduce sedentarism and the primary target group is families with children aged 3-8 years-old. The high intensity intervention sites are 3 neighborhoods at the Baltic isle of Bornholm. The program works through integrated interventions in supermarkets, media, school, and kindergarten settings. SoL is building conceptually on a partnership between representatives from academia, civil society, community-based associations, businesses and the public administration. The CHL program focuses on training, social marketing, policy change, and coalition building in order to increase sleep, active play and healthy food intake for 2-8 year old children. The program targets more drinking water, fruit and vegetables and fewer sugar sweetened beverages, less screen time, more active play, and more sleep with a goal to decrease obesity among children. Presentations will present preliminary findings from each study, plus lessons learned and next steps for conducting large scale participatory multilevel programs to create sustainable environmental change for improved health.
S10.1

SOL Program – a local community multi-level and multi-component health promotion program: Development and evaluation of a systematic tool to assess community preparedness

Bent Egberg Mikkelsen
Aalborg University, Aalborg University, Denmark

SIG: Policies and environments

Awards: No

Purpose: The program is targeting eating and sedentary behavior in families with children aged 3-8 years-old. The intervention site is the Baltic isle of Bornholm with 3 neighborhoods selected for high intensity treatment. The program works through integrated and coordinated interventions in supermarkets, media, school & kindergarten settings. It is a Multi-Level Multi-Component (ML-MC) intervention and is building conceptually on a participatory partnership where representatives from civil society, community-based associations, businesses and the public administration are assigned influence in designing the program along with the researchers. It applies an action research approach to develop the intervention component while maintaining a traditional intervention-control design. This setup offers clear advantages in terms of the potential to create impact and intensity. But it also creates challenges in terms of choosing the right intervention components and implementation strategies. This paper addresses this challenge by suggesting a tool to assist program leaders to choose and develop intervention strategies.

Methods: A The Local Community Foodscape Assessment Tool (LC-FAT) was developed as a mean for systematic assessment of community preparedness. The tool builds conceptually on insights from foodscape studies and stakeholder theory. The tool was developed using an auto-ethnographic approach and tested through interviews with 2 experts, 2 local community leaders and 2 end-users.

Results: The interviews showed that achieving program success through creation of synergy and intensity needs to involve balancing a number of different and sometimes conflicting interests among the actors involved in and targeted by the program. In local community programs developed using an action research strategy these comprise researchers, community leaders and mediators as well as citizens. The assessment tool therefore needs to balance the strength of the evidence base of intervention components, the expectations of the end-users, the strategies and policies already adopted in the community.

Conclusion: Creating sustainability of intervention & long term engagement is a serious challenge to ML-MC interventions. To address this require a systematic approach to the alignment of multiple stakeholders expectations to what the program should involve. It is concluded that the Local Community Foodscape Assessment Tool can assist in such planning of community interventions.
B'More Healthy Communities for Kids, a multilevel obesity prevention program for African American children: Wave 1 process and impact results

Joel Gittelsohn, Angela Trude, Cara Shipley, Teresa Schwendler, Maria Jose Mejia, Ivory Loh, Naomi Rapp

Johns Hopkins Bloomberg School of Public Health, Baltimore, USA

SIG: Policies and environments

Awards: No

Purpose: BHCK is an ongoing multi-level, multi-component obesity prevention program which targets multiple levels of the urban food environment to improve healthy food access, purchasing, and consumption for low income African American youth, through interventions carried out at the individual, peer leader, family, community (corner store, carry-out, wholesale), and policy levels.

Methods: Wave 1 of BHCK was evaluated through a combination of process and impact measures. We observed small food stores to detect change in availability of BHCK promoted products. In youth, we used the Block Kids FFQ to estimate dietary intake, assessed change in psychosocial factors (knowledge, self-efficacy, intentions), food-related behaviors (purchasing, preparation and consumption) and BMI. Pre-post program impact measures were made at each intervention level. Difference-in-differences was calculated based on the mean change by treatment groups.

Results: Different components of the intervention were implemented with moderate to high reach, dose and fidelity observed. Twelve youth-leaders conducted 98 nutrition sessions in the recreation center component, with an average of 10 low income AA children (10-14) attending, and a total of 1600 child interactions in recreation centers and community venues combined. Educational sessions and promotional activities at stores reached 5-10 youth per store session. Approximately 200 families received text-messages during the program. We found a 8.6% increase in availability of whole wheat bread in intervention stores while control stores decreased 37.8% (p<0.01). Youth in the intervention group increased consumption of whole grain foods from pre to post intervention, whereas youth in the control group decreased. Youth in the intervention group had a statistically smaller decrease in fruit daily serving (-0.58 servings), when compared to control youth (-1.57 servings) (p>0.01). Additional analyses will examine impact of the BHCK program on access, purchase and consumption of healthier beverages and other foods.

Conclusions: This study is an example of a successful MLMC intervention. Findings will inform public health strategies to improve dietary quality and access to healthful food in low-income urban settings.
**S10.3**

*Impact of the Children’s Healthy Living (CHL) multi-level, multi-component intervention to improve food intake and active living and decrease prevalence of obesity: Process evaluation and preliminary results.*

Rachel Novotny¹, J Butel¹, M Esquivel¹, M Fialkowski¹, K Braun¹, R Leon Guerrero², A Bersamin³, T Fleming⁴, P Coleman⁵, Claudio Nigg¹

¹University of Hawaii, Honolulu, Hawaii, USA, ²University of Guam, Mangilao, Guam, Guam, ³University of Alaska, Fairbanks, Alaska, USA, ⁴American Samoa Community College, Pago Pago, American Samoa, American Samoa, ⁵Northern Marianas College, Saipan, Commonwealth of the Northern Mariana Islands, Northern Mariana Islands

**SIG:** Policies and environments

**Awards:** No

**Purpose:** The Children’s Healthy Living (CHL) program aimed to reduce prevalence of obesity among 2-8-year-old children through a multi-level multicomponent intervention program to increase sleep, physical activity, water and healthy food intake and to decrease sugar sweetened beverage intake and sedentary behavior. In this presentation we will present process evaluation results and preliminary findings on impact of the intervention.

**Methods:** The CHL intervention program has engaged 4,488 children in 27 communities of 5 jurisdictions of the US Affiliated Pacific region. Four primary intervention strategies included strengthening preschool policy, advocating for environment change, marketing the CHL message, and training trainers and role models to support CHL’s goal to decrease obesity among children. The intervention was developed following the ANGELO model of community engagement and program development. Strategies were tailored to fit community context. The intervention was implemented in 9 communities in the 5 jurisdictions. Jurisdictions submitted monthly process reports to track intervention progress.

**Results:** The four primary intervention strategies were implemented in all 9 communities during the evaluation period. Process reports indicate that the core elements of the intervention program were implemented, even when tailored to fit local context. Preliminary intervention findings showed that preschool environments can be improved to promote physical activity through implementation of preschool wellness policies by teachers who role modeled healthy behaviors in the classroom.

**Conclusion:** Community engagement, role modelling and coalition building were key to building and implementing the CHL multi-level multi-component intervention program.
Correlates And Consequences Of Declining Children’s Independent Mobility: Evidence From Australia, Belgium, Canada And United Kingdom

Convenor:
Guy Faulkner, University of British Columbia, Vancouver, Canada

Discussant:
Jasper Schipperijn, University of Southern Denmark, Odense, Denmark

Description:
Purpose: The purpose of this symposium is to examine the correlates and consequences of declining independent mobility among children and youth in Australia, Belgium, Canada and the United Kingdom.
Rationale: Children’s independent mobility (CIM) has been defined as the freedom of children to travel around their own neighbourhood or city without adult supervision (Tranter & Whitelegg, 1994). Previous research has recognised the importance of independent mobility for a child’s psychological development and welfare. For example, CIM may improve a child’s spatial, motor and analytical skills and social development. Children who travel and play on their own may also demonstrate greater knowledge about their neighbourhoods and a more sophisticated sense of community compared with those who are less independent. A greater sense of community, in turn, may relate to higher sociability and the attenuation of safety concerns. Notably, greater independent mobility is associated with higher levels of physical activity.

Objectives: The objectives of this symposium are to 1) present recent research examining CIM in Europe, North America and Australia, 2) identify the prevalence and correlates of CIM, and 3) discuss potential consequences of declining CIM for children and youth.
Summary: Four presentations from Australia, Canada, Belgium and England will address these objectives.

Overall, there is evidence that CIM is declining in western, industrialized nations but there is variation – CIM appears to be higher in Europe compared to North America and Australia. A range of correlates of CIM have been identified. A consistent finding is the gendered nature of CIM where girls experience less independent mobility than boys. A synthesis of the findings and their implications for intervention will be provided.

Format (Four presenters and one discussant):
- Stephanie Schoeppe, PhD
  Central Queensland University, School of Human, Health and Social Sciences, Physical Activity Research Group, Rockhampton, Australia

- Ariane Ghekiere, MSc
  Ghent University, Faculty of Medicine and Health Sciences, Department of Public Health, Ghent, Belgium

- Guy Faulkner, PhD
  University of British Columbia, School of Kinesiology, Vancouver, Canada

- Angie Page, PhD
  University of Bristol, Centre for Exercise, Nutrition and Health Sciences, Bristol, United Kingdom

Discussant: Jasper Schipperijn, Associate Professor, MSc, PhD, Department of Sports Science and Clinical Biomechanics and Active Living, University of Southern Denmark, Odense, Denmark
The decline in children's independent mobility: How does Australia compare to other countries?

Stephanie Schoeppe¹, Paul Tranter², Mitch Duncan³, Carey Curtis⁴, Alison Carver⁵, Karen Malone⁶

¹Central Queensland University, Rockhampton, Australia, ²University of New South Wales, Canberra, Australia, ³The University of Newcastle, Newcastle, Australia, ⁴Curtin University, Perth, Australia, ⁵Deakin University, Melbourne, Australia, ⁶University of Western Sydney, Sydney, Australia

SIG: Children and families

Awards:

Purpose: To 1) present changes in Australian children’s independent mobility levels between 1991 and 2012, and 2) compare Australian findings with trend data on children’s independent mobility from other countries.

Methods: Data from five Australian cross-sectional studies conducted in 1991, 1993, 2010, 2011 and 2012 were analysed. Parent and child surveys were used to assess parental licences for independent mobility and actual independent mobility behaviour (i.e. unsupervised travel) in children aged 8-13 years. Descriptive analyses were conducted to investigate changes in changes in Australian children’s independent mobility levels between 1991 and 2012. The Australian findings were compared to those from other countries reporting changes in children’s independent mobility levels in the last decades.

Results: Australian data showed declines in the proportion of young children (≤ 10 years of age) being allowed to travel home from school alone (1991: 68%, 1993: 50%, 2010: 43%, 2011: 45%, 2012: 31%) and travel on buses alone (1991: 31%, 1993: 15%, 2010: 8%, 2011: 6%, 2012: 9%). Furthermore, the proportion of children travelling independently to school decreased (1991: 61%, 1993: 42%, 2010: 31%, 2011: 32%, 2012: 32%). These findings are consistent with those observed in other countries. For example, in English children aged 7-11 years independent mobility licences for travelling home from school alone decreased from 35% in 1990 to 25% in 2010. Similarly, in German children aged 7-11 years independent mobility licences for travelling home from school alone dropped from 93% in 1990 to 76% in 2010. Actual independent mobility behaviour has also declined in English, German and Finnish children. In England, 36% of children aged 7-11 years travelled independently to school in 1990, whereas in 2010 this proportion had dropped to 23%. In Germany, children’s independent travel to school declined from over 60% in 1990 to under 20% in 2010. In Finland, independent travel to and from school decreased from 85% in 1990 to 65% in 2010.

Conclusions: Overall, data from Australia and other Western countries suggest that children’s independent mobility levels have markedly declined over two decades. Although, compared to Australian children, German and Finnish children enjoy higher independent mobility levels.
**S11.2**

*Insights into children’s independent mobility for transportation cycling - which socio-ecological factors matter?*

Ariane Ghekiere\(^1,3\), Benedicte Deforce\(^1,2\), Alison Carver\(^4\), Bas de Geus\(^3\), Peter Clarys\(^2\), Greet Cardon\(^1\), Ilse De Bourdeaudhuij\(^2\), Jelle Van Cauwenbergh\(^1,3\)

\(^1\)Ghent University, Ghent, Belgium, \(^2\)Vrije Universiteit Brussel, Brussels, Belgium, \(^3\)Fund for Scientific Research, Brussels, Belgium, \(^4\)Deakin University, Melbourne, Australia

**SIG:** Children and families

**Awards:** Yes, for the Student Competition*

**Objective:** To assess the associations of socio-ecological factors with independent mobility for transportation cycling (IM) in 10-12 year old boys and girls. Additionally, we examined whether these associations differed across family socio-economic status (=SES) and urbanization level.

**Methods:** Parents (n=1286) were recruited via 45 primary schools across Flanders, Belgium. They completed an online questionnaire assessing demographic and psychosocial factors, and neighborhood environmental perceptions, as well as some characteristics of the child. IM was assessed as the distance children were allowed to cycle for transport without adult supervision. Multilevel linear regression analyses stratified by gender were performed to examine the associations between the independent variables and children’s IM and the interaction effects of family SES and urbanization level.

**Results:** Parental perceived cycling and traffic skills, and children’s grade were positively associated with IM among boys and girls. Parental perceived presence of cycling infrastructure was positively associated with IM among boys, but not among girls. Parental perceived traffic safety was positively associated with IM only among boys living in urban areas. In contrast, parental perceived traffic safety was only significantly associated with IM among girls living in rural areas. Parental perceived presence of public transit stops and maintenance of cycling facilities were positively associated with IM among low SES but not among high SES girls.

**Conclusions:** Children are granted more IM when parents perceive their child having sufficient cycling and traffic skills. The study highlights that different factors are associated with children’s IM according to gender, family SES and urbanization level.
S11.3

Experiencing Independent Mobility: Is there neighbourhood inequality in the Greater Toronto and Hamilton Area?

Guy Faulkner¹, Ron Buliung², Kristian Larsen²

¹University of British Columbia, Vancouver, Canada, ²University of Toronto Mississauga, Toronto, Canada

SIG: Children and families

Awards:

Purpose: To examine the social and environmental barriers and enablers to children accumulating experience with independent mobility in the Greater Toronto and Hamilton Area (GTHA).

Method: This study was set in the GTHA and uses parental survey data (n=1016). Questions were asked about the school travel patterns of the eldest elementary school age child in each surveyed household. Survey questions also assessed perceptions about the school travel experience (e.g., safety), and individual and household characteristics. GIS analysis was performed to construct objective measures that describe neighbourhood design characteristics. Binary logistic regression was then applied to test the association between social, individual and objective neighbourhood characteristics and school travel outcomes. Separate models were specified and estimated to study the social and environmental correlates of school mode of travel (walk vs drive) and independent travel (escorted vs independent) across the GTHA.

Results: Older children are more likely to walk to school without adult supervision. Population density was negatively related to walking independently: more densely populated areas had a lower likelihood of children walking independently. Children, in older neighbourhoods (neighbourhoods with a larger proportion of dwellings constructed prior to 1960), travel independently at a younger age than children living in much newer neighbourhoods.

Conclusions: Where children grow up appears to affect independent mobility. Some children living in certain neighbourhoods may benefit from a head start in the associated types of cognitive development that arise from independent mobility. Targeting planning efforts toward correcting neighbourhood inequality in childhood experiences with independent mobility should be considered.

This work was supported by Metrolinx, an agency of the Government of Ontario, Canada.
S11.4

Longitudinal change in independent mobility from childhood to adolescence and local approaches to developing children's spatial independence

Angie Page¹, Russ Jago², Ben Wheeler², Ashley Cooper¹

¹University of Bristol, Bristol, UK, ²University of Exeter, Exeter, UK

SIG: Children and families

Awards:

Purpose: To 1) examine longitudinal changes in independent mobility in UK young people and 2) investigate the importance of local streets and neighbourhood for developing children's independence.

Methods: Longitudinal data from 3 waves of the PEACH project were analysed for changes in independent mobility (IM) and physical activity in UK children from 10 to 16 years (n=486). Physical activity was measured by accelerometer and ability to travel and visit local and wider destinations without adult supervision (TravellIM, LocalIM, AreaIM) were self-reported (Page et al. IJBNPA 2009). Interviews (n=39) were carried out with parents to determine the impact of temporary street closures after school on children's level of independence.

Results: LocalIM, AreaIM and TravellIM increased with age and gender differences were most marked in early adolescence but persisted into late adolescence. Higher IM scores were associated with higher levels of physical activity, particularly for females. Higher scores for AreaIM were associated with living in areas of higher deprivation. Interviews with parents (n=39) showed that temporary street closures increased children's confidence to navigate their local neighbourhood and cycling skills.

Conclusions: This longitudinal study shows that early adolescence is an important time to intervene to reduce gender disparity in IM, particularly as IM is more strongly related to physical activity in females. Local interventions that allow children to experience greater independence are important for developing increased spatial confidence and to help ameliorate the decline in independent mobility observed in studies in this symposia.
**Think Plural: Multiple behaviour approaches in epidemiological and intervention research on diet, physical activity, and sedentary behaviour**

**Convenor:**
Ding Ding, University of Sydney, Camperdown, Australia

**Discussant:**
Adrian Bauman, University of Sydney, Camperdown, Australia

**Description:**
Purpose: In this symposium we will present innovative methodologies and theoretical frameworks for epidemiological and intervention studies that simultaneously examine or target multiple lifestyle risk behaviours, particularly diet, physical activity, and sedentary behaviour. We will facilitate discussions on the opportunities and challenges of applying an integrated multiple behaviour approach to population health research and practice.

Rationale: Lifestyle behaviours, such as physical activity, sedentary behaviour and diet, cluster in populations, and have synergistic effects on many health outcomes. However, traditionally health risk behaviours have often been dealt with using a “singular” approach where each risk behaviour is examined or targeted in isolation without taking into account clustering or interactions among them. As ISBNPA is a society that brings together experts from physical activity, nutrition, and other fields, an ISBNPA symposium will provide an ideal forum for facilitating discussions on multiple behaviour research and for instilling an integrated way of thinking and for promoting inter-disciplinary collaboration.

Objectives:
1) To introduce several innovative methodologies and frameworks for addressing multiple lifestyle behaviours in epidemiological and intervention studies.
2) To present case studies that applied multiple behaviour approaches.
3) To discuss opportunities and challenges of applying an integrated approach to behavioural epidemiology and interventions.

Summary: This symposium will start with an overview of the needs for an integrated multiple behaviour approach in population health research and practice, and of the limitations and pitfalls of the conventional single behaviour approaches. The introduction will be followed by four presentations, two on multiple behaviour epidemiological approaches, and two on multiple behaviour change interventions. Following the individual presentations, we will have an open discussion on how to apply multiple behaviour research methodologies to improve the current research in the field of physical activity, sedentary behaviour and diet by incorporating an integrated and transdisciplinary approach.

**Format:**
Introduction: Ding Ding, Australia; 5 min
Presentation 1: Combinations of multiple lifestyle risk behaviours and all-cause mortality in a large Australian cohort of older adults (Ding Ding, Australia) 10 min
Presentation 2: Compositional analysis of the 24 hours physical behaviours toward multiple behaviour integrated guidelines for preventive medicine (Sebastien Chastin, UK) 12 min
Presentation 3: Self-efficacy for multiple behaviour change: is there a ‘gateway effect’? (Camille Short, Australia) 12 min
Presentation 4: Example of a Multiple Behavior Worksite Intervention: the Work, Weight, Wellness (3W) Trial (Claudio Nigg, USA) 12 min
Discussion: led by Adrian Bauman, Australia, 20+ min
S12.1

Combinations of multiple lifestyle risk behaviours and all-cause mortality in a large Australian cohort of older adults

Ding Ding¹, Kris Rogers¹, Hidde van der Ploeg¹,², Emmanuel Stamatakis¹, Adrian Bauman¹

¹University of Sydney, Camperdown, Australia, ²VU University Medical Centre, Amsterdam, The Netherlands

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Background: Behavioral risk factors, such as poor diet and physical inactivity, tend to cluster within populations and may have synergistic effects on health. As evidence continues to accumulate on emerging lifestyle risk factors, such as prolonged sitting and unhealthy sleep patterns, incorporating these new risk factors will provide clinically relevant information on combinations of lifestyle risk factors.

Purpose: This study aims to 1) examine the association between a lifestyle risk index and all-cause mortality, and 2) to describe the most commonly occurring combinations of health risk behaviors and to quantify the risk for all-cause mortality for each unique lifestyle combination.

Methods: Using data from a large Australian cohort of middle-aged and older adults, this is the first study to examine a lifestyle risk index incorporating sedentary behavior and sleep in relation with all-cause mortality. Baseline data (2006-2009) were linked to mortality registration data until June 15, 2014. Smoking, high alcohol intake, poor diet, physical inactivity, prolonged sitting and unhealthy (short/long) sleep duration were measured by questionnaires and summed into an index. Cox proportional hazards analysis was used for the index and each unique risk combination, adjusted for socio-demographic characteristics.

Results: During 6 years of follow-up of 231,048 participants for 1,409,591 person-years, 15,635 deaths were registered. Of all participants, 31.2%, 36.9%, 21.4%, and 10.6% reported 0, 1, 2, and 3+ risk factors, respectively. There was a strong relationship between the lifestyle risk index score and all-cause mortality. Out of all 96 possible risk combinations, the 30 most commonly occurring combinations accounted for more than 90% of the participants. Among those, combinations involving physical inactivity, prolonged sitting, and/or long sleep duration had one the strongest associations with all-cause mortality. In contrast, prolonged sitting or unhealthy sleep patterns alone had only marginally significant association with mortality. Limitations of the study include self-reported and under-specified measures, dichotomized risk scores, lack of long-term patterns of lifestyle behaviors, and lack of cause-specific mortality data.

Conclusions: Adherence to healthy lifestyles could reduce risk for deaths from all causes. Specific combinations of health risk behaviors may be more harmful than others, suggesting synergistic relationships among risk factors.
S12.2

Compositional analysis of the 24 hours physical behaviours toward multiple behaviour integrated guidelines for preventive medicine

Sebastien Chastin¹, Javier Palarea-Albaladejo²

¹Glasgow Caledonian University, Glasgow, UK, ²Biomathematics and Statistics Scotland, Edinburgh, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose:

To date the relationship between health and each daily physical behaviours i.e. MVPA, LIPA, SB and sleep has only been studied in isolation adjusting only for one other behaviour, because standard statistical methods cannot deal with the whole day (time spent in each behaviour is highly collinear and correlated even when correlation indices are low). There is a dearth of information about the combined effect of allocating time to these different behaviours. During the day time is finite, time spent in one behaviour naturally displace time in others. Time budget data are intrinsically compositional in nature and require adopting statistical methodology consistent with this type of data.

Methods:

Compositional data analysis enables to investigate how different allocation of time spent in different activity is associated with health outcomes and adequately adjust model for time spent in all behaviours. As an example, we investigated the relationship between the 24 hour physical behaviour composition and health markers using data from the NHANES 2005-6 cycle.

Results:

The composition of the day is significantly associated with markers of obesity, cardiovascular and diabetes risk. The analysis indicates that each behaviour has a direct effect, but also an effect due to substitution. Less inactity, in particular sedentary time, and more time spent in moderate to vigorous physical activity, is associated with a better cardio-metabolic risk profile. However, the health risks are higher when more of the inactive time is spent in SB rather than in LIPA, even with the same amount of time spent in MVPA.

Conclusions:

The NHANES results hint that it is important to prevent a transfer of time from LIPA to SB. It is also important to prevent a transfer of time from MVPA to LIPA or SB. Although replacing SB by MVPA has a stronger positive health effect, our results show that replacing SB by LIPA could have beneficial health effects as well.

A compositional paradigm has the potential to advance the epidemiology and enable the development of combined guidelines for daily movement behaviour, but it requires a different philosophical approach and a rethinking about how we conceptualise time budget data.
**S12.3**

**Self-efficacy for multiple behaviour change: is there a ‘gateway effect’?**

Camille Short\(^1\), Ding Ding\(^2\), Amanda Rebar\(^3\), Mitch Duncan\(^4\), Corneel Vandelanotte\(^3\)

\(^1\)University of Adelaide, Adelaide, Australia, \(^2\)University of Sydney, Camperdown, Australia, \(^3\)Central Queensland University, Rockhampton, Australia, \(^4\)University of Newcastle, Callaghan, Australia

**SIG:** Cancer prevention and management

**Awards:**

**Background:** At present, there are mixed views regarding self-efficacy and multiple behaviour change. While some suggest that focusing on multiple behaviours may place too much demand on a person’s self-efficacy, others suggest that changing one behaviour will increase self-efficacy for other behaviours and as such serve as a ‘gateway’ for lifestyle change.

**Aim:** To provide insight into possible gateway effects relating to physical activity, sitting and dietary behaviour change.

**Methods:** Cross-sectional data were collected as part of the 2013 Queensland Social Survey (response rate = 41%; \(n = 1293\)). Participants were asked to rate how certain they are on a scale of 0-10 that they could successfully complete a 12-week healthy lifestyle program aiming to a) promote physical activity, b) reduced sitting time, and c) improve fruit and vegetable consumption (at a level sufficient to meet public health recommendations). Current lifestyle behaviours were assessed using validated self-reported questionnaires and dichotomised into meeting recommendations and otherwise. Four linear regression analyses were used to examining associations between each self-efficacy measure (dependent variable) and all three health behaviours (independent variables). Relevant demographic and health variables were entered as covariates.

**Results.** Contrary to the gateway hypothesis, meeting the dietary recommendations was not associated with increased confidence to change physical activity behaviour. Likewise, reporting sitting less than six hours per day was not associated with increased confidence to change physical activity or dietary behaviour. However, sufficient diet behaviours were associated with increased confidence to change sedentary behaviours \((b = 0.54, 95\%CI =0.03-1.05)\) and being active on most days of the week was associated with increased confidence for changing both diet \((b = 0.47, 95\%CI =0.17-0.78)\) and sedentary behaviour \((b = 0.399, 95\%CI = 0.04-0.755)\).

**Conclusion.** Sufficient physical activity may be a potentially better ‘gateway’ to lifestyle change than sedentary behaviour, and potentially diet behaviour. This may have implications for how multiple behaviour change interventions should be designed.
**S12.4**

**An Example of a Multiple Behavior Worksite Intervention: the Work, Weight, Wellness (3W) Trial**

Claudio Nigg¹, Mahabub Anwar¹, Andrew Williams², Victor Stevens³, Cheryl Albright¹, Richard Meenan³, Thomas Vogt²

¹University of Hawaii, Manoa, USA, ²Kaiser Permanente Center for Health Research, Hawai'i, Honolulu, USA, ³Kaiser Permanente Center for Health Research, Portland, Portland, USA

**SIG:** Theories of motivation

**Awards:**

**Purpose:** The Work, Weight, and Wellness (3W) program was a community-based cluster-randomized trial involving 30 hotels (~12,000 employees). The intervention approach of this social ecological based multibehavioral worksite obesity management program is highlighted.

**Methods:** The intervention was designed to increase motivation and access to physical activity (PA) and healthy low-fat/low-calorie foods. Each hotel assigned an employee to serve as the primary 3W coordinator. After every assessment, both intervention and control employees received brief personalized oral and written health recommendations based on their health risks. The 3W Intervention was an environmental group program designed to improve dietary habits, increase PA, and manage weight. The annual onsite groups included 48 sessions (30 minutes each), the content of which was reinforced with messages delivered concurrently in the environment (e.g., monthly newsletters, scrolling health messages on electronic signs in dining areas). The intervention included strategies known to support sustained, long-term weight loss, including increased PA, reduced-fat diet, reduced intake of refined sugar, increased fruit and vegetable intake, social support, group, and the environment. The environmental intervention focused on employee-only areas, primarily the employee cafeteria, break rooms, halls, stairways, freight elevators and pay envelopes, and included healthy vending machines and cafeteria options.

**Results:** Annual employee assessments (n=6,952; mean age=44(± 11.71) years, 56.8% female, 8.5% Hispanic) revealed no demographic differences between control and intervention groups. At year 1, the unadjusted PA (in METmin/wk) for intervention was (1114.68±1186.31) versus the control group (1225.32±1344.59; p < 0.05, similar after age and sex adjustment). No group differences were found in year 2 (p>.05). In year 3, adjusted results show significantly higher PA in intervention compared to control (1238.10±1227.78 vs. 1229.97 ±1272.34, p = .004).

In year 1, the unadjusted healthy diet for intervention was (2.85±1.57) versus the control (2.95±1.62; p<.05; similar after adjusting). In year 2 and 3, no differences were found between groups (year 3 intervention=3.14±1.63; control=3.16±1.63; p>.05).

**Conclusions:** The 3W program is a promising approach for nutritional and PA programs in the worksite. It is encouraging, too, that the program impact improved in the second year, suggesting the need for longer periods of time.
Measuring Physical Activity Environments in Africa: NEWS-Africa

Convenor:
Adewale Oyeyemi, North-West University, Potchefstroom, South Africa

Discussant:
Estelle Lambert, University of Cape Town, Cape Town, South Africa

Description:
Purpose: The purpose of this symposium is to present the results of a coordinated study of development and psychometric evaluation of the Neighborhood Environment Walkability Scale (NEWS) conducted in multiple African countries representing Central Africa (Cameroon), East Africa (Kenya and Uganda), West Africa (Ghana and Nigeria) and Southern Africa (Mozambique and Republic of South Africa).

Rationale: Increasing physical activity is one of four strategies recommended by the United Nations to reduce global epidemics of non-communicable diseases (NCD). Environmental variables are recommended by the World Health Organization and other authoritative groups as a viable strategy for improving physical activity and controlling obesity because they can be modified by public policy. However, Africa remains the only region where evidence on the influence of the built environment on physical activity and other health behaviors is scarce. Developments of valid measures of theoretically relevant environmental variables applicable to Africa are needed for research on environmental correlates/determinants of physical activity to progress. Development of an applicable evidence base in African countries could inform public health, land use, and urban planning and transportation policies that could have population-wide impacts and long-term implications for preventing or delaying the development of cardiovascular disease, cancers, diabetes, and other physical and mental health conditions in the African region.

Objectives: The main aims of this symposium are: (1) to present findings from a seven-country study describing the development process and the psychometric evaluation of the NEWS-Africa measure; (2) to provide a forum to discuss findings of this study and to share experiences; and (3) to discuss implications for further research and practice in Africa based on the findings.

Summary:
The presentations in sequence will be:
1. 1st presenter (James Sallis, USA): NEWS-Africa: Developing a Built Environment Survey Measure for Africa
2. 2nd presenter (Adewale Oyeyemi, Nigeria and South Africa): Multi-country reliability and validity study of NEWS-Africa
3. 3rd presenter (Sandra Kasoma, Uganda): Reliability and validity of the African version of Neighbourhood Environment Scale (NEWS-Africa) for physical activity in Uganda.

Format:
A short introduction (5 min) on the rationale, purpose, and format of the symposium will be given by the chairperson (Adewale Oyeyemi). After the four presentations (each 10 min), the discussant will comment on the research and policy implications of the findings and will facilitate a general discussion (30 min).
NEWS-Africa: Developing a Built Environment Survey Measure for Africa

James Sallis1, Adewale Oyeyemi2,3, Vincent Onywera4, Kingsley Akinroye5, Sandra Kasoma6, Rufus Adedoyin7, Tracy Kolbe-Alexander8,9, Mark Tremblay10,11

1University of California, San Diego, California, USA, 2North-West University, Potchefstroom, South Africa, 3University of Maiduguri, Maiduguri, Borno, Nigeria, 4Kenyatta University, Nairobi, Kenya, 5Nigerian Heart Foundation, Lagos, Nigeria, 6Makerere University, Kampala, Uganda, 7Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria, 8University of Cape Town, Cape Town, South Africa, 9University of Queensland, Brisbane, Australia, 10University of Ottawa, Ottawa, Canada, 11Children’s Hospital of Eastern Ontario Research Institute, Ottawa, Canada

SIG: Policies and environments

Awards:

Objective
Non-communicable diseases (NCDs) related to physical inactivity account for the majority of deaths in Africa, yet actions to prevent NCDs in Africa are rare. Evidence is needed to guide prevention efforts tailored to African circumstances. As Africa urbanizes, it is important to create built environments that facilitate physical activity. Thus, it is relevant to build evidence about how built environments are related to physical activity in Africa, and appropriate measures are required for such research. The aim of the present study was to systematically develop a built environment self-report measure for use in sub-Saharan Africa.

Methods
The goal was to adapt the widely-used Neighborhood Environment Walkability Survey (NEWS) that would both allow comparisons with other regions and be tailored for Africa. The adaptation began with a workshop in Nairobi, Kenya attended by investigators from 7 sub-Saharan African countries and North American collaborators. Attendees agreed on goals, recommended adaptations to existing items, and drafted new items to reflect African environments. The development process was informed by visits to local areas, plus feedback from residents, a public health advocate, and a transportation expert. Investigators from each country consulted further with local experts and residents of urban and rural areas. The second draft underwent cognitive testing in each country. The third draft was further pre-tested. The fourth draft was translated to local languages and back-translated, then subjected to a psychometric evaluation with participants of diverse ages, SES, and neighborhood types.

Results
Consensus was achieved on an instrument with 76 items covering both built and social environment attributes. Pre-testing revealed that interviewer administration was required. Among existing NEWS items, the residential density, common destinations, and pedestrian infrastructure items required the most revision. Fourteen new items assessed aesthetic items related to positive and negative smells and sounds, informal paths, barriers like blocked sidewalks, and play areas.

Conclusion
NEWS-Africa was developed using a systematic process that assured content validity. A coordinated approach with input from investigators, experts, and residents of several countries improves the likelihood the measure can be used throughout sub-Saharan Africa.
Multi-country reliability and validity study of NEWS-Africa

Adewale Oyeyemi1,2, Felix Assah3, Terry Conway4, Sarah Moss5, Reginald Ocansey5, Kavita Gavand4, Antonio Prista6, James Sallis4

1North-West University, Potchefstroom, USA, 2University of Maiduguri, Maiduguri, Borno, Nigeria, 3University of Yaoundé I, Yaoundé, Cameroon, 4University of California, San Diego, California, USA, 5Active Living and Wellness Research and Education Center, Nungua, Ghana, 6Universidade Pedagogica, Maputo, Mozambique

Purpose
Built environment interventions are recommended for controlling mortality and morbidity from physical inactivity related non-communicable diseases. Yet, Africa remains the region of the world with the fewest studies on built environment-physical activity relationships. To develop African-specific evidence, it is important to first develop built environment measures adapted to Africa, then assess their psychometric properties. The present study assessed the test-retest reliability and construct validity of an adapted NEWS-Africa measure in six African countries.

Methods
Four hundred and sixty-nine participants (age= 12 - 85 years) from six countries (Cameroon, Ghana, Mozambique, Nigeria, South-Africa and Uganda) were purposively recruited from neighborhoods varying in walkability (high/low walkable) and SES (high and low income) and from villages. The 76-item NEWS-Africa survey had scales for residential density, land use mix - diversity, land use mix - access, street connectivity, infrastructure and safety for walking and cycling, aesthetics, traffic safety, safety from crime, personal safety, and child-related questions on stranger danger. The survey was completed twice within two weeks. Self-reported walking for transport and recreation were assessed with the validated International Physical Activity Questionnaire (long version).

Results
Over 92% of both individual NEWS-Africa items and computed scales demonstrated evidence of "excellent" (ICCs>0.75%) or "good" (ICCs=0.60 to 0.74) reliability. More than half (53.8%) of computed NEWS scales demonstrated "excellent" agreement and only 1 scale demonstrated "fair" agreement ("Roads and walking paths scale’ ICC = .597). No items or scales demonstrated "poor" reliability (ICCs<.40). Of the 10 built environment scales, one (access to services) was positively related to walking for transport (p=0.007), and three (proximity of recreation destinations [p=0.01]; roads and walking paths [p=0.002]; path infrastructures [p=0.03]) were positively related to walking for recreation. However, an activity-friendly environment index was positively related to walking for both transportation (p=.01) and recreation (p<.02). Safety from crime was marginally related to walking for transportation (p=.05) and recreation (p<.07), but in unexpected negative direction.

Conclusion. The NEWS-Africa instrument had excellent test-retest reliability and fair construct validity. The measure is likely to be useful for research, surveillance of built environment conditions for planning purposes, and to evaluate policy interventions in Africa.
Reliability and Validity of the African Version of Neighbourhood Environment Walkability Scale (NEWS-Africa) for Physical Activity in Uganda

Sandra Kasom1, Ssewannyana Charles2, Mugisha Lillian1
1Makerere University, Kampala, Uganda, 2Bishop Stuart University, Mbarara, Uganda

SIG: Policies and environments

Awards:

Objective
The Neighbourhood Environment Walkability Scale (NEWS) has been used widely internationally as an instrument for the assessment of neighbourhood environments for physical activity, but needed to be adapted for use and psychometrically evaluated in Africa. The study aimed at the adaptation and testing the reliability and validity of the modified version of the NEWS for Africa (NEWS-Africa) in Uganda.

Methods
A total of 142 participants were purposively recruited from different neighbourhoods varying in socioeconomic status (SES) in Kampala and some parts of Wakiso. The NEWS-Africa instrument was used to rate participants’ perceptions of environmental attributes in their neighbourhoods. Self-reported physical activity and walking was assessed using the IPAQ (long version: last 7 days). Validity of the NEWS-Africa was tested by comparing the relationship of NEWS-Africa’s scale with self-reported minutes/week spent in walking for transportation and for recreation. To assess the test-retest reliability of the NEWS-Africa’s scale, 48 of the participants completed the questionnaire twice two weeks apart.

Results
Test-retest reliability ICCs of NEWS-Africa scales ranged from 0.031 to 0.849, and 61.5% of the scales were “good” (ICC>.60) or better. Of the 10 built environment scales one (sidewalks) was marginally related to walking for transport (p<.09), and two (proximity of recreation destinations [p<.06]; roads and walking paths [p<.08]) were marginally related to walking for recreation in the expected positive direction. However, an activity-friendly environment index was positively and significantly related to walking for both transportation (p<.05) and recreation (p<.03). Safety from traffic was marginally related to walking for transportation (p<.08) in the positive direction.

Conclusions
A built environment survey tailored for Africa had fair to excellent test-retest reliability in Uganda. Validity analyses with physical activity revealed that individual scales were not significant, but a built environment index was significantly related to walking for both transportation and recreation, indicating the overall pattern of neighborhood characteristics may be important for physical activity in Uganda.

Richmond Aryeetey1, Seidu Sofo2, John Doku3, Reginald Ocansey3

1University of Ghana, Legon, Accra, Ghana, 2Southeast Missouri State University, Missouri, USA, 3Active Living and Wellness Research and Education Center, Nungua, Ghana

SIG: Policies and environments

Objective.

Policies and built environment strategies are effective for promoting a physically active lifestyle among populations. Although evidence on Built environment monitoring exists elsewhere, there are no validated tools to assess the built environment in the African context. We report data from Ghana on test-retest reliability and validity of an adapted built environment tool, the Neighborhood Environment Walkability Scale for Africa (NEWS-Africa).

Methods.

Seventy-two adult participants (MEAN AGE or RANGE) were purposively recruited from neighborhoods varying in walkability (high and low) and socioeconomic status (SES) (high and low income) in urban and rural areas of Ghana. The NEWS-Africa instrument was used to rate participants’ perceptions of neighborhood environmental attributes. Self-reported physical activity and walking was assessed using the IPAQ (long version; last 7 days). Validity of the NEWS-Africa was tested by comparing the relationship of NEWS-Africa’s scales with self-reported minutes/week spent in walking for transportation and recreation. To assess the test-retest reliability of NEWS-Africa’s scales, 49 of the participants (female= 51.2%; age= 31.4±13.2 years) completed the questionnaire twice within two weeks.

Results.

All scales (10 of 10) of NEWS-Africa demonstrated ‘very high’ (ICC>.90) test-retest reliability with ICCs ranging from 0.91 to 1.00. Of the 10 built environment scales one (proximity of recreation destinations) was significantly related to walking for recreation (p<.05), and three (crossing busy roads [p=.03]; safety from traffic roads [p=.01] and stranger danger [p=.02]) were significantly related to walking for transportation. The overall scale for places for walking, cycling and playing was marginally related to walking for transportation (p<.07).

Conclusion.

The NEWS-Africa instrument had excellent test-retest reliability in Ghana. Validity analyses revealed few significant associations with physical activity behaviors, suggesting neighborhood environmental attributes may be related to walking for both transportation and recreation in Ghana.
**Novel and innovative technologies to assess physical activity in diverse settings.**

Convenor:
Rachel Jones, University of Wollongong, Wollongong, NSW, Australia

Discussant:
Michael Rosenberg, University of Western Australia, Perth, WA, Australia

**Description:**
Title: Novel and innovative technologies to assess physical activity in diverse settings
Chair: Rachel Jones

Purpose: To provide insight into innovative and novel methods of tracking the location, quantity and quality of physical activity.

Rationale: Physical activity is crucial for health and wellbeing. Irrespective of age, levels of physical activity are suboptimal and are of concern. Data collected from Global Positioning System devices, in conjunction with accelerometers, are routinely used as objective measures of outdoor location-based physical activity. However, there is currently no alternative method to provide indoor location or accurately assess outdoor location in micro settings. Radio Frequency Identification (RFID) technology shows promise and when coupled with accelerometer data, has the potential to set a new gold standard in measuring location-based physical activity, as well as the ability to profile the quantity and quality of children’s physical activity.

Objectives: Through discussion on four studies currently being conducted in Australia, Wales and England, the session will achieve insight into: methodological considerations associated with the use of location systems in early childhood settings; the use of location systems to measure indoor-based physical activity and validity of the RFID system; associations between office layout and sitting, standing and stepping using objective measures such as RFID and accelerometry; and new technologies that profile the quantity and quality of movement in children.

Summary: The symposium will focus on innovative technologies used to assess physical activity in diverse settings, specifically micro settings. The discussion will highlight the versatility of these systems and its ability to have a positive influence on the health and wellbeing of a wide population.

Format: Chaired by Rachel Jones, the first presentation will provide methodological considerations using location systems in an Australian early childhood context. This will be followed by an overview of research using location systems in Australian homes, exploring data analysis as well as the validation of the RFID systems used. The third presentation will focus on research from the Active Buildings project in England – both accelerometry and RFID data will be presented. The final presentation will provide insight into an innovative new technology to further understanding of children’s physical activity by profiling the quantity and quality of movement. Finally, the Discussant, Michael Rosenberg will facilitate a discussion on the use of new technologies for increasing physical activity in diverse populations and settings.
The use of Radio Frequency Identification systems in Early Childhood Education and Care settings

Karen Tonge¹,², Rachel Jones¹,², Anthony Okely¹,²
¹University of Wollongong, Wollongong, NSW, Australia, ²Early Start Research Institute, Wollongong, NSW, Australia, ³Illawarra Health and Medical Research Institute (IHMRI), Wollongong, NSW, Australia

SIG: Early care and education

Awards:

Title: The use of Radio Frequency Identification systems in Early Childhood Education and Care settings

Authors: Tonge KL, Jones, RA, Okely, AD

Objective: To report on methodological considerations of Radio Frequency Identification (RFID) systems when used in outdoor environments in Early Childhood Education and Care (ECEC) services located in Australia.

Methods: The primary outcome of this study is the location and physical activity of educators and children. Cross sectional data from 8 ECEC services have been collected to date. Data have been collected on both educators and children (aged 2-5 years) and is collected over a 5 day week in the outdoor environments. Whilst at the service, educators and children wear dual sensors - the RFID Real Time Location System (RTLS) wrist watches (or Tags) and an accelerometer (GT3x) fitted around the waist. The RTLS consists of a Master Anchor reader and multiple Slave Anchor readers spaced evenly around each unique outdoor environment. The Tags transmit a 2.4 GHz signal to the Anchor Readers which triangulate the data to provide specific locations and the tracking of participant movements. Data from the RTLS will be analysed in conjunction with physical activity data provided from accelerometers.

Results: Data has been collected on 83 educators and 424 children. Given that this is the first time that the RTLS has been used in outdoor environments in ECEC services, a number of challenges have arisen. These challenges have been grouped into three categories: participants (size of tags for children, children removing tags, variations in attendance at the service); technology (tag monitors losing charge, sourcing power for the anchor readers, reliability of the internet connection, storage of and interference of unused tags); and environments (children were not in outdoor environments at times due to weather conditions, and variability in the size, layout and features). Challenges will be initially discussed and possible solutions will be provided. Initial outcome data from 11 services will also be presented.

Conclusions: This RFID has significant potential for observing interactions between educator and children and their environment, however it will be important to overcome these challenges to maximise the efficacy of the system.
Using portable RFID and accelerometry to measure indoor location-based physical activity: System development, validation and lessons learned

Clover Maitland¹,², Gareth Stratton³,⁴, Jeremy Tan¹,⁵, Jonathon Kur¹, Rebecca Braham¹,², Sarah Foster³,⁶, Michael Rosenberg¹,²

¹University of Western Australia, Perth, WA, Australia, ²School of Sport Science, Exercise and Health, Univ of WA, Perth, WA, Australia, ³Applied Sports Technology Exercise Medicine Research Centre, School of Engineering, Swansea Univ, Swansea, Wales, UK, ⁴Swansea University, Swansea, Wales, UK, ⁵School of Computer Science and Software Engineering, Univ of WA, Perth, WA, Australia, ⁶Centre for Built Environment and Health, Univ of WA, Perth, WA, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: GPS and accelerometer data is routinely used for objective measurement of outdoor location-based physical activity. However, there is currently no alternative method for use indoors. This paper outlines the development of a portable RFID system, and software to combine indoor location and accelerometer data. We also examine the system's accuracy and discuss current limitations of this technology.

Methods: A portable RFID system was constructed, and protocols developed to ensure consistent application across indoor locations. In an initial validation trial the system was centrally located in a university building and calibrated to determine signal field. A researcher walked RFID wrist tags in a nine room circuit (six in and three out of signal range) in time intervals (1, 2, 5 minutes and mixed) recording room entry and exit times. Data analysts, blinded to tag condition, were tasked with predicting the accuracy of the system by comparing their predicted time in and out of the signal field, with the experimental conditions. Custom software was then developed to upload, match and analyse RFID, absolute truth and accelerometer data. Subsequent trials using similar methods were conducted in home and office settings to validate the RFID system under a range of conditions.

Results: For the initial validation trial, eight hours and 41 minutes of data were collected. Accuracy for time spent in and out of range was high for most conditions. For the two minute condition absolute error was highest at 14%, while 6% for one minute, 5% for five minutes and 4% in the mixed condition. Subsequent trials in home and office settings found between 94% and 100% room level location accuracy.

Conclusions: In a controlled situation our portable RFID system was highly accurate in determining the presence of tags within its signal field and at room level. However, throughout development and validation, several challenges and limitations were identified. These included environmental conditions influencing the RFID signal, variations in epoch length between signals and the level of location accuracy. Further research is underway to conduct larger scale trials in combination with movement data in real-world settings including home, offices and childcare centres.
Associations between office layout and sitting, standing and stepping: The Active Buildings Study

Lee Smith, Alexia Sawyer, Richard Spinney, Alexi Marmot, Marcella Ucci, Abigail Fisher

University College London, London, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Title

Associations between office layout and sitting, standing and stepping: The Active Buildings Study

Authors

Lee Smith, Alexia Sawyer, Richard Spinney, Alexi Marmot, Marcella Ucci and Abigail Fisher

Purpose: Health benefits of regular participation in physical activity and reductions in sedentary time are well documented. In UK office workers levels of physical activity are low and sedentary behaviour high. Office layout may influence characteristics of sitting, standing and stepping. Limited literature has focused on the role that the layout of the indoor office environment plays in facilitating or inhibiting these behaviours. The primary aim of this study was to investigate associations between office layout and sitting, standing and stepping using objective measures.

Methods: A sample of office-based workers residing in England were fitted with thigh-worn time-stamped ActivPal accelerometers (to measure sitting, standing and stepping) and time-stamped RFID sensors (to measure office building location) were worn on lanyards around necks. Participants were asked to wear devices for five consecutive working days. Participants also completed questionnaires on standard demographics and putative socio-ecological correlates of work-related physical activity and sedentary behaviour. The final data will be analysed using multilevel regression analyses and results will be presented here. Below we report simple associations in a sub-sample of participants (n=33).

Results: In our sub-sample of 33 participants and using simple regression several strong associations can be identified for stepping and standing. The number of trips per hour to various locations was seen to correlate with the number of steps performed per hour (kitchen, R 0.646; other desks R 0.672). We also found a strong association between trips to kitchen and standing behaviour (R 0.579).

Conclusions: In our sub-sample of participants associations between office layout and postural characteristics can be observed. We will present final results here from the Active Buildings study.
Profiling the quantity and quality of movement in children in different contexts

Gareth Stratton¹,², Huw Summers¹,³, Claire Barnes¹,³, Cain Clark¹,⁴, Kelly Mackintosh¹,⁴

¹Swansea University, Swansea, Wales, UK, ²College of Engineering, Swansea University, Swansea, Wales, UK, ³Systemas and Process Engineering Research Centre, Swansea University, Swansea, Wales, UK, ⁴Applied Sport Technology Exercise and Medicine Research Centre, Swansea University, Swansea, Wales, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Physical literacy is an entitlement to healthy growth and development in children. Physical literacy encompasses fundamental movement skills and positive self-efficacy related to physical movement. Fundamental movement skills are key contributors to lifelong engagement in physical activity that in turn is related to all cause mortality. To allow a comprehensive analysis of both the quantity of activity and the quality of movement that determine it, detailed quantitative measures are required across time scales (Mannini et al, 2013). This can be achieved by using automated signal analysis of millisecond resolution acceleration data to report on exercise ‘quality’ through gait analysis together with data integration across longer timescales (minutes to days) to assess the ‘quantity’ of activity, previously unreported in the literature.

Method: We constructed our own sensor to measure physical activity and designed a number of experiments that sought to identify quality and quantity of movement in various contexts such as during running tests, fundamental skills assessment and play. We used a multi-time scale analysis to implement a novel approach to the profiling of activity and motion in children and to use this data for cluster based stratification of the cohort. Children wore a custom made, ankle worn MEMS device. Raw tri-axial acceleration traces from the device were used to derive various measures that describe both quantity and quality of motion. These included activity, duration and intensity, the spectral purity of the frequency content of the motion as well as key force characteristics of the gait trace.

Results: Preliminary data analysis confirmed that the quantity (5-20 minute profiles) and quality (50-500 ms profiles) was accurately assessed using the stored acceleration data. Profiling of the cohort using mean and coefficient of variation statistics for each of the quantifiers identified the stride-to-stride variability (quality indicator) in the individual motion as well as the population heterogeneity of the population.

Conclusions: Automated, quantitative profiling has allowed data from a cohort of children to be grouped together based on their similarity, enabling large amounts of data to be processed and allowing greater insight into both the quality and quantity of movement hitherto unavailable in the literature.
**Serious games in health promotion: do’s and don’ts**

**Convenor:**
Wendy Van Lippevelde, Ghent University, East-Flanders, Belgium

**Discussant:**
Nicky Ridgers, Deakin University, Australia

**Description:**
Rationale and purpose Serious games are becoming extremely popular as an intervention channel to change behaviour in children, adolescents and adults. Games are seen as an innovative, attractive and fun way to reach and engage people and create behaviour change on a larger scale. This element of fun is very important as it can foster players’ intrinsic motivation to play the game which can lead to more engagement and subsequently to more effects on behaviour. Nevertheless, earlier intervention studies using this innovative strategy to change nutrition and physical activity behaviours had only limited effects. Therefore, this symposium would like to provide some ideas on the use of serious games to make a success story of this intervention strategy.

**Objectives**
- To learn about the theory behind effective game mechanics and behaviour change techniques;
- To discuss best practices/lessons learned based on a review of successful and unsuccessful serious game interventions;
- To learn more about increasing emotional engagement of participants in game interventions via better game design including the use of the self-determination theory;
- To discuss the effectiveness of existing commercial exergames and the importance of the social structure/support to enhance game play;

**Summary**
The symposium will focus on providing perspectives on why earlier serious game interventions had only limited effects and adds lesson learned, best practices and suggestions to design future serious games and increase the likelihood of success. The first speaker (Elisabeth Lyons) will elaborate on effective game mechanisms and techniques based on a literature review. The second speaker (David Farrell) will present on optimising the game design by means of the self-determination theory in order to increase game engagement. And the third speaker (Amanda Staiano) will elaborate on the influence of social support to enhance game play while presenting a randomised controlled trial using existing commercial games.

**Format**
Chair: Wendy Van Lippevelde
Presenter 1: Elisabeth Lyons – Active gaming interventions: best practices and lessons learned
Presenter 2: Amanda Staiano – Self-selected exergaming intensity reduces adiposity among adolescents who adhere to a 12-week exergaming intervention
Presenter 3: David Farrell – How to create more engagement in a serious game? Improving the game design using the self-determination theory
Discussant: Nicky Ridgers
Active gaming interventions: best practices and lessons learned

Elisabeth Lyons
Institute for Translational Sciences, Galveston, USA

SIG: E- & m-health

Awards:

Purpose: Though a growing literature exists describing outcome evaluations of active video gaming interventions, few studies have reported process measures. There is a need for information on best practices learned via earlier projects. The purpose of this review was to investigate unexpected outcomes and discuss logistical issues related to several active gaming interventions.

Methods: A narrative synthesis of process and intermediate results across several randomized controlled trials of console (PS3, Xbox360, and Wii; N = 240 young adults) and mobile (Zombies, Run!, The Walk, etc.) video games (N = 80 adults 18 – 79 years old).

Results: Best practices include: 1) Objective surveillance provides necessary insight into behavior patterns over time, existing methods are friend ing systems, social networks, and even “selfies.” 2) Changes in popular culture can change game content acceptability. Older adult women are a population traditionally assumed to dislike violent horror-based stories. However, older adult women participated in a study of a zombie-themed walking game and often mentioned an older adult woman character from the popular TV show “The Walking Dead” as their inspiration. 3) Automaticity and simplicity are highly valued by participants. When possible, automatic activity logging is preferred to even minor manual input. 4) Provision of tablet or iPod mobile devices avoids numerous problems associated with smartphone provision. Older adult participants dislike smartphones specifically, but not tablet or iPod Touch devices. Additionally, participants of all ages tended to view the smartphones affordable in the context of research as sub-par and slow. 5) Finally, participants will move less if moving less is more fun than moving more. In the case of running simulation games, for example, running in place in a room was perceived as boring. To alleviate their boredom, participants experimented with methods of cheating, finding their trial-and-error of different methods of using active controllers to be more fun than the instructed method. Unfortunately, that trial-and-error produced smaller movements and thus lower energy expenditure than anticipated.

Conclusions: Implementing games for health interventions to increase physical activity is complex. Formative and process research as well as communication of lessons learned during implementation should help prevent unexpected consequences.
How to create more engagement in a serious game? Improving the game design using the self-determination theory

David Farrell, David Moffat
Glasgow Caledonian University, Glasgow, UK

SIG: E- & m-health

Awards:

Video games have great potential in supporting and motivating change. But creating the right kind of emotional engagement in a Serious Game is essential for this potential to be realised. Treating games as simple vehicles for ‘delivering a message’ does a disservice to play and ignores the role of design in their creation. It is not enough to suggest a “story” will sustain engagement. Stories come in all forms and can appeal to, or put off, players in equal measure. Similarly, it is not enough to ask that a game be fun; the way the game is fun may support behaviour change goals or may accidentally undermine them. Successful game design may be “one part intuition to two parts play-testing”, but when we intend to use games to affect some form of change the specifics of every part of the design are important. This talk will argue for more clarity of intent in Serious Game design; for using games, not as “spoonfuls of sugar” but rather as holistic experiences with deeply integrated cognitive and affective aspects. I will discuss some techniques that can help bridge the gap between cognitive and psychological theories and game design practice and will present some early stage research investigating methods to engage players using the principles of Self Determination Theory.
S16.3

**Self-selected exergaming intensity reduces adiposity among adolescent girls who adhere to a 12-week exergaming intervention**

Amanda Staiano, Arwen Marker, Robbie Beyl, Daniel Hsia, Peter Katzmarzyk, Robert Newton
Pennington Biomedical Research Center, Baton Rouge, USA

**SIG:** E- & m-health

**Awards:**

**Purpose:** Prescribing the intensity of exergaming (i.e. video gaming that requires gross motor activity) has reduced adiposity in adolescents. Because free choice is integral to gaming, it is important to understand the extent to which adolescents will self-select an intensity level that achieves adiposity reduction. This randomized controlled trial examined body composition and cardiovascular risk factors in a 12-week exergaming intervention for adolescent girls who self-selected play intensity.

**Methods:** Forty-one overweight/obese girls 14 to 18 years of age were randomly assigned to group exergaming (36 hours over 3 months) or to a self-directed care control condition. The exergaming condition played Just Dance and Dance Central on the Kinect for Xbox 360. Adolescents wore a pedometer and were provided with ongoing coach support during gameplay. At weeks 0 and 12, body fat and bone mineral density (BMD) were measured by dual-energy x-ray absorptiometry, subcutaneous (SAT) and visceral adiposity by magnetic resonance imaging, and cardiovascular risk factors by blood pressure percentile and fasting levels of glucose, insulin, triglycerides, and cholesterol. Group differences were tested using analysis of covariance controlling for baseline value, age, and race using intent-to-treat and per protocol (>75% attendance and >2600 steps/session).

**Results:** Participants were 16 ± 1.4 years of age and had a BMI z-score of 2.1 ± 0.5. The sample was 64.3% African American and 35.7% White. Attrition was 5%. On average, participants attended 79% of the 36 sessions and performed 2756 steps per 60 minute session. There were no significant condition differences in the intent-to-treat analysis. In the per protocol analysis for attendance, the intervention group significantly decreased SAT and increased spine and trunk BMD (all p values <0.05). In the per protocol analysis for steps/session, the intervention group significantly decreased leg %fat and decreased SAT and total adiposity (all p values <0.05).

**Conclusions:** Among adolescents who adhered, the exergaming intervention reduced body fat and increased BMD but was not sufficient to affect cardiovascular risk factors. For exergames to be used as effective weight management tools, social support mechanisms should be identified to elicit adolescents' adherence and intensity to achieve clinically meaningful outcomes.
**Nutrition and Physical Activity across the Survivorship Journey**

**Convenor:**
Fang Fang Zhang, Tufts University, Boston, MA, USA

**Discussant:**
Laurien Buffart, the EMGO Institute for Health and Care Research, Amsterdam, The Netherlands

**Description:**

**Purpose:** With advancements in cancer screening and treatment, cancer mortality rates continue to decline for most major cancer types globally. This translates into a growing cohort of cancer survivors worldwide, estimated to be over 30 million surviving at least five years post diagnosis. However, this success has also brought to the recognition that cancer survivors have significantly elevated risk of premature death and serious morbidity due to cancer recurrence, secondary cancers, and chronic health conditions such as cardiovascular disease and obesity. Cancer survivors also experience fatigue, depression, and pain, resulting in reduced quality of life.

**Rationale:** Nutrition and physical activity are one of the cornerstones for cancer prevention and control, and are among the few modifiable behaviours for preventing chronic health conditions and improving quality of life. Poor nutritional intake and sedentary behaviour can exacerbate morbidity in cancer survivors, while healthy dietary patterns and being physically active can serve a protective function. Health care professionals play critical roles in reinforcing the importance of healthy lifestyles for long-term health. It is imperative to assess health care professionals' knowledge and practice of providing lifestyle support to cancer survivors. Research is also needed to understand the targeted nutritional needs in cancer survivors and the mediators of lifestyle interventions to develop personalised lifestyle prescription for the growing population of cancer survivors.

**Objectives:** We aim to discuss the targeted nutritional needs in cancer survivors, the effect and underlying mechanisms of clinical- and community-based lifestyle interventions on survivors’ physical and psychosocial functioning and quality of life, and cost-effective strategies to integrate personalized lifestyle prescription into cancer care or community settings.

**Summary:** Four short papers will be presented on diet quality and nutritional intake in cancer survivors, the effect and underlying mechanisms of lifestyle interventions on survivors’ physical and psychosocial functioning and quality of life, and health care professionals’ knowledge and practice of physical activity promotion for cancer survivors. This will be followed by facilitated discussions on how to address specific nutrition and physical activity needs in cancer survivors through cost-effective interventions.
S17.1

Diet Quality in Association with Cancer Diagnosis and Treatment Exposures in Adult Survivors of Childhood Cancer: A Report from the St. Jude Lifetime Cohort

Fang Fang Zhang1, Rohit Ojha2, Kevin Krull2, Melissa Hudson0

1Tufts University, Boston, MA, USA, 2St. Jude Children’s Research Hospital, Memphis, TN, USA

SIG: Cancer prevention and management

Awards:

Purpose: Cancer treatment has been associated with elevated risk of chronic health morbidity at a young age in adults treated for childhood cancer. Nutrition is one of the cornerstones for preventing early onset of chronic diseases. Nutritional intake in childhood cancer survivors and its association with cancer diagnosis and treatment exposures are largely unknown.

Methods: We evaluated diet quality and nutritional intake in 2,570 adult survivors of childhood cancer in the St. Jude Lifetime Cohort (mean age=32.3 years) and associations with cancer diagnosis and treatment exposures. Diet was assessed using the Block Food Frequency questionnaire. The Healthy Eating Index (HEI)-2010 was used to quantify diet quality. Medical records were abstracted for cancer diagnosis and treatment exposures.

Results: The mean HEI-2010 was 57.9 (SD=12.4), of a 100 maximum score. Referenced to dietary guidelines, survivors consumed inadequate levels of vitamin D, vitamin E, potassium, fiber, magnesium, and calcium (27%, 54%, 58%, 59%, 84%, and 90% of the recommended intake) but excessive levels of sodium and saturated fat (155% and 115% of the recommended intake). Survivors diagnosed when <5 years had a lower diet quality compared to those diagnosed when ≥ 5 years (mean HEI-2010 score: 56.9 vs. 58.2, p=0.046). Survivors who received higher radiation doses to the abdomen had lower diet quality than those treated who received lower doses (mean HEI-2010 score = 58.9, 57.2, 56.7, and 56.1 for 0, 1-19.9, 20-29.9, and ≥30 Gy dose, respectively, p=0.02).

Conclusions: Adult survivors of childhood cancer have poor adherence to 2010 Dietary Guidelines for Americans. Findings highlight the need for ongoing evaluation with survivors to assess intake patterns and to promote healthy consumption for improved long-term health.
Mediators of the Effects of Resistance and Endurance Exercise on Global Quality of Life and Physical Function in Cancer Survivors who Completed Primary Cancer Treatment

Joeri Kalter¹, Caroline Kampshoff², Mai Chinapaw², Willem van Mechelen³, Goof Schep⁴, Irma Verdonck-de Leeuw⁵, Johannes Brug¹, Laurien Buffart¹

¹VU University Medical Center, Amsterdam, The Netherlands, ²Máxima Medical Center, Veldhoven, The Netherlands

SIG: Cancer prevention and management

Awards:

Purpose: To further build the knowledge of mechanisms underlying the exercise intervention effect on HRQoL, we tested the hypothesis that a combined resistance and endurance exercise program improves cardiorespiratory fitness and muscle strength, thereby reducing fatigue and consequently improving global quality of life (QoL) and physical function among cancer survivors who completed treatment including chemotherapy with curative intent.

Methods: We used data from the Resistance and Endurance exercise After ChemoTherapy (REACT) study. In the REACT study, 277 cancer survivors were randomized into 12 weeks of high intensity (n= 91), low-moderate exercise (n= 95) or a waitlist control (WLC) group (n= 91). Both exercise interventions were identical with respect to exercise type, duration and frequency, and only differed in intensity. Because we assumed the intervention effects to follow the same path, we combined both intervention groups (n=186). Path analyses using follow-up values (12 weeks) adjusted for baseline values were conducted to test if the exercise effects on global QoL and physical function (EORTC QLQ-C30) were mediated by changes in cardiorespiratory fitness (peakVO2), upper (handgrip) and lower body muscle strength (functional 30s chair-stand-test), and fatigue (multidimensional fatigue inventory).

Results: Compared with WLC, exercise increased cardiorespiratory fitness (β=1.8, 95% confidence interval (CI)= 1.0;2.6 mL/kg/min) and reduced general (β=-1.0, 95%CI=-1.8;-0.2) and physical fatigue (β=-1.5, 95%CI=-2.3;-0.6). The exercise effects on physical fatigue was mediated by change in cardiorespiratory fitness (β=-0.2, 95%CI=-0.4;-0.1). Higher muscle strength of the upper body was significantly associated with lower physical fatigue, and muscle strength of the lower body with physical and general fatigue. Lower general and physical fatigue were significantly associated with higher global QoL (β=-1.6, 95%CI=-2.2;-1.1 and β=-1.7, 95%CI=-2.3;-1.1, respectively), and physical function (β=-1.0, 95%CI=-1.3;-0.7 and β=-1.2, 95%CI=-1.6;-0.9, respectively). The models explained 44-61% of the variance in global QoL and physical function.

Conclusions: Beneficial effects of exercise on global QoL and physical function in cancer survivors were mediated by increased cardiorespiratory fitness, and subsequent reductions in fatigue. Improving cardiorespiratory fitness could therefore be an important intervention target to reduce fatigue and to improve cancer survivors’ global QoL and physical function.
A Mixed Methods Evaluation of the Feasibility and Physical and Psychosocial Impact of a Community-Based Adapted Chi-Gung Service for People Affected by Cancer

Anna Campbell, Graham Brennan
1Edinburgh Napier University, Edinburgh, UK, 2University of Glasgow, Glasgow, UK

SIG: Cancer prevention and management

Purpose: Emerging evidence suggests that chi gung can improve the physical and psychological wellbeing of cancer patients. However, very little is known about the feasibility and effectiveness of delivering an Adapted Chi-Gung (ACG) service in a community setting. This mixed methods research evaluated an 8-week programme of ACG for (1) Recruitment, retention and adherence levels; (2) the impact of ACG on the participants' active daily living (primary outcome), mood, fatigue, sleep patterns, confidence, cardiorespiratory and muscular fitness and balance (secondary outcomes); and (3) The participants' personal views and perceived benefits.

Methods: In this single arm feasibility study, pre and post assessments were undertaken with 14 participants (50% of the community cohort) measuring: Quality of Life (EQ5D), Fatigue (FACIT-F), Self-Efficacy, Anxiety and Depression (HADS), Mood (PANAS), Active Daily Living (SPAQ), Cardiorespiratory Fitness (6 min walk), Muscular Strength (seated bicep curl, sit to stand test), flexibility (‘back scratch’ test, seated ‘sit and reach test’) and Balance (4-stage Balance Test). Ten participants took part in a focus group at the end of their 8-week programme. A thematic analysis was used to understand the perceived impact of participation in ACG.

Results: Uptake was low due to lack of understanding of the intervention. Average age was 65.6 years (range 47-79 years). Paired sample t-test for mean values, identified significant differences for: PANAS negative scores (p=0.05) and self-efficacy for walking at the 5-minute (p=0.04). Improvements were also observed for self-reported walking, flexibility, HADS, FACIT and EQ5D scores. Network familiarity and interpersonal communication were strong themes for recruitment. Perceived benefits spanned the physiological, psychological and sociological dimensions of health; in particular, tangible coping strategies for psychological wellbeing and building capacity for daily physical activity. Progression to other programmes was affected by a lack of awareness and an attachment to the current programme.

Conclusions: Significant changes in mood and self-efficacy, self-reported increased walking time and perceived improved coping skills (physical and psychological) indicate a direct impact of participation in this 8-week programme. There is scope for further evaluation and additional work is needed to improve the profile of ACG and optimise recruitment to this service.
Health Care Professionals’ Knowledge and Practice of Physical Activity Promotion for Cancer Survivors in Ireland

Mairéad Cooney¹, Deirdre Walsh¹,², Bróna Furlong³, Catherine Woods¹
¹Dublin City University, Dublin, Ireland, ²Insight Centre for Data Analytics, Dublin City University, Dublin, Ireland

SIG: Cancer prevention and management

Awards:

Objective: In Ireland, there is limited evidence regarding the extent of exercise prescription within cancer care, or how this relates to published recommended guidelines. There is also a dearth of evidence that identifies the barriers experienced by health care professionals (HCPs) in recommending and using exercise with cancer patients. To address this, a Delphi study is currently underway to: i) explore HCPs’ knowledge and practice in promoting PA to cancer survivors, ii) to achieve consensus from HCPs on the barriers and motivators they experience in referring patients to community based exercise programmes (CBEPs), and iii) identify strategies to optimise the referral process to programmes of this nature.

Methods: A minimum of fifty HCPs working in oncology in hospitals and community based settings will be recruited. HCPs will be asked questions regarding: i) their demographic information, ii) opinions regarding PA for cancer survivors and iii) a series of open-ended questions regarding referral to CBEPs. A content analysis will be performed on the answers given to the open-ended questions in round one. A list of statements will be generated to form the second round questionnaire. Participants will rank these statements in order of importance. Quantitative data analysis will then be conducted on the responses to the survey in both rounds.

Results: Two rounds of the Delphi study will be conducted in order to reach consensus on the: i) key barriers and motivators experienced by HCPs in referring patients to CBEPs, and ii) strategies that would optimise the referral process to programmes of this nature.

Conclusions: Recommendations from oncologists have been shown to positively influence survivors’ PA levels and HCPs are encouraged to consider PA promotion as part of usual care for all cancer patients. With limited time and resources to facilitate this, it has been suggested that medical professionals refer patients to external sources for more comprehensive community-based support. This study will provide an insight into the knowledge and practices of HCPs working in oncology in Ireland in promoting PA to cancer survivors. It will also identify strategies to facilitate greater ease of referral by HCPs to CBEPs for cancer survivors.
Are physical activity, sedentary time and screen time associated with cognitive and psychosocial development in early childhood?

Convenor:
Dylan Cliff, University of Wollongong, Wollongong, NSW, Australia

Discussant:
Dianne Ward, University of North Carolina, Chapel Hill, NC, USA

Description:
Purpose: This symposium describes new evidence on the relationship between physical activity, sedentary time and screen time with cognitive and psychosocial development among preschool children.

Rationale: Early childhood is a critical period for cognitive, social and emotional development. Globally, levels of physical inactivity and sedentary behaviour among preschool-aged children are high. Likewise, mobile devices now provide young children with unprecedented access to electronic media for entertainment and education. Evidence indicates that television viewing during early childhood impacts important areas of cognition and psychosocial well-being. Robust evidence in older children indicates that physical activity is positively associated with learning and academic achievement. However the relationships of physical activity, sedentary time, and contemporary forms of screen time with cognitive and psychosocial development in early childhood are unclear.

Objectives: This symposium aims to provide topical evidence on the association between physical activity, sedentary time, and screen time with developmental outcomes in young children. Specific objectives are to investigate if:
- the volume, intensity or type of physical activity or sedentary behaviour are associated with key developmental outcomes?
- physical activity or sedentary behaviour have different short-term effects on preschool children’s executive functioning?
- changes in screen time cause improvements in social skills and cognitive functioning?

Summary:
Introduction - Dr. Dylan Cliff: including the significance of early childhood cognitive and psychosocial development and gaps in the evidence base examining the influence of physical activity, sedentary behaviour and screen time on developmental outcomes.
Presentation 1 – Dr. Valerie Carson: What is the association between objectively measured physical activity and sedentary time with cognitive development in children of the early years?
Presentation 2 – Ms. Jade McNeill: Physical activity, sedentary behaviour, and cognitive development in preschool children: Does type or intensity matter?
Presentation 3 – Dr. Pooja Tandon: Short term impact of physical activity on preschoolers’ cognitive functions
Presentation 4 – Dr. Trina Hinkley: Active Minds Happy Kids: a stealth-based pilot intervention to reduce screen time, support cognitive functioning and social skills in preschoolers

Format:
Dr. Cliff will provide an introduction (5min) to the topic. This will be followed by four presentations (10min each) of new research. Prof. Dianne Ward will follow the presentations and act as discussant for the symposium (5min), facilitating discussion (15min). Based on the presentations and following discussion, the symposium will be closed by highlighting the implications for practice and formulating recommendations for future research.
What is the association between objectively measured physical activity and sedentary time with cognitive development in children of the early years?

Valerie Carson, Aishah Abdul Rahman, Sandra Wiebe

University of Alberta, Edmonton, Alberta, Canada

SIG: Early care and education

Objective: The early years, birth to five years, are marked by the most intensive period of brain development throughout the lifespan. Current trends of high sedentary behavior and low physical activity in the early years may impact cognitive development. However, recent reviews indicate only two studies to date have examined these associations using objective measures of physical activity and sedentary time. Therefore, the objective of this study was to examine the associations between objectively measured physical activity, sedentary time and cognitive development in a sample of children in the early years.

Methods: Participants were 23 children aged 30 to 57 months from Edmonton, Canada. Data was collected between April and October, 2015. Data will be collected on an additional 68 participants by February, 2016. Sedentary time (<25 counts/15-sec), light-intensity physical activity (LPA; 25 to ≤420 counts/15-sec), and moderate- to vigorous-intensity physical activity (MVPA; >419 counts/15-sec) were accelerometer-derived using 15-sec epochs. Response inhibition was assessed using a computerized measure called the Fish-Shark Go/No-Go task. Working memory was assessed using a computerized measure called the Nebraska Barnyard task. All measures of cognitive development are age-appropriate with demonstrated reliability and validity. Sedentary time and working memory were log transformed. Correlations between variables were computed and effect sizes were examined.

Results: Average age of participants was 46.3±8.5 months and 65% of the sample was female. A small to medium effect size was observed between sedentary time and response inhibition (r=0.25). A small to medium effect size was observed between LPA and response inhibition (r=0.21) as well as working memory (r=0.29). A small to medium effect size was also observed between MVPA and response inhibition (r=0.19). A medium to large effect size was observed between MVPA and working memory (r=0.41). All other associations produced small effects.

Conclusions: Preliminary analyses found a medium to large and several small to medium effect sizes for correlations between physical activity and sedentary time and measures of cognitive development. Future analyses will examine the association between parent-reported screen time and cognitive development. Once data collection is complete, statistical significance will be evaluated and the implications of findings will be discussed.
Physical activity, sedentary behaviour, and cognitive development in preschool children: Does type or intensity matter?

Jade McNeill¹, Steven Howard¹, Stewart Vella¹, Trina Hinkley¹, Anthony Okely¹, Dylan Cliff²

¹University of Wollongong, Wollongong, Sydney, NSW, Australia, ²Deakin University, Deakin, Melbourne, VIC, Australia

SIG: Early care and education

Awards:

Objective: Although studies have examined associations between television viewing or physical activity and cognitive development in young children, objective measures of physical activity have rarely been used, and no studies have simultaneously investigated associations for physical activity, sedentary behaviour, and screen time. The purpose of this study is to examine if the type or intensity of physical activity, and the type or overall volume of sedentary behaviour are associated with cognitive development in preschool children.

Methods: 167 children (mean age=4.2±0.7y, 58% boys) participating in the Preschool Activity, Technology, Health, Adiposity, Behaviour and Cognition (PATH-ABC) study completed tasks from the iPad-based Early Years Toolbox (EYT). These assessed children's ability to select a desired response and inhibit an undesired response (inhibition - Go/No-Go), and their non-verbal short-term memory (visual-spatial working memory - Mr Ant). Light-intensity (LPA), moderate- to vigorous-intensity physical activity (MVPA), and sedentary time were measured by 7-day accelerometry (ActiGraph GT3X+). Parents reported children's participation in organised sports (individual or team sports) and weekly screen time (television programs/DVDs/movies, hand-held/computer games/ apps, and console games). Linear regression models examined associations, adjusting for preschool-level clustering and socio-demographic characteristics (age, sex, suburb-level socio-economic status, parental education, and cultural background).

Results: Participation in team sports was associated with higher inhibition scores (coefficient = 0.10, p=0.004), but LPA, MVPA, sedentary time, and screen time were not (p>0.05). Lower levels of television viewing (coefficient = -0.15, p=0.022) and LPA (coefficient = -0.09, p=0.008), and higher levels of MVPA (coefficient = 0.06, p=0.019) were associated with higher visual-spatial working memory scores. Other types of screen time and the type of physical activity were not associated with visual-spatial working memory (p>0.05).

Conclusions: The type and intensity of physical activity, and the type of screen time, were associated with different aspects of cognitive development in preschool children. Supporting participation in team sports and MVPA-promoting active-play, and reducing television exposure, may be beneficial for young children's cognitive development.
**S18.3**

**Short term impact of physical activity on preschoolers’ cognitive functions**

Pooja Tandon¹,², Dimitri Christakis¹,², Brian Saelens¹,², Liliana Lengua¹

¹University of Washington, Seattle, WA, USA, ²Seattle Children's, Seattle, WA, USA

**SIG: Early care and education**

**Awards:**

**Purpose:** There is compelling evidence in older children and adults that physical activity enhances cognitive performance, but experimental evidence of this in the early childhood years is lacking. The specific aims of this study are to test if physically active versus sedentary time differentially influence preschool aged children’s executive functioning in the short term. We hypothesize children’s executive functioning would be higher after physical activity than after sedentary activity.

**Methods:** Three to five year old children were recruited from and tested at their child care center. Using a pre-post cross-over design, children were randomly assigned to start with either: 15 minutes of typical preschool sedentary activities (e.g. storytime, crafts, coloring) or 15 minutes of directed physical activity (e.g. chasing games, running & jumping activities). Children wore accelerometers during their exposure condition. Immediately after each condition they underwent the same series of tasks to measure cognitive (Day/Night) and behavioral (Monkey/Dragon) inhibitory control, sustained attention (Butterfly), and working memory (Head-Toes-Knees-Shoulders), and self-reported mood. Approximately one week later, each child participated in the other condition and was re-tested. We conducted a within-subjects comparison of executive function and mood outcomes across the 2 conditions while controlling for relevant co-variates, including order of condition.

**Results:** Twenty-five children (mean age = 4.2 years, 32% girls) completed the study. Data will be collected on an additional 30 children by March 2016. Accelerometry confirmed that the desired activity level was achieved in each condition (physical activity: mean activity count=807 and 73% of time in MVPA; sedentary: mean activity count=68 and 92% of time sedentary). Children performed better on the Day/Night cognitive inhibitory control task after physical activity vs sedentary time (0.79 vs. 0.65, p=0.06). On There were no significant differences by condition on the other executive function tasks or reported mood with the current sample size.

**Conclusions:** Even short durations of physical activity may enhance some aspects of young children’s cognitive functioning. Further conclusions are pending completion of the study.
**Active Minds Happy Kids: a stealth-based pilot intervention to reduce screen-time, support cognitive functioning and social skills in preschoolers**

Trina Hinkley¹, Dylan Cliff³, Jarrad Lum², Kylie Hesketh⁰

¹Deakin University, Centre for Physical Activity and Nutrition Research, Burwood, Victoria, Australia, ²Deakin University, School of Psychology, Burwood, Victoria, Australia, ³Early Start Research Institute, School of Education, University of Wollongong, Wollongong, New South Wales, Australia

**SIG: Early care and education**

**Awards:**

Objectives Preschoolers spend a large amount of time in screen-time which may be detrimental to growth and development. Parents are reluctant to reduce screen-time and fail to appreciate potential impacts on their preschool child. Focusing on characteristics with saliency to parents may be an effective behaviour change approach. This study examines the potential efficacy of a family-based, online intervention targeting cognitive functioning and social skills as a means to reduce preschoolers' screen-time.

Methods This pilot intervention assigned families within preschools to either a wholly-online (n=11 preschools, 26 families) or online with one group session (n=3 preschools, 16 families) intervention. The intervention included weekly activities to support cognitive functioning and social skills and decrease screen-time. Social Cognitive and Family Systems Theories underpinned program development. Parents participated in eight weekly sessions covering topics including screen-time recommendations, behaviour change processes and strategies, language development and seven social skills (e.g. communication, empathy). Screen-time and social skills (Social Skills Rating Scale) were assessed by parent-proxy report; cognitive functioning was assessed using the NEPSY-II (a standardised neuropsychological test; memory/theory of mind subtests). Cross-sectional associations between dependent and independent variables were assessed using linear regression. Potential efficacy will be assessed by comparing within- and between-group changes from pre- to post-intervention using regression and Cohen’s d. Follow-up data are currently being collected (October 2015).

Results At baseline, children spent 127 and 199 mins/day on week and weekend days, respectively, in screen-time (p<0.001). Children’s average daily time in sedentary electronic games was positively associated with sentence repetition as an indicator of memory. Children’s total screen-time on weekdays was inversely associated with Theory of Mind (verbal score). Average daily time using computers and in total screen-time were inversely associated with total social skills. Computer use was inversely associated with assertion and weekend day TV viewing was inversely associated with cooperation (all associations p<0.05).

Conclusions Significant associations of screen-time variables with indicators of cognitive functioning and social skills suggest that changing screen-time may impact these outcomes. Providing parents with suggestions of activities to minimise screen-time and to support cognitive functioning and social skills may positively impact both behaviour and outcomes.
**Role of the built school environment in physical activity promotion**

**Convenor:**
Mark Hamer, Loughborough University, Loughborough, UK

**Discussant:**
Greet Cardon, Ghent University, Ghent, Belgium

**Description:**
Purpose: The effects of interventions to increase physical activity (PA) in young people have been at best modest, and alternative approaches are required. Children spend approximately 60% of weekdays in school where PA levels are at their lowest. The school environment therefore presents an important setting for intervention. Many school-based interventions have focused on physical education (delivered once or twice a week) or curriculum-based approached, finding only small effects. Environments can both facilitate and hinder PA, but also provide the arena for activity. However, there is little robust empirical evidence concerning the effect of changing the (school) physical environment on PA levels in children. The aim of this symposium is to present findings from several novel studies on the physical environment and PA in school age children.

Rationale: Promoting PA behaviour in young people and the role of the environment are both key topics of interest at ISBNPA. To date, PA interventions in young people have produced modest effects, and exploring non-educational approaches is warranted.

Objectives: i) to present associations between school environments and (changes in) PA in different contexts; ii) to understand the effectiveness of physical and social environmental interventions on PA in primary schools; iii) to discuss opportunities for PA promotion through the school environment and identify areas of further research.

Summary: Four international speakers will present data covering an array of study designs, including young people ranging from pre-schoolers to adolescents. Using observational data, Rachel Jones (University of Wollongong, Australia) will present on the association between the preschool environment and preschoolers’ sedentary behaviour and PA, followed by Esther van Sluijs (University of Cambridge, UK) presenting longitudinal analyses of the association between change in school environment and PA over the transition from primary to secondary school. This will be followed by evidence from intervention studies: Dave van Kann (Maastricht University, NL) will present results of the Active Living trial evaluating physical and social environmental interventions in primary schools; and Mark Hamer (Loughborough University, UK) will present results of the Camden Active Spaces natural experimental study of introducing new playground design in primary and secondary schools from a deprived area of London.

Format: Chaired by Mark Hamer, the session topic will be introduced by Esther van Sluijs followed by the four presentations of original data (10+2mins). Lastly, Greet Cardon (Ghent University, Belgium) will act as the discussant, drawing upon the presentations and her wider experience of school-based environmental interventions.
The relationship between physical activity levels, sedentary behaviour and the childcare environment: A cross sectional study.

R Jones, M Peden, S Costa, Y Ellis, T Okely
University of Wollongong, Wollongong, Australia

SIG: Children and families

Purpose: The purpose of this study was to investigate the relationship of the childcare environment to physical activity and sedentary behaviour among toddlers and preschoolers.

Methods: Data were collected from 68 toddlers (1.0-2.9 years) and 233 preschoolers (3.0-5.9 years), recruited from 11 childcare services in New South Wales, Australia. The childcare environment was assessed using the Environment and Policy Assessment Observation System (EPAO) and services were categorised based on their EPAO total scores and scores for each of the EPAO sub-categories. Physical activity and sedentary behaviour were assessed objectively assessed using activPAL accelerometers. Children wore the monitor on their right thigh whilst at childcare over a period of a week. Multi-level mixed effects linear regression was used to examine the relationships between total and sub-category EPAO scores and time spent sitting, standing and stepping.

Results: Compared with preschoolers who attended services with low and medium EPAO scores, preschoolers who attended high EPAO services sat less (mean [95%CI]= -7.81mins [-26.64,11.02]). Toddlers who attended high EPAO services sat more (8.73 mins [10.26,27.73]) and stood less (-13.64 mins [-29.27,2.00]) than those who attended low EPAO services. Preschoolers who attended services with high scores for the following EPAO sub-categories also spent less time sitting: active opportunities (-8.52 mins [-23.69,6.66]), portable play equipment (-13.37 mins [-35.00,8.25]). Compared with toddlers who attended services categorized as having a high sedentary environment, those with a low sedentary environment spent less time sitting (-16.09 mins [-34.02,1.84]) and more time standing (mean 4.65 mins [-10.41,19.72]) and stepping (9.10 mins [-2.25,20.44]).

Conclusions: This is the first known Australian study to investigate the relationship between the childcare environments, physical activity and sedentary behaviours among toddlers and preschoolers. This study provides insights into the differences between both age groups and the results highlight that particular aspects of a supportive environment are related to physical activity and sedentary behaviour in children.
**School policies, programmes and facilities and objectively measured physical activity and sedentary time: associations over the transition from primary to secondary school**

E Van Sluijs¹, K Morton¹, K Corder¹, F Harrison², A Jones², M Suhrcke³, A Atkin¹

¹University of Cambridge, Cambridge, UK, ²University of East Anglia, Norwich, UK, ³University of York, York, UK

**Purpose:** There is increasing policy interest in ensuring that the school environment supports healthy behaviours, but most research to date is cross-sectional. We examined longitudinal associations between changes in school policies, practices and facilities for physical activity (PA) over the transition from primary to secondary school, and changes in young people’s school-based objectively-measured activity intensity.

**Methods:** Change in accelerometer-derived PA (change in proportion of time spent sedentary (SED), and in light PA and moderate-to-vigorous PA, MVPA) during school hours and lunchtime from 325 participants in the SPEEDY study was obtained from baseline measurements (10 years, primary school) and +4y follow-up (14 years, secondary school). On each occasion, school staff reported on nine school environment characteristics, including school-level policies (e.g., total break time, hours of PE, extracurricular PA provision), details of the school’s physical environment (e.g., high quality facilities) and wider school attitudes relating to PA. The association of changes in school environment with changes in PA and sedentary time was examined using cross-classified linear regression models adjusted for sex, age, BMI and family socio-economic status. Effect modification by sex was investigated.

**Results:** Moving from primary to secondary school, students increased time spent sedentary during the school day and decreased time spent in light PA and MVPA. Environmental features differed substantially between primary and secondary schools (e.g., secondary schools reported shorter breaks, more lunchtime PA opportunities, and higher number of sports facilities). Results of the regression analysis showed that participants moving from a school without PA opportunities at lunchtime to a school that did exhibited smaller increases in SED and smaller reductions in MVPA. An increase in the duration of breaks was associated with smaller reductions in MVPA over the whole school day.

**Conclusions:** Only lunchtime PA opportunities and length of break are associated with objectively measured activity intensity over the transition to secondary school. As evidence indicates greater change in activity during breaks, interventions targeting break time may be warranted at both primary and secondary school.
The effect of a multicomponent school-centered intervention on physical activity and sedentary behavior in primary school children: the Active Living study

D Van Kann¹, S Kremers¹, N de Vries¹, S de Vries², M Jansen¹

¹Maastricht University, Maastricht, The Netherlands, ²The Hague University of Applied Sciences, The Hague, The Netherlands

SIG: Children and families

Awards:

Purpose: Increased levels of physical inactivity emphasize the necessity to prevent sedentary lifestyles and stimulate physical activity (PA) in early life. The aim of the current study is to examine the effectiveness of multicomponent school-centered PA interventions, called ‘Active Living’, on children’s daily PA levels.

Methods: A quasi-experimental design was used including 10 intervention schools and 10 matched control schools. The baseline measurement took place between March and June 2013 and follow-up was conducted 12 months afterwards. Objectively assessed PA data of 791 children were collected and complemented with questionnaire, weather condition data, and process evaluation data on implementation magnitude. Implementation magnitude was measured by keeping logbooks on the number of implemented physical environmental interventions (PEIs; average number implemented = 4; SD=2) and social environmental intervention (SEIs; average number implemented = 5; SD=2). The number of implemented interventions was dichotomized (High/Low) using median split and a ‘set of interventions’ variable was defined as high magnitude set if both the dichotomized PEIs and SEIs variable was high. Other combinations were defined as low magnitude, whereas the number of implemented interventions in control schools was set to zero. Multilevel multivariate linear regression analyses were performed to study change in sedentary behavior (SB), light physical activity (LPA) and moderate-to-vigorous physical activity (MVPA) between baseline and follow-up. Models included demographics, weather conditions and the implementation variable, i.e. condition (exposed-not exposed), number of PEIs, number of SEIs, and ‘set of interventions’ respectively, as independent variables and schools as higher-level covariate.

Results: No differences in PA and SB were found between children exposed and not exposed to Active Living after 12 months. However, children attending schools that implemented both a high number of physical and social environmental interventions performed 15 minutes more LPA per weekday as replacement of SB at follow-up compared to children in the control condition (Effect Size=0.41; p<.05). No changes were found on MVPA. A limited number of interventions implemented did not result in significant changes in PA levels.

Conclusions: Multicomponent school-centered PA interventions hold potential to activate children, but a comprehensive set of interventions elements with a sufficient magnitude is necessary.
The effect of active school playgrounds on children’s physical activity levels: Camden Active Spaces

M Hamer\textsuperscript{1,2}, D Aggio\textsuperscript{3}, C Kipps\textsuperscript{2}, L Smith\textsuperscript{2}

\textsuperscript{1}Loughborough University, Loughborough, UK, \textsuperscript{2}University College London, London, UK

SIG: Policies and environments

Awards:

Purpose: The school environment is a promising setting to increase children's physical activity (PA) but limited empirical evidence exists on how a change in the outdoor physical school environment influences PA behaviour. The aim was to evaluate the impact of redesigned playgrounds on objective PA in seven schools from a deprived London borough.

Methods: Seven experimental schools and two control schools were recruited at baseline. Before the construction of the new playgrounds (summer term 2014), baseline assessments were conducted that included a series of fitness tests, anthropometric and questionnaire measurements, and 7-day objective PA monitoring (Actigraph accelerometer). These assessments were repeated at follow-up one year later (summer term 2015). Changes in overall PA and levels during different times of the day (eg, school breaks) will be examined using multilevel regression modelling.

Results: The baseline sample comprised 450 students (mean age = 9 years, 51% boys: 36% Caucasian). Boys spent on average 35 minutes a day in moderate-to-vigorous PA and girls just 22 minutes. At follow up 390 pupils attended assessment and data are presently being analysed. The final results will be presented in this symposium.

Conclusion: The present sample recorded low levels of PA at baseline. We hypothesise that the new playgrounds will increase PA during school and reduce sedentary time, consequently improving levels of general fitness and wellbeing.
Urban Green Spaces: using novel methodologies to explore visitation and green space-based physical activity

Convenor:
Jenny Veitch, Deakin University, Burwood, Victoria, Australia

Discussant:
Myron Floyd, NC State University, Raleigh, North Carolina, USA

Description:
Purpose: Urban green spaces or parks are important settings that provide opportunities for physical activity and for facilitating health-related environmental justice in low-income and developing communities and countries. Despite the potential of parks for physical activity, parks are generally under-utilised and park visitors are not necessarily active. To optimise visitation and physical activity it is necessary to better understand characteristics of park visitors and how park design may encourage visitation. Research is required to provide policy makers, planners and public health practitioners with information on how to plan and design parks and interventions to optimise the value and use of parks for physical activity and other health benefits.

Rationale: The integration of new approaches and methodologies can generate novel hypotheses and findings to better understand park visitation and the associated physical activity and health benefits. The presentations in this symposium will describe innovative methodologies and provide an overview of the state of the research in the field.

Objectives: The aims of this symposium are i) to present current evidence about the role of parks for fostering physical activity and health, ii) to showcase novel methods, iii) to provide a platform for guiding future research, and iii) to stimulate collaboration among researchers and public health professionals related to the role of parks in population-level physical activity promotion and highlight opportunities for cross-country research.

Summary: This symposium will provide an international perspective on the role of urban green space for physical activity and health and will include speakers from Australia, United States and Denmark. Each presentation describes a different methodology and will highlight where the field is heading and questions for future research. The symposium will also provide ample opportunity for discussion, which will be facilitated by internationally-recognized leader on the relationship between urban green space and health among low-income communities, Professor Myron Floyd.

Format: The symposium will comprise the following panel members and presentations:
1) Dr Jenny Veitch (chair): Understanding typologies of park visitors using latent class analysis (Australia)
2) Dr. J. Aaron Hipp: Using captured images to evaluate the spatio-temporal use of public open space (USA)
3) Dr Hayley Christian: Measuring the relationship between outdoor natural (tree canopy coverage) and built shade coverage and children’s physical activity in the urban environment (Australia)
4) Dr Jasper Schipperijn: Effect of park renovations on adolescent physical activity in a low SES neighborhood in Copenhagen (Denmark)
5) Professor Myron Floyd: discussant (USA)
A Latent Class Analysis Approach to Understanding Park Visitation

Jenny Veitch¹, Wei Wang¹, Jo Salmon¹, Alison Carver², Billie Giles-Corti², Anna Timperio³

¹Deakin University, Burwood, Victoria, Australia, ²University of Melbourne, Melbourne, Victoria, Australia

SIG: Policies and environments

Awards:

Objective: Physical inactivity is a major contributor to the burden of chronic disease. Parks are important settings that provide opportunities for physical activity across the lifespan. To optimize visitation and park-based physical activity it is necessary to better understand the characteristics of visitors and the activities they are involved with whilst in the park. Few studies have examined park visitor typologies according to socio-demographic characteristics or gathered information on park visitation while the visitors are actually visiting the park. This study aimed to identify typologies of park visitors and to examine associations between these typologies and socio-demographic characteristics.

Methods: One-on-one intercept interviews were completed with 794 adult park visitors in April 2013 at large metropolitan parks located in high and low socio-economic status areas of Melbourne, Australia. This study used latent class analysis (LCA) in Mplus with seven park visitation characteristics and several socio-demographic covariates. This technique used maximum likelihood procedures to separate respondents into an optimal number of unobserved (i.e. latent) classes characterised by meaningful and mutually distinctive subgroups.

Results: The majority of park visitors were female (56.3%) with a mean age of 46.3 years (SD=14.87) and less than half were dog owners (42.8%). Three classes of park visitor were identified: 1) physically active visitor, with dog (12.4%); 2) physically active visitor, with no dog (35.7%); and 3) infrequent, low active, social visitor (51.9%). Respondents who were older and owned a dog had higher odds of being a physically active visitor, with dog (Class 1) and a physically active visitor, with no dog (Class 2). Respondents who had children had higher odds of being an infrequent, low active, social visitor (Class 3). Respondents who reported poor health were more likely to be in Class 3 than in Class 2.

Conclusion: Park-users can be distinguished by the behaviours in which they engage. Understanding typologies of visitors will assist with the development of intervention strategies to optimise park visitation and park-based physical activity. Different interventions and park features may be warranted to encourage different types of park visitors with varying socio-demographic characteristics to visit and be active in parks.
Using captured images to evaluate the spatio-temporal use of public open space

J. Aaron Hipp, Alicia Manteiga, Deepti Adlakha, Abby Stylianou, Robert Pless

SIG: E- & m-health

Objective

There are a diversity of public open spaces (plazas, parks) under the surveillance of public, online, streaming webcams. Can these webcams be used to evaluate the spatio-temporal use of public space and how and when use may differ following built environment or programmatic changes?

Methods

Since 2006 the Archive of Many Outdoor Scenes (AMOS) has captured and archived images every 30 minutes from 30,000 international public, outdoor, webcams. Ten percent of these webcams are capturing images on public open spaces allowing for the audit of built environments and annotation of human behaviors (e.g., pedestrian activity, cycling). We identified 25 international plazas, squares, and parks, most with visible built environment or programmatic changes, and annotated use of public space.

Over a two week period 200 timestamped images during daylight hours were randomly selected and annotated per webcam (n=5,000). The annotation process was completed by an online crowdsource with Research Assistant validation. Annotation included the digital drawing of polygons around each person captured in a scene, resulting in two forms of data; 1) number of people per scene and 2) raster data on location of people in the scene.

Data was analyzed to determine change in number of people present pre and post built environment change or program (e.g., farmer’s market). Heat, or density, maps of scenes have been created from raster data to analyze density of use across time of day and day of week.

Results

An average of 22.5 people were captured per image of public open space. Use across days of the week were significantly different (F= 6.72, p<0.001) with Saturday representing the greatest number (29.7) and Thursday the fewest (17.5). There was also a significant difference in the number of people present during programs (32.7) versus non-programmed time (24.9; t=4.25, p<0.001) and more people were present after noon, compared to before (t=-9.38, p<0.001).

Conclusions

Captured images from public webcams can be used for the public health surveillance of public open space utilization across time and space. Methodologies developed and presented here are scalable across webcams and environments and provide non-invasive and biased evaluation of use of space.
Measuring the relationship between outdoor natural (tree canopy coverage) and built (structure) shade coverage and children’s physical activity in the urban environment

Hayley Christian¹, Zakia Jeemi², Bryan Boruff², Jasper Schipperijn²

¹The University of Western Australia, Crawley, WA, Australia, ²University of Southern Denmark, Odense, Denmark

SIG: Policies and environments

Awards:

Objective

Natural and built shade is an effective protection measure against exposure to harmful ultraviolet radiation (UVR). This is particularly relevant for geographical areas characterized by high solar UVR levels. Yet time spent outdoors is a known determinant of children’s physical activity behavior. Provision of shade across different environmental settings where children spend their time may facilitate outdoor play as well as minimize over-exposure to harmful levels of UVR. This study investigates UVR exposure and physical activity levels of children aged 2 to 5 years and associations with outdoor shade coverage in the home, neighborhood and center-based childcare environments.

Methods

Participants (n=300 children 2-5 years) involved in the Play Spaces and Environments for Children’s Physical Activity (PLAYCE) Study had their physical activity levels measured over 7 days using accelerometers. Time spent outdoors was measured objectively using Radio Frequency Identification (RFID) and Global Positioning Systems (GPS) units. Personal UVR exposure was objectively measured using polysulphone (PS) film mounted in small cardboard holders pinned to a child's shoulder.

A bottom up (sky-view factor - SVF) and top-down (shade coverage from remote sensing imagery) measure of outdoor shade coverage was utilized. The SVF was measured using fisheye photography taken in outdoor play areas. Remotely sensed imagery was used to calculate percent vegetation (tree canopy) coverage. Measures were taken at the childcare center and home level.

Results

We hypothesized that the level of outdoor shade coverage is negatively associated with UVR exposure and positively associated with children’s physical activity levels. Data collection and analysis will be finalized in April 2016.

Conclusions

Limiting exposure to UVR and the attainment of adequate physical activity levels are two important health behaviors influenced by outdoor shade provision. Both behaviors are indirectly associated with each other through time spent outdoors. Health promotion strategies that focus on the provision of sun protective physical environments (i.e., shade coverage) may positively influence both UVR exposure and physical activity levels of young children. Findings provide the evidence base to inform early educators, local planners, landscape architects and policy-makers of the importance of green urban environments for children’s health and wellbeing.
Effect of park renovations on adolescent physical activity in a low SES neighborhood in Copenhagen

Jasper Schipperijn, Henriette B. Andersen, Jens Troelsen
University of Southern Denmark, Odense, Denmark

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective
Assess the effect of large scale park renovations on adolescent physical activity in a low SES neighborhood in Copenhagen.

Methods
In 2011, the City of Copenhagen, the Danish capital, carried-out a large scale urban renewal project in a low-income neighborhood, with focus on increasing the possibilities for youth to be active. The interventions included a 22 million Euro renovation of a large park, with funds donated by philanthropic foundations. This provided a unique opportunity for a natural experiment in which we could measure the changes in adolescent park use and PA levels during park use before and after park renovations. Roughly 500 teenagers (10-16 years old) enrolled in four local schools wore an accelerometer and GPS for a week in spring 2010 and again in spring 2012. All GPS and accelerometer data were compiled and joined using the Personal Activity Location Measurement System (PALMS), and data were further processed in a custom build PostgreSQL database. Time spent in different activity domains, as well as different locations was calculated, as was time spend in MVPA. Data were analyzed in STATA using a mixed multilevel model to examine both unadjusted and adjusted models.

Results
At baseline, 359 participants provided valid data for, on average, 3.2 valid days. At follow-up, 324 participants provided 4.4 valid days on average. Boys aged 10-12 (children), were significantly more active during leisure time at follow-up (19 min/day at baseline, 26 min/day at follow-up). Girls aged 13-16 (adolescents) increased their leisure time MVPA from 9 to 17 minutes per day. Overall daily MVPA did not change significantly. The majority of the participants lived within 1km of the large renovated park, but only 69 at baseline and 81 at follow-up used the park. Time spent in the park in general, as well as time spent in the park in MVPA did not change significantly.

Conclusions
Despite large scale park renovations, in part aimed at increasing activity among 10-16 years olds, the average time spent in the park did not change for our participants, nor did the time spent in MVPA in the park.
Recent developments in ICT assisted collection of dietary data

Convenor:
Bent Mikkelsen, Aalborg University, Copenhagen, Denmark

Discussant:
Mingui Sun, Pittsburgh University, Pittsburgh, PA, United States

Description:
The considerable costs associated with collection of dietary data have fuelled a huge interest in new ICT assisted methods that make such collection easier. Easy-to-use portable intelligent devices is spreading and there is an increased accessibility of mobile technologies, including smartphones, personal digital assistants, touch pads and ultra-portable computers. This has made them more feasible for use by researchers and health care service providers for monitoring health behavior, compliance and effectiveness. The new technologies allow for detailed analysis for example of patterns of physical activity, food intake, addictive behaviors and environmental exposure either in real-life or simulated, virtual settings to study new choice architectures that aim to facilitate healthy choice. The aim of the symposium is to present some of the new technologies that has been developed by some of the research groups from the growing food & devices community. The symposium will be highly interactive with presentations of technologies such as the eButton, DIMS, Splendid and similar devices that includes imaging technologies, The aim of the symposium is to create a special interest group that will function as a platform for exchange of research based knowledge and news about easy-to-use portable intelligent technologies and aims at linking scholars in the field across the globe.

• Introduction to the symposium

• Lifestylelogging with the eButton – results from dietary assessment studies. Mingui Sun, Professor, Pittsburgh University

• Real time smart monitoring of eating patterns during main meals – the Splendid technology. Monica Mars, Wageningen University

• Monitoring of patient intake with the Dietary Intake monitoring system (DIMS) – predicting low nutritional intake. Bent Egberg Mikkelsen, Professor Aalborg University

• Online assessment of dietary intake and provision of real-time feedback, Clare Collins, Professor University of Newcastle,

• Discussion and hands-on demo
Translating national Australian dietary guidelines to a web-based tool to evaluate diet quality and provide real-time feedback and brief advice: the Healthy Eating Quiz

Claire Collins1,2, Tracy Burrows1,2, Melinda Hutchesson1,2, Megan Rollo1,2
1School Of Health Sciences, Faculty of Health, University of Newcastle, Callaghan New South Wales, Australia,
2Priority Research Centre in Physical Activity and Nutrition, Faculty of Health and Medicine, University of Newcastle, Callaghan New South Wales, Australia

SIG: Policies and environments

Awards: No

Background: The Australian Dietary Guidelines (ADGs) recommend consuming a wide variety of nutritious food from core groups. Adherence to ADGs has been evaluated for epidemiological purposes using validated diet quality indexes and scores, with evidence demonstrating reduced risk of all-cause and disease specific morbidity and mortality.

Aim: To describe the adaptation of a validated brief diet quality index, the Australian Recommended Food Score, that reflects ADG adherence, into a freely available web-based tool, the Healthy Eating Quiz (HEQ). To report data related to HEQ use and scores obtained over the first years of use.

Method: The 70-question HEQ was derived from a sub-set of questions from a validated food frequency questionnaire (FFQ) with eight food group sub-scales. The relationship between HEQ and FFQ nutrients and food groups was evaluated in 96 adults (65 female) by fitting linear regression models.

Results: HEQ was strongly positively related to FFQ nutrient and food groups intakes [vitamin C 53% ] (95%CI 37-67%), vegetables 45% (23-61%) and negatively with %energy from saturated fat (-23%), indicating validity compared to usual intake. HEQ takes 5 minutes to complete online at www.healthyeatingquiz.com.au, with real time feedback provided, plus advice on how to improve sub-scale component scores in a personalised report that can be printed or emailed. HEQ is linked to websites (e.g. Back to Basics, Healthy Dads Healthy Kids), and via media articles on nutrition. Since February 2012 the HEQ has been completed by thousands of people, the majority between age 16 and 35 years. User feedback from version 1 after the first year was incorporated and version 2 released in February 2013. HEQ scores indicate individual diet quality is commonly low (36%) to moderate (27%) with sub-scales requiring most improvement being lean animal protein (53%), wholegrains (49%), fruit (37%) and vegetables (36%). Further evaluation of the HEQ as a strategy to promote adherence to the Australian dietary guidelines is warranted.
Lifestyle logging with the eButton – Results from Dietary and Physical Activity Assessment Studies

Mingui Sun\textsuperscript{1}, Wenyan Jia\textsuperscript{1}, Lora Burke\textsuperscript{1}, Zhi-Hong Mao\textsuperscript{1}, Tom Baranowski\textsuperscript{2}

\textsuperscript{1}University of Pittsburgh, Pittsburgh, USA, \textsuperscript{2}Baylor College of Medicine, Houston, USA

SIG: Policies and environments

Awards: No

In recent years, wearable electronic devices have entered many people’s daily life, adding new functions to those provided by smartphones and tablets. As “always-on” miniature devices in the personal space, they are playing increasing roles in monitoring people’s health and wellness. With research grants from the National Institutes of Health in the United States, we have developed a wearable device called eButton for objective evaluation of diet and physical activity. The size of eButton is similar to a common chest button, and its weight is only about one-fifth of a smartphone. The face of the eButton is covered by a removable sticker which can be designed personally. Despite its simple and personalized appearance, eButton is a complex miniature computer with a powerful CPU and massive data storage. It is also equipped with an array of sensors, including a wide-angle video camera, a light sensor, an inertial measurement unit (containing an accelerometer, a gyroscope and a magnetometer), a global positioning system (GPS) receiver, and a barometer. We have developed data processing algorithms and software to process the massive amounts of data acquired by eButton, including food identification, portion size measurement, calorie and nutrient determination, physical activity identification, and calorie expenditure estimation. The eButton has also been used to measure the heart rate and respiratory rate non-invasively without any skin contact. We have conducted a series of experiments on human subjects in real life and demonstrated the usefulness of this multifunctional wearable device.
Real time smart monitoring of eating patterns during meals – the SPLENDID technology

M Mars, I Ioakeimidis, C Maramis, C Diou, J van den Boer, B Langlet, A Delopoulos, Splendid Consortium

Multimedia Understanding Group – Information Processing Lab, Aristotle University of Thessaloniki, Thessaloniki, Greece

SIG: E- & m-health

Awards: No

SPLENDID is an EU-funded collaborative project that intends to develop a personalised guidance system for training adolescents and young adults to improve their eating and activity behaviour. The SPLENDID system builds on an existing device, i.e., the Mandometer®, complementing it with an accelerometer, a bio-sensor that detects chewing, a mobile application and a web-based tool, creating a comprehensive system for quantifying, monitoring and potentially modifying lifestyle behaviour. The Mandometer® is a portable weight scale that registers the food-on-plate weight throughout a meal and communicates with the SPLENDID app through Bluetooth. The app stores the resulting food weight time-series into its database. The meal recording functionality is delivered through a useable user interface (UI) that also allows for user input, collecting subjective, meal-related information. Sophisticated algorithms are processing the data on the mobile phone before sending it to the server, making it possible to give real-time feedback on behaviour. The chewing sensor an ear worn device incorporating an open air microphone and a photophethysmography (PPG) sensor, is SPLENDID’s second option for meal recording. The sensor collects chewing signals, which are then processed in order to automatically detect occurrences of eating episodes and provide objective snacking behaviour information. The processing algorithms will also be integrated into the SPLENDID app. So far, the first version of the system has been tested in a group of 40 adolescents and 20 young adults. In these experiments, subjects wore the system in a realistic, semi-controlled setting. The presentation will entail the technical progress and evaluation results that been obtained with the first functional version of the system.
Monitoring of patient intake with the Dietary Intake monitoring system (DIMS) – predicting low nutritional intake

Bent Mikkelsen, Kwabena Ofei, Michal Dobroczynski

Aalborg University, Copenhagen, Denmark

SIG: E- & m-health

Awards: No

Data collection in dietary intake studies using traditional methods is costly and time consuming. As a result there is great interest in the development of ICT assisted methods. This paper present the DIMS technology - a device for easy capturing dietary data. It has been developed for collecting data about patient’s meals in foodservice. Data has shown that lack of nutritional monitoring and large amount of food waste is a problem at hospitals. Against this background the DIMS was developed. Qualitative data was collected on practices related to meal service at hospital wards using practice theory as conceptual foundation. After that the DIMS prototype was designed. It is able to estimate the type and amount of plated food using imaging, weighing scale, and ID technology: first the plated meal is recorded and second the returned plate is recorded. The system return the estimated intake and plate waste. The DIMS offers the functionality of being in a co-creational mode in which user-inputs can be added from a handheld computer to improve accuracy. The paper present results from feasibility and validation studies. Results show that the time spent on nutritional monitoring can be reduced from 15 to 4 minuites. The DIMS output was able to predict nutritional risk since patients at nutritional risk produced increased amounts of plate waste, with less energy & protein intake when compared to patients not at nutritional risk. As a spin-off the DIMS was able to provide data on waste to be used in planning of menus in the catering production unit.
How food-related practices and eating attitudes contribute to quality of diet and mental well-being

Convenor:
Lisa Lahteenmaki, Aarhus University, Aarhus, Denmark

Discussant:
Tatjana van Strien, VU University Amsterdam, Amsterdam, United States

Description:
Purpose: Food, eating and food-related practices are a central part of everyday life. Quality of diet has been linked to mental well-being, including depression; this link seems to be bi-directional, and partly influenced by weight status, but we still do not fully understand how food-related practices and psychological eating styles are associated with the quality of diet, and whether they have an impact in the mental well-being that goes beyond the diet quality. The purpose of this symposium is to explore these relationships in three countries, namely Denmark, Spain and the Netherlands, with different cultural eating patterns and diets.
Rationale: Discussing the role of food-related practices and eating styles in diet quality and mental well-being widens the perspective of behavioural nutrition in explaining the links between eating and health-related outcomes. A better understanding of these links will allow us to design more effective behavioural interventions and campaigns to promote diet quality and mental well-being.
Objectives: To explore how 1) food provisioning practices, 2) meal patterns, 3) psychological eating styles, such as mindful eating and emotional eating, and 4) diet patterns are related to diet quality and depressive symptoms.
Summary: The symposium outline follows food-related practices from purchases to eating and ends with overall dietary patterns. First, the role of shopping behaviour and food preparation practices in diet quality and depressive feelings will be explored. Second, the role of meal patterns in diet quality and whether the meal patterns contribute to mental well-being beyond the impact on food quality will be discussed. The psychological aspects of mindful eating and the mediating role psychological eating styles will be explored next together with the role of comfort foods in mental well-being. The last presentation studies how the ethnic background influences dietary pattern and whether this pattern is linked with depression.
Format: The workshop will consist of four short presentations and general discussion for 15 minutes. Outline of the presentations is presented below:
The role of food-related shopping, preparation and meal practices in diet quality and association with depressive symptoms
Madeleine Broman Toft et al., Aarhus University, DK
Mindful eating, psychological eating styles and depressive symptoms
Laura Winkens et al., VU Amsterdam, NL
Comfort food and the link between depression and emotional eating
Tatjana van Strien et al. VU Amsterdam, NL
The association between dietary patterns among different ethnic groups and depressive symptoms: the HELIUS-Dietary patterns study
Esther Vermeulen et al, AMC, NL:
General discussion (15 minutes)
The role of food-related shopping and preparation practices in diet quality and association with depressive symptoms

Madeleine Broman Toft¹, Susanne Pedersen¹, Catalin Stancu¹, Viktorija Kulikovskaja², Ana Alina Tudoran¹, Laura Winkens², Tatjana van Strien², Liisa Lahteenmaki²

¹Aarhus University, Aarhus, Denmark, ²VU University Amsterdam, Amsterdam, The Netherlands

SIG: Policies and environments

Awards: No

Purpose: Depression has become a major public health concern. Previous research indicates that depression is associated with diet quality and irregularity of meals. Yet, very few studies have addressed the role of food provisioning related behaviours, such as buying, storing and preparing food, and meal patterns in diet quality and depressive feelings. This study takes a wide perspective on food provisioning practices and examines their role in diet quality. The hypothesis is that less impulsive, more skilled and structured food provisioning practices are associated with better diet quality, and thereby lower depressive feelings. The study also explores whether the effect on depressive symptoms goes beyond the effects of diet quality.

Method: An online survey with a random sample of Danish (N=1522) and Spanish (N=1512) participants was recruited in 2014 through a Qualtrics panel. Depressive symptoms were measured using the CES-D 20 scale. Quality of diet was based on use frequencies of seven food categories. Impulse buying tendency, food-related practices on eating food on-the-go, storing foods at home, cooking skills, food choice motives and meal patterns were measured using multi-item instruments. Data were analysed by means of cluster analysis, confirmatory factor analysis, and structural equation modelling.

Results: The results confirmed that impulse buying and eating food on-the-go had a negative association with overall quality of diet, as well as a positive association with depressive symptoms. Furthermore, storing unhealthy food at home was negatively linked with quality of diet, whereas cooking skills and using raw ingredients for cooking had a positive link with diet quality, as well as a negative link with depressive symptoms. Three major meal patterns could be categorised in both Denmark and Spain: those with three regular meals and low level of snacking had highest diet quality and lowest depressive symptoms, whereas those with irregular meals and moderate snacking had lowest diet quality and highest depressive symptoms.

Conclusion: This study indicates that quality of diet, and thereby mental well-being, can be influenced by targeting the practices in the whole food provisioning chain from purchases outside home to food provisioning practices at home.
Mindful eating, psychological eating styles and depressive symptoms

Laura Winkens¹, Tatjana van Strien¹, Ingeborg Brouwer¹, Brenda Penninx¹, Madeleine Broman Toft², Marjolein Visser¹, Liisa Lahteenmaki²

¹VU University Amsterdam, Amsterdam, The Netherlands, ²Aarhus University, Aarhus, Denmark

SIG: Policies and environments

Purpose: Depression is a common illness worldwide, with a high impact on the global disease burden. Next to recent indications that nutrition is related to depression, food-related behaviours may have an impact on depressive symptoms as well. One of these behaviours is mindful eating, which is eating with awareness and attention while not being distracted. Mindfulness-based interventions focused on eating behaviour have led to decreases in depressive symptoms. However, background information on mindful eating in general population samples is missing. Therefore, we wanted to study the relation between mindful eating and depressive symptoms and look at possible underlying mechanisms.

Possible pathways are via two psychological eating styles (emotional eating and external eating), which are related to depression. Emotional eaters and external eaters have difficulties in self-regulating their eating behaviour. Mindful eating may have a positive impact on these eating styles, because by increasing awareness people learn to eat more in response to their hunger and satiety cues and automatic patterns of eating behaviour may get disrupted. The objective is to test whether emotional eating and external eating are mediators in the mindful eating-depressive symptoms link.

Methods: An online survey was conducted using a random sample of Danish (N=1522) and Spanish (N=1512) participants who were recruited in 2014 through Qualtrics panel. Measurements were the CES-D scale for depressive symptoms, the DEBQ-20 for the psychological eating styles and 17 items on a 5-point Likert-scale for mindful eating. Analyses were conducted using linear regression analysis and the bootstrapping method by Hayes (2013). Results: Results show that mindful eating was negatively related to depressive symptoms in both the Danish (b=-0.52, 95% CI (-0.59, -0.44), P<0.001) and the Spanish (b=-0.61, 95% CI (-0.68, -0.54), P<0.001) samples. Emotional eating and external eating were found to be mediating factors in the mindful eating-depressive symptoms link in both samples; the higher the mindful eating scores, the lower the scores on emotional and external eating, the lower the depressive symptoms score. Conclusions: This study shows that mindful eating may be an instrument in the prevention of depression, especially for people who score high on emotional eating and/or external eating.
Comfort' food and the link between depression and emotional eating.

Tatjana van Strien¹,², Laura Winkens¹, Madeleine Broman Toft³, Susanne Pedersen³, Liisa Lahteenmaki³

¹VU University Amsterdam, Amsterdam, The Netherlands, ²Radboud University, Nijmegen, The Netherlands, ³Aarhus University, Aarhus, Denmark

SIG: Policies and environments

Awards:

Purpose: Depression is often associated with overweight, which link may be mediated by emotional eating. Feeling depressed is normally associated with loss of appetite and weight loss, however, a depression subtype exists, which is characterized by the atypical features of increased appetite, and weight gain. Emotional eating may be a marker of a-typical depression.

In a study on Danish adults we earlier found that the depression-body mass link was indeed fully mediated by emotional eating. In this presentation we will explore the underlying mechanisms, namely whether the link between depression and emotional eating is moderated by increased appetite and whether this moderation effect is mediated by 'comfort food' (food rich in carbohydrate and fat: chocolate, cake, and snacks). We are also interested in possible effects of gender. Both a-typical depression and emotional eating are associated with a preference for sweet food, particularly so in women. Therefore we hypothesise that the moderator effect of increased appetite on the association of depressive feelings with emotional eating is mediated by consumption of chocolate and cake but not by the consumption of snacks, particularly so in the women.

Method: We used Hayes' PROCESS macro of SPSS version 21.0 to test the mediated moderation models in a sample of 1402 male and female Danish adults recruited in 2014 through a Qualtrics panel. We assessed self-reported depressive feelings (CES-D), body mass index (BMI), emotional eating (Dutch Eating Behavior Questionnaire), change in appetite and intake of various food items (Food Frequency Questionnaire).

Results: Results indicate that the link between depression and emotional eating is indeed moderated by increased appetite and that this moderation effect is mediated by both sweet and salty 'comfort food'. We further found that the mediation effect of cake is moderated by gender, with stronger effects for the women.

Conclusions: Emotional eating could explain the association between depression and the consumption of food rich in carbohydrate and fat. This means that obesity interventions should take emotional eating into account.
The association between dietary patterns among different ethnic groups and depressive symptoms: the HELIUS-Dietary Patterns Study

Esther Vermeulen¹, Karien Stronks², Marijke Snijder¹, Aart Schene¹, Roel Mocking¹, Eske Derks¹,³, Mary Nicolaou¹
¹University of Amsterdam, Amsterdam, The Netherlands, ²Radboud University, Nijmegen, The Netherlands, ³University Medical Centre Utrecht, Utrecht, The Netherlands

SIG: Policies and environments

Awards:

Purpose: The Netherlands is an ethnically diverse country where more than one million non-Western migrants originated from Turkey, Morocco and Suriname are situated. However, information is scarce on dietary habits of non-Western migrants in the Netherlands and the depression prevalence seems to be higher among these groups of which the exact causes remain to be unknown. The objective was to investigate the association between dietary patterns and depressive symptoms among five ethnic groups residing in Amsterdam, the Netherlands and if these associations differ between ethnicities.

Methods: In total, 5,052 men and women aged 18-70 years of Dutch, Hindustan-Surinamese, Creole-Surinamese, Turkish and Moroccan origin living in the Netherlands were included in this study. Diet was obtained through ethnic-specific food frequency questionnaires and dietary patterns were derived by using reduced rank regression (RRR) with 46 food groups and the nutrients EPA+DHA, folate, vitamin B12, magnesium and zinc as response variables. In the sensitivity analyses, RRR was repeated with the same food groups but with only EPA+DHA and folate as response variables. Depressive symptoms were measured with the Patient Health Questionnaire-9. Associations between dietary patterns and depressive symptoms were tested per ethnic group using multivariable logistic regression models with adjustment for demographic, behavioural and health status variables.

Results: Two dietary patterns were identified which were labelled as ‘mixed pattern’ (high intakes of milk products, whole grains, vegetables, legumes, cheese, potatoes, red meat, nuts & seeds, chocolates & sweets) and ‘Dutch healthy pattern’(high in milk products, whole grains, vegetables, legumes, lean fish & crustaceans, fatty fish, fish savoury snacks, fruit, eggs and chicken). After full adjustment for confounding factors, only a (borderline) significant inverse association was observed for the Dutch ethnic group in the third quartile between the ‘mixed pattern’ (OR: 0.21, 95% CI: 0.07-0.59, P=0.003) and the ‘Dutch healthy pattern’(OR: 0.46, 95% CI: 0.20-1.07, P=0.07) and depressive symptoms.

Conclusion: In the current study, higher adherence to a ‘mixed pattern’ and a ‘Dutch healthy pattern’ do not reduce depressive symptoms in different ethnic groups residing in the Netherlands.
Making e&mHealth interventions more engaging and appealing to increase their use and effectiveness

Convenor:
Camille Short, University of Adelaide, Adelaide, Australia

Discussant:
Corneel Vandelanotte, Central Queensland University, Rockhampton, Australia

Description:
Purpose:
The potential of electronic and mobile health (e&mHealth) behavior change interventions to improve public health in a cost-effective and sustainable way is well recognised. Owing to this, the last decade has seen a substantial increase in the number of e&mHealth interventions developed and evaluated. While several well-conducted reviews have shown that these interventions can be effective, intervention effect-sizes have been small and long-term maintenance of behavior change has been elusive. This is attributable in large part to poor user engagement. Significant issues facilitating user engagement are consistently reported in the literature, with many studies reporting few logins and limited use of intervention platforms over time. This substantially limits the public health impact of these interventions. Clearly, if we continue to design interventions that few people use, the public health impact of this approach will be minimal. To advance the field, a greater effort to build a science of user engagement and apply this in the development and evaluation of e&mHealth interventions is needed. To this end, this symposium explores determinants of engagement and strategies to foster and sustain engagement across a diverse set of e&mHealth intervention platforms.

Rationale:
e&mHealth interventions are frequently used across the globe to promote changes in diet, physical activity and sedentary behaviors. The issue of poor user-engagement in these interventions is wide spread, and is of growing concern. Despite this, there has been little research on user engagement itself and very little public discussion about how to move the field forward. Thus, the proposed symposium is both timely and warranted. As ISBNPA had over 120 presentations related to e&mhealth research last year we anticipate that this symposium will be well attended.

Objectives:
We aim to:
1. Explore potential determinants of user engagement
2. Examine strategies for enhancing user engagement
3. Discuss necessary next steps to build a science of user engagement and progress research in this area

Summary
The session will start with an introduction provided by the symposium chair, which will cover what user engagement is in the context of e&mHealth, what some of the major issues have been to date and what recent breakthroughs in theory and practice have occurred across e&mHealth platforms. This will allow individual presenters to focus solely on research findings. The first presentation will explore the impact of gamification techniques on engagement within an innovative social networking intervention targeting physical activity; the second presentation will showcase the use of marketing and branding techniques in a digital intervention setting to produce changes in multiple health behaviors, including dietary behaviors; the third presentation will examine factors associated with use of a freely available physical activity promotion web-site and mobile-phone app (10,000 Steps) that currently has thousands of users; the fourth presentation will explore how to foster enjoyment in serious games for health in order to improve engagement and effectiveness. A discussant who has a wealth of experience in the development and evaluation of e&mHealth interventions will present some key observations from the presentations in light of future research. The session will finish with a Q&A with the audience.

Format (total time available 75 minutes):
Introduction – Camille Short (Symposium Chair) – 6 minutes

Presenter 1 - Carol Maher (Australia) - Engagement with a gamified online social networking intervention to increase physical activity - 11 minutes (+ 2 minutes questions).
Presenter 2 - Douglas Evans (USA) - Digital strategies for increasing program engagement: Case Studies from the US and South Africa - 11 minutes (+ 2 minutes questions).
Presenter 3 - Diana Guertler (Germany) - Influence of a smartphone app on engagement and determinants of non-usage attrition within a free physical activity promotion program: The case of 10,000 Steps Australia – 11 minutes (+ 2 minutes questions).
Presenter 4 - Rik Crutzen (Netherlands) - Enjoyment: a conceptual exploration in the context of games for health - 11 minutes (+ 2 minutes questions).

Discussion: Corneel Vandelanotte (Discussant) - 6 minutes + 11 minutes of questions from the audience.
Engagement with a gamified online social networking behavior change intervention to increase physical activity

Carol Maher¹, Corneel Vandelanotte², Ronald Plotnikoff³, Timothy Olds¹

¹University of South Australia, Adelaide, Australia, ²Central Queensland University, Rockhampton, Australia, ³University of Newcastle, Newcastle, Australia

SIG: E- & m-health

Purpose: “Active Team” is a 50 day team-based physical activity intervention delivered via Facebook app incorporating gamification features. Participants join in teams of 3-8 members, use a pedometer to take 10,000 steps a day, and the app to log their steps, view a tally board, unlock awards and send messages and virtual gifts. A previous randomised controlled trial (RCT; n=110) evaluating Active Team, found that users significantly increased their moderate to vigorous physical activity (MVPA) by 135 min per week. This study aims to examine engagement with the Active Team app features, users’ self-reported app preferences, and whether engagement mediated intervention effectiveness.

Methods: Usage statistics were downloaded from the study server (total number of logins, and occasions of logging steps, posting messages, and sending virtual gifts). Intervention participants completed a feedback survey regarding the app comprising Likert items. Random effect mixed modelling was used to determine whether total number of logins (dichotomised into “high” and “low” based on median split) was related to change in MVPA.

Results: Of the 51 intervention participants, 48 (94%) used the app at least once; 28 (55%) logged steps for all 50 days, and 35 (69%) logged steps for 36 days or more. Participants sent a mean of 4.8 gifts (SD 6.3, range 0-27), and made a mean of 2.7 posts to their team discussion wall (SD 3.4, range 0-13). Of the 47 intervention participants who completed the feedback survey, 38 (81%) reported that they found the step logging feature useful, 18 (38%) found the daily tips useful, but only 14 (30%) found the virtual gifts motivating and only 12 (26%) agreed the unlockable awards were motivating. Mixed modelling analyses showed that participants’ success in the program was associated with intervention dosage, with “high dose” participants increasing their MVPA significantly more than “low dose” participants (F = 3.06, P=.04).

Conclusions: An online social networking physical activity intervention achieved high overall levels of engagement, and confirmed previous literature showing that engagement is associated with intervention effectiveness. However, engagement was predominantly with traditional features (step logging), and gamification features were not well used or liked.
Digital strategies for increasing program engagement: Case Studies from the US and South Africa

Douglas Evans¹, Nelia Steyn², Sharmilah Booley²

¹The George Washington University, Washington, DC, USA, ²University of Cape Town, Capte Town, South Africa

SIG: E- & m-health

Awards:

Purpose: Mobile health (mHealth) is growing rapidly, but more studies are needed on how to optimize programs, including optimal timing of messaging, dose of exposure, and value of interactive features. This presentation presents two studies focused on participant engagement using mobile phones: text4baby and Self-Help Obesity Prevention Program in Stokvels (SHOPPS). The text4baby study aims were to evaluate (1) treatment effects and (2) dose-response effects of text4baby on behavioral outcomes compared to control (no text4baby) condition. The SHOPPS study aims were to design and pilot test a weight management treatment program among Black African female Stokvel members.

Methods: The text4baby study was a randomized trial of text4baby at Madigan Army Medical Center. They were followed up at 3 time points thereafter through delivery of their baby. We examined treatment effects and the effects of higher doses of text4baby messages on outcomes. The SHOPPS study was a pilot test of a digital media program for use in the Stokvel informal credit union, a source of social support. This paper describes the SHOPPS intervention and pilot test results.

Results: For text4baby, at 1 month follow up, there were positive changes in intentions to use pre-natal vitamins, consume more fruits & vegetables, and attend pre-natal care appointments compared to control. At postpartum follow up, there was a significant effect of high exposure to text4baby on self-reported alcohol consumption (OR 0.212, 95% CI 0.046-0.973, P=.046). For SHOPPS, researchers conducted focus groups at the University of Cape Town to develop a SHOPPS prototype. Participants reported numerous barriers to behavior change and message concepts for SHOPPS were tested. There were high levels of interest in a digital intervention.

Conclusions: The results of text4baby offer lessons for future scalable mHealth programs and suggest the need to study dose-response effects of these interventions. Mobile phones and evidence-based, Web-based weight control programs are promising approaches for obesity prevention and SHOPPS will demonstrate their potential.
**S23.3**

*Influence of a smartphone app on engagement and determinants of nonusage attrition within a free physical activity promotion program: The case of 10,000 Steps Australia*

Diana Guertler¹,², Corneel Vandelanotte², Morwenna Kirwan¹, Mitch Duncan³,⁴

¹University Medicine Greifswald, Greifswald, Germany, ²Central Queensland University, Rockhampton, Australia, ³Western Sydney University, Sydney, Australia, ⁴The University of Newcastle, Newcastle, Australia

**SIG:** E- & m-health

**Awards:**

**Purpose:** Data from controlled trials indicate that Web-based interventions generally suffer from low engagement and high attrition. However, data from real-life Web-based interventions are scarce. The aims of this study were to (1) examine how the use of a smartphone app may be helpful in increasing engagement and decreasing nonusage attrition within the freely available physical activity promotion program 10,000 Steps, and (2) identify sociodemographic and engagement-related determinants of nonusage attrition.

**Methods:** Users that had been members for at least 3 months (N=11,651) were grouped based on which platform (website, app) they logged their physical activity: Web only, app only, or Web and app. Groups were compared on engagement parameters (duration of usage, number of individual and workplace challenges started, and number of physical activity log days) using ANOVA. Kaplan-Meier survival curves were estimated to plot attrition over the first 3 months after registration. A Cox regression model was used to determine predictors of nonusage attrition.

**Results:** Engagement with the program was highest for Web-and-app users. Within all users, 50% stopped logging physical activity through the program after 30 days. Cox regression showed that user group predicted nonusage attrition: Web-and-app users (hazard ratio=0.86, 95% CI 0.81-0.93, P<.001) and app-only users (hazard ratio=0.63, 95% CI 0.58-0.68, P<.001) showed a reduced attrition risk compared to Web-only users. Further, having a higher number of individual challenges, workplace challenges, physical activity logging days, and steps logged per day were associated with reduced nonusage attrition risk.

**Conclusions:** The use of an app alone or in addition to the website can enhance program engagement and reduce risk of attrition. Better understanding of participant reasons for reducing engagement can assist in clarifying how to best address this issue to maximize behavior change.
**S23.4**

**Enjoyment as a determinant of engagement: a conceptual exploration in the context of games for health**

**Rik Crutzen**¹, **Jonathan van ’t Riet**², **Camille Short**³

¹Maastricht University, Maastricht, The Netherlands, ²Radboud University, Nijmegen, The Netherlands, ³University of Adelaide, Adelaide, Australia

**SIG:** E- & m-health

**Awards:**

**Purpose:** Enjoyment is consistently noted as an important determinant of engagement in games for health. However, as a term, enjoyment is often used interchangeably with a host of other terms, some of which overlap conceptually. This obscures what does and what does not constitute enjoyment, and in turn slows scientific progress by making the study of enjoyment and the synthesis of enjoyment-related research difficult. This paper aims to improve our understanding of (determinants of) enjoyment.

**Methods:** A conceptual overview of the literature to distinguish enjoyment from other important constructs, such as fun, and to summarize available evidence of the determinants of enjoyment in serious videogames.

**Results:** Enjoyment refers to the action or state of deriving gratification from a game. It is experiential in nature and distinct from engagement and fun. Competence seems to be a crucial factor in the enjoyment of games. There is theoretical and empirical evidence regarding three mechanisms to increase the player’s sense of competence and thereby enjoyment: providing feedback, challenge and rewards. Narrative transportation is a second factor that contributes to enjoyment and refers to a process in which the player is mentally ‘transported’ away from his/her physical world into the imaginary world that is presented in a story. Relevance is another important factor to increase enjoyment and can be defined as ‘being closely connected or appropriate to the matter at hand.’ This can be achieved via self-identification with game characters.

**Conclusions:** Competence, narrative transportation and relevance are identified as key factors related to enjoyment and future studies examining these factors using games for health are recommended.
Engaging the public in the science of health promotion

Convenor:
Katie Morton, University of Cambridge, Cambridge, UK

Discussant:
Helen Elizabeth Brown, University of Cambridge, Cambridge, UK

Description:
Purpose: The purpose of this symposium is to highlight examples of public involvement from the physical activity and dietary research fields in order to demonstrate the value of investing time and resources into embedding a rigorous public involvement aspect into a research programme.

Rationale: Public involvement in research is defined as research being carried out ‘with’ or ‘by’ members of the public rather than ‘to’, ‘about’ or ‘for’ them. It aims to improve the quality, relevance and acceptability of research by ensuring that it addresses the issues that are most important to the public. Although the importance of public involvement is emphasised by funding bodies – researchers often pay “lip service” to public involvement. This is probably due to the fact that until recently, no real evidence base existed in terms of how to effectively engage the public in research. Furthermore, the fact that public involvement components of research are often not reported limits how much we can learn from this process.

Objectives:
1. Highlight a range of examples of how researchers have involved the public in physical activity and dietary research.
2. Discuss and share the lessons learned from the process of public involvement – what works and challenges to consider for incorporating public involvement into research.

Summary: The symposium will feature four presentations of ten minutes each. Hayley Reed will discuss a project that engaged with young people within the development of a grant about childhood interventions that improve dietary behaviour. Catherine Draper will report on the engagement of stakeholders in the development of a physical activity and gross motor skills intervention in rural preschool children. Katie Morton will highlight the ongoing public and stakeholder involvement in the Creating Active School Environments project, including the process of using Delphi techniques to prioritise promising interventions. Finally, Sandi Winter will describe a collection of community engaged research projects that have empowered “citizen scientists” to create healthier neighborhoods. The discussant, Helen Elizabeth Brown will then comment on the presented work in light of lessons learned and future directions, and lead the audience discussion on how these examples of public involvement can be replicated in other research areas, thus enhancing a culture of effective public involvement in physical activity and dietary research.

Format:
1. Hayley Reed (Cardiff University, UK)
2. Catherine Draper (University of Cape Town, South Africa)
3. Katie Morton (University of Cambridge, UK)
4. Sandi Winter (Stanford University, USA)
Working with young people in the grant development phase on dietary research: the benefits for researchers and young people

Hayley Reed, Jeremy Segrott
DECIPHer, School of Social Sciences, Cardiff, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: This presentation reports how young people informed the development of a systematic review grant about childhood interventions that improve dietary behaviour and nutritional outcomes through to adulthood. This work is novel as the public are infrequently involved in informing the development of systematic reviews, and due to the use of a visual timeline method to engage those under 18.

Methods: 12 young people aged 14-18, from an already established public involvement group called ALPHA that is run by DECIPHer (the Centre for the Development and Evaluation of Complex Interventions for Public Health Improvement) in the UK, were involved in the visual method of producing a dietary behaviour timeline. The timeline demonstrated what influenced their food choices as children (0-11 years old), what affects what they eat now (aged 11-18) and what they think will influence them into early adulthood (18-25). The timeline and notes taken at the session were used, in conjunction with current research evidence, to inform the systematic review application.

Results: The session informed the research through: highlighting family should be the focus particularly as there was an absence of school related influences on dietary behaviour; that a broad definition of family should be used to take account of social relationships between different family members; that the study design should include a qualitative component focussing on the views of young people. The young people felt the method was appropriate to explore temporal issues in dietary behaviour, and that their views had been respected and accurately represented when decisions were made on the grant.

Conclusions: Public involvement has ensured that the research focus of the systematic review is relevant, and that the design will further take into account young people’s perspectives. There is a need for guidance on how the public can inform systematic reviews which includes methods for involving young people. The young people benefited from being part of this session through receiving vouchers and time recognition through a national volunteering scheme. Additionally continuing involvement with ALPHA provides young people with new skills and knowledge through research training, evidence for job and university applications, and references.
Engaging with stakeholders in the development of a preschool intervention in a low-income rural South African setting

Catherine Draper¹,², Rhian Twine³

¹Division of Exercise Science and Sports Medicine, University of Cape Town, Cape Town, South Africa, ²MRC/Wits Developmental Pathways for Health Research Unit, University of the Witwatersrand, Johannesburg, South Africa, ³MRC/Wits Rural Public Health and Health Transitions Research Unit, Agincourt, South Africa

SIG: Early care and education

Awards:

Objective: This presentation will report on the engagement of stakeholders in the process of developing an intervention to promote physical activity and gross motor skills in rural preschool children.

Methods: The project was conducted in Agincourt village, in rural Mpumalanga Province in South Africa. Engagement with stakeholders was done in collaboration with the Learning, Information dissemination and Networking with the Community (LINC) office of the MRC/Wits-Agincourt Unit, and took place through focus groups (FGs) with preschool educators and mothers/caregivers of preschool children. FGs were conducted to obtain initial views about physical activity and gross motor skills of preschool children, and input about possible intervention strategies. Subsequent plans for intervention were presented to stakeholders for their feedback, and a final presentation to stakeholders will be made on conclusion of the project (November 2015) to present final results, intervention components, and future research plans.

Results: The LINC office was responsible for communicating with local traditional authorities and governance structures in Agincourt as well as relevant local and provincial government departments, including gaining permission for, and feeding back results from the research project. Furthermore, the LINC office was involved in the initial recruitment of preschools, but key to the recruitment and retention of participants was an enthusiastic local fieldworker. The FG discussions provided valuable insight into priority issues for preschool children in the community regarding physical activity and related issues, such as nutrition. Additionally, the FG process highlighted challenges of conducting qualitative research in cross-cultural settings. Feedback from both the FG participants and local and provincial Department of Education stakeholders also affirmed the feasibility and acceptability of the proposed intervention activities, which were refined and some were piloted. More importantly, participants and stakeholders pointed out potential barriers to intervention implementation and effectiveness, such as limited engagement of parents/caregivers and food insecurity. Within this project, the importance of involving enthusiastic local fieldworkers for successful engagement has also been emphasised.

Conclusions: The process of working with the LINC office, and lessons learned from engaging with stakeholders have informed both the development of the intervention, and have influenced the planning of future research in this setting.
Engaging stakeholders in the prioritisation of interventions: The Creating Active School Environments (CASE) project

Katie Morton¹, Andrew Atkin¹, Kirsten Corder², David Turner², Marc Suhrcke³, Esther van Sluijs¹

¹MRC Epidemiology Unit and UKCRC Centre for Diet and Activity Research (CEDAR), University of Cambridge, Cambridge, UK, ²Norwich Medical School, University of East Anglia, Norwich, UK, ³Centre for Health Economics, York, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: The Creating Active School Environments (CASE) project aims to find ways to help young people be more active and sit less within the school environment. It will help us find out what strategies would be most effective, acceptable and provide the best value for money. The CASE project has involved a systematic review of the evidence, secondary data analyses and also extensive public engagement (with adolescents, teachers, and parents) in order to develop a list of promising intervention strategies that focus on modifying the school environment to increase physical activity and/or reduce sedentary time in adolescents. The purpose of the current study was to prioritise these promising interventions, using a stakeholder led consensus (Delphi) method that was appropriate for all CASE stakeholders, including young people.

Methods: We recruited 40 participants representing all of our stakeholder groups – including secondary school students, teachers, school administrators, parents and commissioners. We developed two online Delphi platforms – one for adult stakeholders and an adolescent version (with help from our public advisory groups). Participants were asked to read (age-appropriate) ‘evidence summaries’ for each of our proposed interventions (e.g., standing desks in classrooms, new physically active uniform policies, active lessons) and asked to rank the interventions according to six different prioritisation criteria (effectiveness, cost-effectiveness, reach, equality, acceptability and feasibility) using the online system. In Round 2, participants received feedback on the rankings and the level of agreement (between all participant groups) achieved in Round 1. Participants were asked to indicate their agreement with the overall group ranking of the interventions and given the opportunity to rank the interventions again based on the feedback and new information.

Results: Analysis of Round 2 data will result in a final prioritisation list accompanied by the level of agreement between stakeholders. This presentation will also discuss the challenges and lessons learned from conducting Delphi studies in order to prioritise interventions.

Conclusions: This public engagement method will help us to achieve consensus among a wide variety of stakeholders (including young people) about what two intervention ideas we will take forwards to test in a feasibility study in 2016.
Engaging citizen scientists as advocates for creating healthier neighborhoods

Sandra Winter¹, Lisa Goldman Rosas², Jylana Sheats¹, Rebecca Seguin³, Mika Moran⁴, Deborah Salvo⁵, Matthew Buman⁶, Abby King²

¹Stanford Prevention Research Center, Stanford University, Stanford, CA, USA, ²Palo Alto Medical Foundation Research Institute, Palo Alto, CA, USA, ³Division of Nutritional Sciences, Cornell University, Ithaca, New York, USA, ⁴School of Public Health, University of Haifa, Haifa, Israel, ⁵The University of Texas Health Science Center at Houston, Austin, TX, USA, ⁶School of Nutrition and Health Promotion, Arizona State University, Phoenix, AZ, USA

SIG: Policies and environments

Awards:

Objective: This presentation will describe a suite of community engaged research projects called “Our Voice” that have empowered “citizen scientists” from a variety of geographic locations and contexts to identify features of their neighborhood environment that impact nutritional choices and active living, and then to advocate for improvements to better support health and wellbeing.

Methods: Citizen scientists from diverse cultural, educational, generational, and geographic circumstances use a custom designed environmental assessment application on a hand-held electronic tablet to gather information about their neighborhoods via photographs, audio narratives, with-in app survey questions and geo-coded walking routes. They then collectively review the data to identify and prioritize issues to address and brainstorm potential solutions and partners. Research and community partners facilitate connections between citizen scientists and policy and decision makers to initiate neighborhood change. The settings for these studies are global and include urban and rural neighborhood food and physical activity environments, schools, parks and “open streets” initiatives. The citizen scientists range in age from adolescents through older adults, and range in income from disadvantaged to wealthy populations. Community partners include public health departments and health systems, community center and senior housing site service program managers, parks and recreations, community coalitions, and not for profit organizations.

Results: The results will focus on lessons learned from this collection of studies and include both the opportunities (e.g., articulation of shared values, creation of mutual understanding, community engagement in problem identification and solution finding, development of context specific interventions, incorporation of multi-level perspectives, provision of a voice to the marginalized), and challenges (e.g., building trust, aligning diverse values, ensuring accessibility, scalability and sustainability as well as challenges of using technology by some population groups).

Conclusions: The environments in which we live, work, and play affect our abilities to live healthy, active lives. Engaging community residents in advocating for healthier environments is a potentially powerful mechanism for initiating and sustaining neighborhood change that can in turn promote healthful living for all.
**Active Children Are Smarter! – Hope, Hype, Or Both?**

**Convenor:**
Amika Singh, VU University Medical Center, Amsterdam, The Netherlands

**Discussant:**
James Sallis, University of California, San Diego, USA

**Description:**

**PURPOSE**
The current symposium is aimed at summarizing the current knowledge on the relationship between physical activity (PA) and cognitive and academic performance of children, with a focus on the methodology, effectiveness (effect size) and feasibility of PA interventions. This information will be used to spark a constructive debate on the role of PA on the scholastic curriculum. This symposium is innovative because it combines expertise on this topic from inter-Atlantic research groups and aims to discuss the impact of scientific research results in the education practice. Furthermore, the effects of PA on behavioral performance (cognitive and academic) and brain structure and function (neuroimaging) will be presented.

**RATIONALE**
Several acute and longitudinal experimental studies suggest a positive effect of PA on cognitive performance and academic achievement in youth. This evidence is used in advocacy to increase the amount of PA in the school setting. However, causal evidence for the effect of PA on cognitive performance and academic achievement is limited and unconvincing. Academic improvement due to increased PA may be negligible. Furthermore, the effects of PA on cognitive and academic performance may be dependent on certain exercise features such as intensity or duration. Thus, it may be difficult if not unfeasible to guarantee the necessary intensity and duration in the school setting. This symposium will critically review and discuss the available evidence.

**OBJECTIVE**
This symposium is centered on two important themes. First, experimental studies on the relationship between PA and cognitive and academic performance will be presented. Second, the effectivity and feasibility of implementing PA interventions aimed at improving measures related to academic performance on a school setting will be discussed.

**SUMMARY**
The symposium consists of three short presentations, aimed at summarizing the scientific work conducted in three multidisciplinary institutions; University of Cambridge (UK), VU University Medical Center Amsterdam (The Netherlands) and the University of Texas at Austin (USA). The topic will be introduced by Dr. Amika Singh (Amsterdam). The following three speakers, Professor Darla Castelli (USA), Dr. Emi Saliasi (Amsterdam) and Dr. Kirsten Corder (Cambridge) will present evidence from acute and longitudinal studies carried on their research labs. The existing knowledge will be summarized to stimulate a constructive discussion session in collaboration with distinguished Professor James Sallis (San Diego, USA).

**FORMAT**
0-5 minutes: Introduction by A Singh (NL)
6-17 minutes: D Castelli (VS): Physical activity, health risk and cognitive performance in children
18-29 minutes: E Saliasi (NL): Acute effects of physical activity on cognitive performance in Dutch children: investigating the differential effects of exercise type, duration and frequency.
30-41 minutes: K Corder (UK): Revising on the run or studying on the sofa: Prospective associations between physical activity, sedentary behaviour, and exam results in British adolescents.
42-50 minutes: J Sallis (VS) first reaction and discussion with speakers.
51-75 minutes: Discussion led by J Sallis with the audience.
**S25.1**

**Physical activity, Health Risk, and Cognitive Performance in Children**

Darla Castelli1, Charles Hillman2, Erin Centeio3, Jungyun Hwang1, Hannah Calvert1

1Department of Kinesiology and Health Education, University of Texas, Austin, USA, 2Department of Kinesiology and Community Health, University of Illinois, Urbana, USA, 3Division of Kinesiology, Health, and Sport Studies, Wayne State University, Detroit, USA

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Purpose**

Improving executive function early in life is critical, as attention and memory subserve learning. We present two studies (FITKids and Kinetic Kidz) examining the effects of physical activity (PA) on attention, working memory, and cognitive flexibility in children.

**Methods**

In both studies, pre/post assessments of aerobic fitness (maximal oxygen uptake) and health risks (BMI, blood pressure) were collected on children ages 7-12 years old. Cognitive performance was measured with the Stroop Color Word, Trail Making Test, Switch Task, Kaufman Brief Intelligence Test and Wide Range Achievement Test. EEG measures were gathered for a subsample, who were randomly assigned to either a 9-month (FITKids) or 8-week (Kinetic Kidz) PA intervention or a matched waitlist control of no formal PA. PA was assessed using Polar heart rate monitors and/or ActiGraph GT3X accelerometers. Multivariate and regression models were used to analyze these data.

**Results**

Both PA programs produced an increased rate of daily participation (M = 70.01±18.45; M = 49.21 ± 21.07 mins, respectively) that was significantly different from waitlist controls. The FITKids program produced a significant increase in aerobic fitness over controls (mean +4.4 ml/Kg/min/cohort), while the Kinetic Kidz program did not produce such fitness effects. The series of studies demonstrated the positive effects of PA on reaction time, accuracy, and P3 amplitude on incongruent trials. There were no significant differences for the other cognitive assessments. The effects size for cognitive tasks across the studies ranged from 0.35 - 0.57. There was no relationship between any individual measure of health risk and cognitive performance. However, when the risk factors were clustered together there was a significant negative correlation between risk factors and performance on the cognitive tasks.

**Conclusions**

Participants in the PA program demonstrated significantly higher PA participation and better performance on some cognitive assessments over the less physically active control group. The number of health risks was a predictor of cognitive performance. Results suggest that specific executive functions may be enhanced by a PA participation, however, since health risks cluster, the possible mediation effects warrant further study. Therefore, the effects of PA on cognitive performance should be interpreted with caution.
S25.2

Acute effects of physical activity on cognitive performance in children: investigating the differential effects of exercise type, duration and frequency.

Emi Salias1, Vera van den Berg2, Mai Chinapaw2, Renate de Groot2, Jelle Jolles3, Teatske Altenburg1, Amika Singh1

1 VU University Medical Center, Department of Public and Occupational Health, Amsterdam, The Netherlands,
2 Open University Netherlands, Centre for Learning Sciences and Technologies (CELESTE), Heerlen, The Netherlands,
3 VU University Amsterdam, Faculty of Behavioral and Movement Sciences, Amsterdam, The Netherlands

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Recent studies indicate that a single bout of physical activity (PA) can have immediate positive effects on children’s cognitive performance. However, the specific PA features that can benefit cognitive performance the most are largely unknown. We investigated the effects of PA type, duration and frequency on cognitive performance in Dutch adolescents.

Methods: In three separate experimental studies, we examined the acute effects of 1) three types of 12-minute classroom-based exercise sessions (i.e. aerobic, coordination and strength) 2) three durations of moderate to vigorous exercise sessions (10, 20 and 30 minutes) and 3) two frequencies (1x 20 minutes or 2 x 20 minutes) of PA bouts. Exercise intensity was measured with a heart rate monitor. Performance on the following cognitive domains was measured: selective attention (the d2, the test of everyday attention for children (TEA-Ch) and the Attention Network Test (ANT)), information processing speed (the Letter Digit Substitution Test) and working memory (n-back task). Statistical models included repeated measures ANOVA and generalized estimating equation model.

Results: There was no effect of light to moderate PA on cognitive performance and this effect was not modulated by PA type. Exercising at moderate to vigorous intensity, for either 10, 20 or 30 minutes, resulted in a slight decrease in performance on the ANT (F(1,96)=5.21, p=0.025; η=0.051)). Children who performed two 20 minute bouts of moderate-intensity had significantly better scores on the TEA-ch test compared to children who performed one PA bout or remained seated the whole morning (B=-0.26; 95% CI=[-0.52; -0.00]).

Conclusions: Our findings suggest that PA type or PA duration does not differentially affect cognitive performance in children. Instead, exercising at moderate to vigorous intensity was found to either decrease or improve selective attention depending on how performance was measured. Our findings support the importance of repeated physical activity during the school day for beneficial effects on selective attention in children.
Revising on the run or studying on the sofa: Prospective associations between physical activity, sedentary behaviour, and exam results in British adolescents

Kirsten Coder, Andrew Atkin, Soren Brage, Valerie Dunn, Ulf Ekelund, Matthew Owens, Esther van Sluijs, Ian Goodyer

1 Centre for Diet and Activity Research at the MRC Epidemiology Unit, Cambridge, UK, 2 MRC Epidemiology Unit, University of Cambridge, Cambridge, UK, 3 Developmental Psychiatry Section, University of Cambridge, Cambridge, UK, 4 Department of Sports Medicine, Norwegian School of Sports Sciences, Oslo, Norway, 5 Mood Disorders Centre, University of Exeter, Exeter, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose

Physical activity may be associated with academic performance but evidence is equivocal and little work has examined potential associations between sedentary behaviour and academic performance. We investigated prospective associations between physical activity / sedentary behaviour (PA/SED) and General Certificate of Secondary Education (GCSE) results in British adolescents.

Methods

Exposures were accelerometer-assessed PA/SED measured over 5 days and self-reported sedentary behaviours (screen (TV, Internet, Computer Games) / non-screen (homework, reading)) measured in 845 adolescents (14.5 ± 0.5 y; 43.6% male). National standard academic performance data (GCSE results) at 16y were obtained directly from government records. Associations between exposures and academic performance (total GCSE points) were assessed using multilevel mixed-effects linear regression adjusted for mood, BMI z-score, deprivation, sex, season and school; potential interactions were investigated.

Results

Physical activity (minutes of moderate and vigorous PA) was not associated with academic performance (β (95% CI) p value) -1.8 (-7.5, 3.8) p=0.50. One-hour more accelerometer-assessed SED was associated with 6.9 (1.5, 12.4) p=0.016 more GCSE points. An hour of screen time was associated with 9.3 (-14.3, -4.3) p=0.001 fewer points whereas an hour of non-screen time (reading/homework) was associated with 23.1 (14.6, 31.6) p<0.001 more points. Screen time was still associated with poorer scores after adjusting for objective PA/SED and reading/homework. TV viewing and Internet use were separately negatively associated with academic performance (9.6 (-17.6, -3.8) p=0.011 and 8.8 (-16.2, -1.5) p=0.023 respectively).

Conclusions

Physical activity does not appear to be detrimental to academic performance indicating that concerns that encouraging more physical activity may decrease academic performance seem unfounded. Results do not suggest encouraging physical activity as an intervention strategy to improve academic performance. An extra hour/day of screen time at 14.5y is approximately equivalent to two fewer GCSE grades over all GCSEs taken (e.g. one subject from B to D) at 16y. Therefore strategies to achieve the right balance between screen and non-screen time may be important for improving academic performance.
Transport behaviour and active transport in adolescents – an international perspective

Convenor:
Hannah Verhoeven, Ghent University, Ghent, Belgium

Discussant:
Anna Timperio, Deakin University, Melbourne, Australia

Description:
Purpose
This symposium aims to provide new insights into adolescents’ transport behaviour, including active transport, across three different countries. Furthermore, the results of an intervention study on the promotion of active transport will be presented.

Rationale
There is a steep decline in physical activity levels during adolescence and this decline continues into young adulthood. Active transport is a convenient way to incorporate physical activity into adolescents’ daily activities and increase overall physical activity levels. However, even for destinations within a feasible walking or cycling distance, adolescents regularly use passive transport modes such as a car, motorcycle or moped. Very little research has focused on determinants of and interventions to promote active transport in this age group, or associations between passive transport modes and overall activity.

Objectives
The main aims of this symposium are: (1) to present studies that explored transport behaviour, including active transport, in adolescents; (2) to present an intervention study on the promotion of active transport in adolescents; (3) to provide a forum to discuss findings of these studies and to share experiences; and (4) to discuss implications for further research and practice based on the findings.

Summary
The chairperson (Ghent University, Belgium) will provide a short introduction on the rationale, purpose and format of the symposium. Afterwards, three presentations will provide new insights on older adolescents’ transport behaviour. The presentations in sequence will be:
1. 1st presenter (University of Porto, Portugal): “Active commuting to school in Portuguese adolescents”
2. 2nd presenter (Deakin University, Australia): “To drive or not to drive? Associations between car travel and physical activity and sitting time in late adolescence”
3. 3rd presenter (Ghent University, Belgium): “The effect of adding a two-hour lesson promoting active transport to ‘Driving License at School’ on psychosocial determinants towards active transport in older adolescents”
After each presentation there will be three minutes for questions. Following the three presentations, the discussant (Deakin University, Australia) will provide an overview of the main issues of the presentations and will facilitate a discussion.

Format
0-10 min: Introduction by Hannah Verhoeven (MSc)
10-25 min: Presentation 1 by Jorge Mota (PhD)
25-40 min: Presentation 2 by Shannon Sahlqvist (PhD)
40-55 min: Presentation 3 by Hannah Verhoeven (MSc)
55-75 min: General discussion led by Anna Timperio (PhD)
S26.1

**Active commuting to school in Portuguese adolescents**

Andreia Pizarro¹, Jasper Schipperijn², José Carlos Ribeiro¹, Jorge Mota¹, Maria Paula Santos¹

¹CIAFEL - Research centre in Physical Activity, Health and Leisure, Faculty of Sports, University of Porto, Porto, Portugal,²Research Unit for Active Living, Department of Sport Science and Clinical Biomechanics, University of Southern Denmark, Odense, Denmark

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Objective:** The declining levels of physical activity (PA) have led to active commuting to school (ACS) being seen as a key strategy to increase PA levels in school-aged children. In Portugal, no data exists on the patterns of this behavior, an essential step for developing evidence-based and effective interventions. The purpose of this study is to explore the travel to school behavior using a new objective methodology.

**Methods:** 155 adolescents (mean age 15.9±1.1 years) wore an accelerometer and a GPS on opposite sides of their waist for 7 consecutive days. Home and school addresses were geocoded to identify home-school trips. The web-based tool PALMS was used to combine GPS and accelerometer data, categorize Moderate to Vigorous Physical Activity (MVPA) and classify trip mode of home-school trips into: walking, bicycling or vehicle.

**Results:** 609 trips were identified as home-school trips. Walking was the most frequent trip mode (60.8%) whereas bicycling was less common (14.4%). Median home-school walking trip length was 0.94km and 96.7% of the trips were under 2km. Each walking trip (to or from school) contributed with an average of 12 (±5.6) minutes to daily MVPA. Differences were found whether the trip started at home or at school, particularly for minutes in MVPA and duration of the walking trips. Logistic regression analysis showed increasing distance to be associated with lower odds of ACS (OR: 0.20; 95% CI: 0.14-0.28).

**Conclusions:** PALMS is a friendly web-based tool to objectively classify trip modes. Walking to school and back home can contribute with up to 40% of recommended daily MVPA, so increasing this behavior may be of particular relevance to increase PA levels. On the other hand, cycling is underused in home-school trips and strategies to promote the use of bicycle could also be of interest, especially in trips longer than 2km.
To drive or not to drive? Associations between car travel and physical activity and sitting time in late adolescence

Shannon Sahlqvist¹, Jenny Hatt², Verity Cleland³,⁵, Jim Dolman⁶, David Crawford², Jacqueline Reid³, Anna Timperio²,⁵

¹Deakin University, Geelong, Australia, ²Deakin University, Melbourne, Australia, ³University of Tasmania, Hobart, Australia, ⁴University of South Australia, Adelaide, Australia, ⁵National Heart Foundation of Australia, Melbourne, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Objective: Most research on transport, physical activity and sedentary behaviour in young people focuses on active transport to school. While children's active travel has been consistently shown to be associated with higher levels of physical activity, associations with sitting time are not as clear. Furthermore, studies have not considered the impact that car travel may have on these behaviours. This study aimed to explore associations between car travel, sedentary behaviour and physical activity in late adolescence.

Methods: Cross-sectional study of 909 (74% female) Year 11 students in Victoria recruited via secondary schools (43 schools) and via social media advertisements (Facebook). Data were collected via online survey (n=848) or telephone interview (n=61). Participants completed the transport, leisure and sitting components of the International Physical Activity Questionnaire (IPAQ-Long) which asked about their usual behaviour. Linear regression models examined associations between car travel and sitting, leisure time physical activity and total physical activity (including walking and cycling for transport). These used: 1) simple unadjusted models; 2) models adjusted for individual characteristics (age, sex, BMI, ethnicity), parents' education and neighbourhood socioeconomic status score. Models exploring association with sitting time additionally controlled for physical activity. All models were stratified by sex and urban/rural status.

Results: In adjusted models, weekly time spent travelling in a car was associated with TV viewing (coefficient = 0.01 95% CI 0.003, 0.01) but not total sitting. Car travel was positively associated with total leisure time physical activity in adjusted models (coefficient = 0.54, 95% CI 0.32, 0.76) but there was no association with total physical activity. Associations remained when analyses were run separately by mode and intensity of leisure time physical activity. Findings were unchanged when stratified by sex and urban/rural status.

Conclusions: These findings indicate that relationships between travel behaviours and the activity spectrum are complex. It may be that young people travel long distances, and therefore accumulate longer periods in sedentary travel, in order to participate in physical activity (particularly sport). Future research could explore trip purpose to clarify these findings. Objective measures of sitting and physical activity could also be explored.
The effect of adding a two-hour lesson promoting active transport to 'Driving License at School' on psychosocial determinants towards active transport in older adolescents

Hannah Verhoeven¹,², Dorien Simons¹,², Bas De Geus², Corneel Vandelanotte², Ilse De Bourdeaudhuij³, Peter Clarys², Benedicte Deforche¹,²

¹Department of Public Health, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium,
²Department of Human Biometry and Biomechanics, Faculty of Physical Education and Physical Therapy, Vrije Universiteit Brussel, Brussels, Belgium,
³Department of Movement and Sport Sciences, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium,
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⁵Institute for Health and Social Science Research, Physical Activity Research Group, Central Queensland University, Rockhampton Queensland, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: The transition from late adolescence to young adulthood is a critical period characterized by major life changes. In Europe, adolescents can obtain a regular driving license from the age of 18 which results in a decline in active transport. Therefore, it is important to promote active transport at the age of 17-18 years, just before habitual car driving patterns get established. No previous intervention studies on transport behaviour focused on older adolescents (17-18 years) in particular. The present study aimed to examine the effect of a theory- and evidence-based intervention promoting active transport among older adolescents on awareness, self-efficacy, perceived benefits, perceived barriers, motivation to comply and intention to use active transport after obtaining a driving license.

Methods: The intervention consisted of a two-hour lesson which was implemented in the course 'Driving License at School', a project of the Flemish Foundation for Traffic Knowledge (Belgium). A quasi-experiment was conducted using a pretest-posttest design with intervention and control schools. A sample of 299 older adolescents (17.3 ± 0.6 years; 57.0% female) from 18 secondary schools in Flanders was included. Self-reported questionnaires were used to assess psychosocial determinants and participants' transport behaviour at three time points. Furthermore, participants in the intervention group completed a process evaluation on the active transport lesson.

Results: An increase in awareness on the existence of bike-/car-sharing systems was found in the intervention group, whereas no change was found in the control group. No intervention effects were found for self-efficacy, perceived benefits, perceived barriers, intention and motivation to comply, nor for transport to school or transport to other destinations. Seventy-nine percent agreed that it is important to reflect on the fact that it is better to walk or cycle for short distances in the course 'Driving License at School'.

Conclusions: The intervention was not able to change older adolescents' psychosocial determinants towards active transport. Probably a two-hour lesson is not sufficient and ceiling effects occurred. It is possible that the intervention is only effective in a subgroup of older adolescents with less positive psychosocial determinants prior to the intervention. Additional analyses in this subgroup will be presented at the conference.
Multidimensional physical activity: An opportunity and not a problem

Convenor:
Stuart Biddle, Victoria University, Melbourne, Australia

Discussant:
Stuart Biddle, Victoria University, Melbourne, Australia

Description:
Purpose: To demonstrate the benefits of a multidimensional approach to physical activity – from technology-enabled feedback aimed at individuals through to guiding decisions taken by researchers and policy makers.

Rationale: Physical activity is a complex behaviour. No single metric will reflect an individual's physical activity adequately because multiple biologically important dimensions are independent and unrelated (see our review in Exercise and Sport Sciences Reviews 2015 43;2, 67-74). For example, people can score highly in one physical activity dimension (e.g., moderate intensity activity) but low in another (physical activity energy expenditure). It is also becoming clear that changing one physical activity dimension will not have an automatic effect on other dimensions. Individuals need to understand this complexity if they are to judge the adequacy of their behaviour. Researchers need to understand how this complexity impacts upon the interpretation of their findings. And policy makers need to understand how their decisions may impact upon one or more physical activity dimension(s) but are unlikely to simultaneously change all of them; as well as how narrow policy approaches could have unintended and potentially detrimental consequences.

Objectives: In this symposium, we will demonstrate how multidimensional profiling can be exploited to improve personalised and technology-enabled feedback in order to provide a smorgasbord of choices tailored to an individual's needs and preferences. We will explain how to tackle baseline physical activity and substitution between/across dimensions when providing feedback. We will illustrate the individuality of specific physical activity behaviours and dimensions – including the false dichotomy regarding some dimensions that can sometimes cloud the picture. We will also demonstrate how a lack of understanding of the complexity of physical activity could hinder the development and evaluation of interventions and policy decisions – and how a broader multidimensional approach to physical activity represents an opportunity to overcome these challenges.

Summary: Taking a multidimensional approach to physical activity is an opportunity to improve the systems used in population surveillance, strengthen the evidence for the relationship between physical activity and health as well as improve personalized feedback delivered to individuals.
A multidimensional profile improves personalized feedback from self-monitoring

Dylan Thompson
University of Bath, Bath, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

PURPOSE: There has been an explosion in the availability of wearable devices that allow people to self-monitor and track their physical activity. Thus, in principle, it should now be easy for individuals to use technology and answer what appears to be a simple question “Am I doing enough of the right kind of physical activity for health?” In reality, our research shows that answering this question is far from straightforward. The purpose of this presentation is to show how a multidimensional approach is required to truly make sense of personalized feedback obtained through self-monitoring.

METHODS: Critical review of the literature and analysis of physical activity data across several studies and in various populations.

RESULTS: Individuals who ostensibly appear similar for one physical activity measure (e.g., time engaged in moderate intensity physical activity) can score very differently for other metrics (e.g., overall physical activity energy expenditure). This heterogeneity applies across multiple dimensions including moderate intensity activity, vigorous intensity activity, physical activity energy expenditure and sedentary time. Only a very few people score consistently across all physical activity dimensions. Thus, with the expansion of technology-enabled feedback aimed at individuals and consumers, many people will form an erroneous opinion about their physical activity if they are guided to focus on one physical activity dimension alone. This is also relevant when people attempt to change their behaviour. Because of factors such as substitution, a large change in one physical activity dimension might only translate to a small or negligible change in other dimensions. Providing a personalised multidimensional picture helps overcome these problems and a variety of innovative and visual infographics have been developed for this purpose.

CONCLUSIONS: There is no single outcome or descriptor that reflects all the relevant information about an individual’s physical activity and, instead, we need to capture physical activity profiles across the physiologically important dimensions. This multidimensional approach reduces the risk of people forming erroneous conclusions about their physical activity status because it recognizes that there are multiple ways in which to benefit from physical activity.
**S27.2**

**Making inferences from multidimensional physical activity profiles**

Alan Batterham  
Teesside University, Middlesbrough, UK

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**PURPOSE:** To explore and explain contemporary analysis approaches for interrogating data from multidimensional physical activity profiles, with physical activity and sedentary time as either dependent (outcome) or independent (exposure) variables.

**METHODS:** Critical appraisal and evaluation of a variety of models including single dimension, effect modification, partition, isotemporal, compositional, and pseudo-Bernoulli. In simple examples, I demonstrate the application of such models to data sets to explore questions such as “Can you out-exercise the deleterious effect of high sedentary time?” and “What is the effect of replacing sedentary time with equal time periods of other activities?” I also touch upon methods for investigating potentially nonlinear exposure: outcome relationships.

**RESULTS:** Isotemporal, effect modification, and pseudo-Bernoulli models hold promise for addressing key questions in the field. Specifying a causal model matched to the research question to guide analysis and inference is critically important. As a simple example, secondary analysis of cross-sectional data from the Health Survey for England in adults >45 years, with physical activity and sedentary time assessed objectively with accelerometry, revealed a prevalence risk ratio for cardiovascular disease (outcome) per 10 hours per day of sedentary time (the median) of 3.3 (95% CI 1.4 to 8.0). Exploration using an effect modification model indicated that >60-min per day of at least moderate intensity physical activity (>3 METs) would be required to offset the adverse association of high sedentary time with cardiovascular disease prevalence. Prospective data sets may be analysed similarly to derive hazard ratios for all-cause mortality and cardiovascular disease outcomes, for example.

**CONCLUSIONS:**

Making valid inferences from physical activity data is not trivial. Multidimensional physical activity profiles from 24-7 monitoring using evolving state-of-the-art devices offers many advantages over the simple accelerometry methods used in national surveys. These benefits include a finer differentiation of the different domains of physical activity including; for example, the capture of high-intensity interval exercise behaviours, which might offset the deleterious effects of sedentary time with a much lower exercise volume. With the accumulation of data of this type, epidemiologists can explore the potential for building a multidimensional physical activity scoring system, analogous to definitions of the metabolic syndrome.
Multidimensional physical activity: implications for policy and practice

Adrian Bauman
University of Sydney, Sydney, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

PURPOSE: To explore the dimensional nature of physical activity assessment in population studies and in physical activity epidemiology, and the relevance and consequences of this approach for policy and practice.

METHODS: Review of the diversity of physical activity measurement methods used in epidemiology, in population level assessment of physical activity, ranging from self-report questionnaires through to objective assessments of populations using accelerometers.

RESULTS: The review demonstrates that most community or population level studies use single dimensional measures of physical activity or use generic total measures of physical activity, such as the International Physical Activity Questionnaire (IPAQ). Alternatively, objective assessment techniques are used, but may fail to capture important components or settings of routine and incidental activity. The impact of these measurement gaps on under or over estimating prevalence, epidemiological associations, and the effects of interventions are illustrated. Solutions include types of measures that can capture multiple domains of physical activity behaviour, and might assess duration and type of activity as well. In particular, a focus on World Health Organization (WHO) Burden of Disease estimates will demonstrate the differences that a multidimensional approach makes to physical-inactivity attributable mortality and morbidity.

CONCLUSIONS: There is a need to consider the multidimensional nature of physical activity, and consider the diverse settings in which physical activity occurs, and consider the entirety of the “physical activity spectrum” in order to better characterise physical activity and health relationship, which may currently be under represented in their contribution to overall health and to the Global Burden of Disease.
Applying time use surveys to physical activity, sedentary behaviour, and nutrition research

Convenor:
Josephine Chau, University of Sydney, Sydney, Australia

Discussant:
Timothy Olds, University of South Australia, Adelaide, Australia

Description:
Purpose: This symposium will increase awareness and knowledge of how time use surveys may be applied to research in physical activity, sedentary behaviour, and nutrition.

Rationale: Academic and government researchers from most industrialized countries and an increasing number of developing countries are collecting and analyzing 24-hour time diary data. These diary data provide a comprehensive and accurate basis for generating national accounts of time spent working, eating, exercising, sleeping, engaging in leisure activities, and how daily life varies across demographic groups, across decades and across countries. Diaries can also provide data on multi-tasking, interacting with others and the location and timing of daily activities. Whilst time use surveys have been conducted for over 50 years, it is only relatively recently that researchers have begun to examine their utility for health-related research.

Objectives:
1. To introduce time use surveys as a source of data for physical activity, sedentary behaviour, and nutrition-related research;
2. To describe the utility of time use surveys in providing information about behavioural contexts; and
3. To demonstrate the innovative application of time use data to behavioural nutrition and physical activity research via examples from a range of studies.

Summary: This symposium brings together researchers from Australia, the UK and the Netherlands to examine the use of 24-hour diaries for studying physical activity and sedentary behaviour. Jonathan Gershuny, will chair and introduce the session with a short history of time use research and how it has evolved to include physical activity. Teresa Harms will present results from the Multinational Time Use Survey (MTUS) MET Score Linkage Pilot Project, an international collaborative research project involving surveys from 25 countries over 50 years. Karen Milton will describe innovations in physical activity measurement linking data from wearable cameras (SenseCam), accelerometers and interviews with time use surveys. Hidde van der Ploeg will present the measurement properties and applications of time use surveys for examining non-occupational physical activity and sedentary behaviour in adults. Josephine Chau will demonstrate the application of time use data for examining the population prevalence of TV-viewing and parallel eating/drinking behaviours in Australian adults. Tim Olds, will summarise the session and lead a discussion of key issues related to using time use surveys for behavioural nutrition and physical activity research.

Format: Brief introduction (5 mins) followed by three 15-minute and one 10-minute presentations (total 55 mins) and discussion (15 mins).
S28.1

The Multinational Time Use Survey (MTUS) MET Score Linkage Pilot Project

Teresa Attracta Harms, Jonathan Gershuny
Centre for Time Use Research, Department of Sociology, University of Oxford, Oxford, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose

The Multinational Time Use Survey (MTUS) MET Score Linkage Pilot Project is a collaborative research project with CTUR and the US National Cancer Institute (NCI). Time use data allow accurate and precise measurement of the time people spend in a range of daily activities, including sleep, paid work, leisure and physical activity. However, a challenge for integrating time use studies and analyses of energy expenditures is that time use survey data involve dozens or hundreds of different activity categories, each with a unique set of movement and energy expenditure characteristics.

Methods

The authors used the Ainsworth (2011) Compendium and other sources to assign metabolic expenditures to the (69 category) Harmonised Multinational Time Use Study (MTUS) activity codes. They used large national time diary studies from the US, UK and Poland to compare the whole day METS (wdMETS) estimated on this basis, with similar wdMETS estimated on the basis of the 250-category Harmonised European Time Use Survey (HETUS) activity categories and the 400-category American Time Use Survey (ATUS).

Results

Two distinct types of result emerged. First, the sample (and hence population) variability of the wdMETS based on the much less detailed 69-category MTUS categorization is strikingly similar (of the order of 1% smaller) than that derived from the much more detailed ATUS and HETUS classifications, when these are calculated for the same surveys. Second, clear patterns of association emerge between wdMETS calculated on both bases, and subjective health status measures for sample members, which are mediated significantly by age, gender and social stratification indicators.

Conclusions

The results provide strong support for the use of the MTUS’ large database of diary studies (approaching 1 million days, 25 countries over 50 years) as a resource for understanding the behavioural correlates of population health. However, a strikingly small proportion of the overall METS over the 24 hour period derive from intentional exercise activities undertaken by the diary respondents, with much larger proportions deriving from diarists’ paid and unpaid work. The authors, however, are concerned about the rather poorly understood metabolic requirements of the paid and unpaid work component of this calculation.
Improving methods to measure physical activity: using accelerometry, wearable cameras and interviews to reconstruct time use

Karen Milton¹, Emma Thomas², Paul Kelly³, Aiden Doherty¹, Charlie Foster¹

¹British Heart Foundation Centre on Population Approaches for Non-Communicable Disease Prevention, Nuffield Department of Population Health, University of Oxford, Oxford, UK, ²Melbourne School of Population and Global Health, Non communicable Disease Unit, University of Melbourne, Victoria, Australia, ³Physical Activity for Health Research Centre, Institute for Sport, Physical Education and Health Sciences, University of Edinburgh, Edinburgh, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Self-report time use diaries collect a continuous sequenced record of daily activities but the validity of their data is uncertain. Our study aimed to test the validity of time use diaries for measuring physical activity and to explore the feasibility of using accelerometry, wearable cameras, and an image-led interview to improve physical activity measurement.

Methods: Participants, aged 18 - 90 years, completed the Harmonised European Time Use Survey (HETUS), wore a wrist-mounted accelerometer, and used an Autographer wearable camera (recording images at approximately 15 second intervals) for the waking hours of the same 24-hour period. Participants also completed an interview in which the visual images were used as prompts to reconstruct a record of activities for comparison with the diary and accelerometry data.

Results/findings: Accelerometry provides data on the intensity of physical activity which is not captured via traditional time use diaries. The use of images provide an objective and more accurate estimate of physical activity duration compared to time use diaries, while also offering information on the type and context of physical activity behaviour. These combined methods enable more accurate estimates of total physical activity and energy expenditure (through the assignment of METs), as well as providing information on the location, type, and social context of physical activity participation. Furthermore, the use of time use diaries and image data may assist in identifying periods of lying, sitting, and standing, as well as transitions between these behaviours. Thus this ‘triangulation’ of methods may improve our understanding of the accuracy of accelerometry in differentiating these behaviours, and may assist in refining appropriate cut points.

Conclusion: This study demonstrates that using new methods such as wearable devices and interviews have considerable potential to increase our understanding of physical activity behaviours, and particularly the context for physical activity participation. These new methods also offer significant potential in improving our understanding of other lifestyle behaviours such as sedentary time.
Measurement properties and applications of time use surveys for non-occupational physical activity and sedentary behavior research in adults

Hidde van der Ploeg

Department of Public and Occupational Health, VU University Medical Centre, Amsterdam, The Netherlands

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Present the reliability and validity of time use surveys for assessing physical activity and sedentary behavior in adults, and present examples of how the national Australian and Dutch time use surveys have been used to study adult population levels of physical activity and sedentary behavior.

Methods: Reliability and validity of time use surveys for assessing sedentary and physical activity behavior was assessed in 134 Australian adults (n=134). Participants completed a 2-day time use diary twice, 7 days apart, and wore an Actigraph accelerometer. The two diaries were compared for test-retest reliability and comparison with the accelerometer determined concurrent validity. Secondary analysis of population representative data were carried out for the Australian Time Use Surveys 1992, 1997 and 2006 (n range=5505-6419) and for the National Time Use Survey of the Netherlands, which has been collected in 5 year intervals from 1975 (7 time points, n range=1017-2845).

Results: Participants with similar days showed reliability Intraclass correlations of 0.74 and 0.73 for non-occupational sedentary behavior and moderate/vigorous physical activity, respectively. Comparison of the diary with the accelerometer showed Spearman correlations of 0.57-0.59 and 0.45-0.69 for non-occupational sedentary behavior and moderate/vigorous physical activity, respectively. The population representative surveys revealed that of all non-occupational domains, leisure time was the most sedentary. Australian adults were on average sedentary for 90% of their leisure time and this was 85% for Dutch adults. The proportion of sedentary leisure time attributed to screen time in the Netherlands increased from 26% in 1975 to 43% in 2005. In 2006, 53% of sedentary leisure time in Australian adults was attributed to screen time.

Conclusions: Time use surveys appeared to be more valid for population surveillance of non-occupational sedentary and health enhancing physical activity behavior than more traditional self-report surveillance systems. Nationally representative time use surveys can be used to study non-occupational sedentary and physical activity behavior and showed that the large majority of leisure time is spend sedentary with screen time being the largest contributor.
Population prevalence and correlates of eating and drinking during adult TV-viewing time from the Australian Time Use Survey 2006

Josephine Chau¹, Anne Grunseit², Hidde van der Ploeg³, Adrian Bauman¹, Dafna Merom⁴
¹Prevention Research Collaboration, School of Public Health, University of Sydney, Sydney, NSW, Australia,
²Department of Public & Occupational Health, VU University Medical Center, Amsterdam, The Netherlands,
³School of Science and Health, University of Western Sydney, Sydney, NSW, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: To examine the prevalence of adult eating and drinking behaviours during TV-viewing time and their correlates.

Methods: This was a cross sectional analysis of data from Australian Time Use Survey 2006 involving adults with at least one complete 24-hour diary (N=6902). We extracted TV-viewing as the primary activity and all secondary activities about eating or drinking (eating a meal, eating a snack, drinking non-alcoholic beverages, and drinking alcohol). Multivariate logistic regressions calculated the odds ratios of eating or drinking during TV-viewing by sociodemographic variables.

Results: Of 6902 respondents, 2514 (36.4%) reported eating or drinking while watching TV (mean TV-viewing time =119±92 min/day; mean time eating/drinking during TV-viewing = 39±41 min/day). Of time spent eating or drinking during TV-viewing, 35% involved eating a meal, 13% involved eating a snack, 38% involved drinking non-alcoholic beverages, and 12% involved drinking alcohol. Women (OR=1.37; 95% CI: 1.23-1.53), adults aged 35-44 (OR=1.25; 95% CI: 1.05-1.49) and 45-54 years old (OR=1.23; 95% CI: 1.03-1.46), adults with university education levels (OR=1.37; 95% CI: 1.23-1.52), and those reporting good to excellent health (OR=1.27; 95% CI: 1.10-1.48), were significantly more likely to eat or drink while they watched TV than men, 15-24 year olds, adults with high school or less educations, and those reporting fair to poor health, respectively.

Conclusions: Time use surveys provide the opportunity to examine adults’ parallel activities during TV-viewing. These study results support the hypothesis that TV-viewing is associated with dietary and alcohol intake and identifies population subgroups that may be more likely to engage in this unhealthy behavioural combination.
Diet diversity and dietary quality: next steps in identification, measurement and improvement

Convenor:
Charlotte Evans, University of Leeds, Leeds, , UK

Discussant:
Nelia Steyn, University of Cape Town, Cape Town, South Africa

Description:
Purpose: The aim of this symposium is to improve our understanding of important dietary factors associated with dietary diversity.
Rationale: Increased diet diversity is associated with improved dietary quality in children and adults in South Africa, the USA and Europe. Currently, no universally accepted measure of dietary diversity exists. Lessons can be learned from comparisons of dietary patterns and methods to assess dietary diversity in different populations in varying stages of transitioning to a western diet high in energy dense foods and drinks.

Objectives:
1. To compare dietary patterns of different populations
2. To identify different methods to assess diet diversity
3. To highlight lessons learned from a RCT aiming to improve diet diversity

Summary: Data from the UK, South Africa and Morocco will enable us to study dietary factors important in improving diet diversity. The symposium will start with identification and comparison of dietary patterns in the UK and South Africa, the former consuming a western diet and the latter transitioning to a western diet. The second presentation will look at the importance of diversity of fruits and vegetables in particular using data from Morocco and suggest ways that it can be improved. The third presentation will explain a new diet diversity tool which has been tested on children in London in order to determine how many foods children should consume each day for a high quality diet. In the fourth presentation, lessons learned from the Health Kick RCT in low income schools in South Africa are described with a focus on diet diversity.

Format: Each of the four presentations will last 15 minutes. Nelia Steyn, an expert in children’s dietary quality and diet diversity will chair the session, introducing the speakers and acting as discussant. The four presentations will proceed as follows. First presentation (2 speakers) by Rebecca Pradeilles from MRC/Wits Developmental Pathways for Health Research Unit, University of the Witwatersrand, Johannesburg, South Africa, and Kath Roberts, both from School of Health and Related Research, ScHARR, The University of Sheffield, UK. Second presentation by Edwige Landais from the Institut de Recherche pour le Développement (IRD), UMR Nutripass IRD-UM-SupAgro, Montpellier, France. Third presentation by Charlotte Evans, a lecturer in Public Health Nutrition at the University of Leeds, UK. Fourth presentation by Anniza De Villiers from the Non-communicable Diseases Research Unit, South African Medical Research Council in Cape Town, South Africa.
**S29.1**

**Exploring dietary patterns in a cohort of urban South African adolescents and British adults and their associations with diet quality**

Rebecca Pradeilles¹,², Kath Roberts³, Paula Griffiths²,³, Shane Norris², Emily Rousham⁴, Janet Cade⁴, Michelle Holdsworth¹, Alison Feeley²

¹School of Health and related research (ScHARR), Sheffield, UK, ²MRC/Wits Developmental Pathways for Health Research Unit, Witwatersrand, South Africa, ³Loughborough University, Loughborough, UK, ⁴University of Leeds, Leeds, UK

**SIG: Policies and environments**

**Awards:**

**Objective**

Evidence is required to identify whether foods and other population characteristics can be employed as proxies of dietary patterns of varying quality. These studies explore dietary patterns in South African adolescents aged 17 to 19 years and the UK adult population and their associations with diet quality. South Africa is undergoing epidemiological and nutrition transitions while the UK consumes a western diet high in fats and sugars and low in fruits and vegetables.

**Methods**

Principal Component Analysis was undertaken to identify factors representing dietary patterns using data from the South African (SA) Birth to twenty Plus Cohort (n=601 adolescents) and the UK National Diet and Nutrition Survey (n=2083; mean age 49y). Regression models were used to explore associations between sample characteristics, lifestyle factors, nutrient intake and biomarkers. Food items were recoded into smaller groups to allow a robust analysis.

**Results**

In the SA data, four main dietary components, explained 29% of the variance. The first component explained 14% of the variance and was characterised by a high consumption of energy dense foods. The second component explained 6% of the variance and was characterised by a low-cost food pattern. The third component explained 5% of the variance and included relatively healthy foods. The fourth component included a high consumption of snacks and sweets. In the UK data, four patterns explained only 13.4% of the total variance in diet. Patterns were labelled: ‘Snacks, fast food and fizzy drinks’ (SFFFD), ‘Fruit, vegetables and oily fish’ (FVOF), ‘Processed meat and potatoes’ (PMP) and ‘Sweet foods and dairy’ (SFD). Higher scores for ‘SFFFD’ were positively associated with being overweight/obese; % food energy from non-milk extrinsic sugars (NMEs), total fat, starch and sodium and negatively associated with: intake of many nutrients. Higher scores for ‘FVOF’ were inversely associated with % food energy from saturated fat, NMEs and sodium and positively associated with many nutrients.

**Conclusions**

The dietary patterns identified were characterised by particular foods and varying levels of diet quality and diversity indicated by intake of key nutrients. There may be foods and wider correlates which may be useful for monitoring dietary quality.
Development of a Fruit and Vegetable Quality Index and its association with fruit and vegetable knowledge and health outcomes in urban Morocco

Edwige Landais1, A Gartner1, A Bour2, Y El Karim2, F Delpauch1, Michelle Holdsworth3, Obe-Maghreb study group na1

1Institut de Recherche pour le developpement, Montpellier, France, 2University Ibn Tofail, Kenitra, Morocco, 3School of Health and Related Research (ScHARR), Sheffield, UK, 4Obe-Maghreb study group, na, Morocco

SIG: Policies and environments

Awards:

Objective: In the context of nutrition transition in urban Morocco where obesity and non communicable diseases (NCD) increased, the consumption of fruit and vegetable (F&V) may have a protective effect against NCD. The present study aimed to: i) develop a F&V quality index (FV-QI) to assess the overall quality of F&V intake; ii) investigate relationship between this FV-QI and knowledge towards F&V; iii) investigate relationship between crude F&V intake or FV-QI and health outcomes.

Methods: A cross-sectional survey conducted in urban Morocco including 855 randomly selected women (20-49y). Derived from a single 24-hour recall, the FV-QI was divided into two components: recommendations (based on WHO) and diversity (based on the ‘five a day’ concept). An extra point was given for the consumption of at least half portion of a vitamin A rich fruit or vegetable. A knowledge questionnaire was developed and validated for this study to measure three domains of knowledge: food based guidelines, nutrient value, and link with NCD. Health outcomes measured were obesity, high blood pressure and diabetes. Relationship with FV-QI was investigated using linear regression for knowledge, and logistic regression for health outcomes; relationship between crude intake and health outcomes was investigated using logistic regression.

Results: The mean F&V intake was 332 g/day±13 (<280 g/day for 50.6% of women). The mean FV-QI was 3.7±0.12/10 (<6 for 71.1%); and the mean score for the diversity component was 2.0±0.06/5. The mean total knowledge score was 40.3±0.9/100, with the best mean score for food based guidelines (46.2±1.0/100) and the worst for the link between F&V and NCD (32.2±1.6/100). FV-QI increased with level of knowledge (p<0.05). The crude F&V intake was not associated with health outcomes. A relationship was found between FV-QI<6 and diabetes (adjusted OR=2.58, p<0.05) but not with obesity or high blood pressure.

Conclusions: In a context of low F&V consumption and low level of knowledge, improving knowledge might increase the quality of F&V consumption that is, moreover, related to NCD. Using complex quality indices in addition to crude F&V intake may improve investigation between F&V consumption and health outcomes.
Measures of low diet diversity predict poor dietary quality in a cross-sectional study of London school children

Charlotte Evans, Jayne Hutchinson, Meaghan Christian, Neil Hancock, Janet Cade
School of Food Science & Nutrition University of Leeds, Leeds, UK

SIG: Policies and environments

Awards:

Objective: Evidence suggests that dietary quality is lower for children in deprived families in high income countries, despite higher obesity rates in this population. Food behaviours that reduce the diversity of children’s diets such as diets lower in energy or missing meals negatively impact on the quality of children’s diets. To determine the relationship between dietary quality and dietary diversity and to make recommendations to identify children with poor quality diets to optimise dietary quality of children living in high income countries.

Methods: A Cross-sectional survey was carried out in 2392 children in 52 primary schools in London in 2010. Diet diversity was assessed using the validated Child and Diet Assessment Tool (CADET) comprising 115 listed foods. Dietary quality was determined by using the proportion of children meeting the estimated average recommended intakes of individual micronutrients and a combined score based on four important micronutrients, namely; calcium, iron, zinc and folate.

Results: For micronutrients, 2.1% (95%CI 1.4, 2.8) of the children did not meet the intake requirements for any of the four nutrients. Between 10 and 20% of children did not meet the recommended levels for individual micronutrients. The mean number of listed foods consumed daily by children was 17.1 (95%CI 16.8, 17.5). The risk of having a poor quality diet doubled (OR 2.1, 95% CI 1.8, 2.4) with a reduction in any one listed foods consumed. Children who consumed fewer than 20 foods each day had a less than optimal diet in terms of dietary quality.

Conclusions: A small but important number of children in high income countries are potentially undernourished in terms of essential nutrient intake. Assessing daily dietary diversity by calculating the total number of different foods consumed using CADET offers a simple method to identify children at high risk of a poor quality diet.
Did the HealthKick primary school nutrition intervention improve dietary diversity in children in low-income settings in South Africa?

Anniza de Villiers¹, Nelie Steyn², E Vicki Lambert³

¹South African Medical Research Council, Cape Town, South Africa, ²University of Cape Town, Cape Town, South Africa, ³Sports Science Institute of South Africa, Cape Town, South Africa

SIG: Policies and environments

Awards:

OBJECTIVE: Studies in schools in the Western Cape Province, South Africa have shown that children have an unhealthy diet, poor in diversity, high in energy, sugar and fat. HealthKick (HK) was a three-year multi-component primary school-based intervention that had the promotion of healthy eating as one of its objective.

METHODS: Sixteen schools were selected from two low-income school districts and randomly allocated to intervention (n=8) or control school (n=8) status. The HK intervention comprised an Action Planning Process with a supporting toolkit. One of the four components of the intervention focused on the school food and nutrition environment, including the food environment, school curriculum and parents. School staff selected actions according to each schools’ needs. Dietary intake was measured by using an unquantified 24-hour recall in 2009 in 500 grade 4 learners at intervention schools and 498 at control schools, and repeated in 2010 and 2011. A dietary diversity score (DDS) was calculated from nine food groups and the frequency of snack food consumption was determined. A school level analysis was performed.

RESULTS: The mean baseline (2009) DDS was low in both arms 4.55(SD=1.29) and 4.54(1.22) in the intervention and control arms respectively, and 49% of learners in HK intervention schools had a DDS ≤4 (=low diversity). A small increase in DDS was observed in both arms by 2011: mean score 4.91(1.17) and 4.83 (1.29) in the intervention and control arms respectively. The estimated DDS intervention effect over the two years was not significant [0.04 (95% CI: -0.37 to 0.46)]. Food groups least consumed were eggs, fruit and vegetables. The most commonly eaten snacking items were table sugar in beverages and/or cereals (82%); followed by potato crisps (75%); non-carbonated beverages (53%); sweets (39%) and sugar-sweetened carbonated beverages 29%. Unhealthy snack consumption in terms of frequency of snack items consumed did not improve significantly in intervention or control schools.

CONCLUSIONS: The HK intervention did not improve diet diversity and unhealthy snacking. Our findings have implications for multi-component interventions where school staff serve as the main implementers and eating behaviour of learners are not directly targeted.
Opportunities and challenges of interactive digital media (serious digital games and mobile apps) to improve a healthy diet and physical activity

Convenor:
Ann DeSmet, Ghent University, Ghent, Belgium

Discussant:
Ralph Maddison, University of Auckland, Auckland, New Zealand

Description:
Purpose: This symposium aims to illustrate the potential of interactive digital media (e.g. games, mobile apps) in promoting a healthy diet and physical activity, and to explore opportunities for future improvements to their intervention efficacy and adoption.

Rationale: Interactive digital media, such as games and apps, are hypothesized to be more motivating to use than other intervention types, and to hence show larger effects than other interventions on healthy lifestyle promotion. Results so far, have however been variable on both efficacy and use of these tools during implementation. This indicates a clear need for a better understanding of their working mechanisms and for an exploration of strategies to improve their efficacy and adoption.

Objectives:
1. To illustrate the effectiveness or adoption of different interactive digital intervention types (e.g. mobile apps, video or computer game, active videogame) in promoting a healthy diet or physical activity.
2. To gain insight in challenges of different interactive digital intervention types (e.g. mobile apps, video or computer game, active videogame) in promoting a healthy diet or physical activity.
3. To explore methods (e.g. co-design, self-regulation theory) to improve the effectiveness or adoption of different interactive digital intervention types (e.g. mobile apps, video or computer game, active videogame) in promoting a healthy diet or physical activity.
4. To inspire future initiatives in designing interactive digital intervention types (e.g. mobile apps, video or computer game, active videogame) in promoting a healthy diet or physical activity, and providing practical tips to do so.

Summary:
Four presentations will be given and discussed. The first two papers describe the use and effects of mobile apps and active video games in promoting physical activity. A third paper describes the feasibility and implementation issues of an interactive digital media intervention to promote children’s obesity management. A fourth presentation describes the effects of co-design with target users as a way to improve serious game effectiveness on healthy lifestyles including a healthy diet and physical activity. A discussant will provide a brief overview of the main issues, and facilitate a discussion on the potential, obstacles and future directions for these intervention types in promoting a healthy diet and physical activity.

List of presenters:
Monique Simons (NL)
Jorinde Spook (NL)
Joanne Henderson (AU)
Ann DeSmet (BE)

Discussant:
Ralph Maddison (NZ)
Effects of and adherence to an in-home active video game promotion intervention on prevention of overweight in gaming adolescents

Monique Simons¹, Johannes Brug², Mai Chinapaw⁴, Michiel De Boer⁵, Jaap Seidell⁶, Emely de Vet⁶
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SIG: E- & m-health

Awards:

Purpose
The aim of the study was to evaluate the effects of and adherence to an in-home active video game promotion intervention on anthropometrics, sedentary screen time, and consumption of sugar-sweetened beverages and snacks among non-active video gaming adolescents who primarily were of healthy weight.

Methods
We assigned 270 gaming (i.e. ≥ 2 hours/week non-active video game time) adolescents randomly to an intervention group (n = 140) (receiving active video games and encouragement to play) or a waiting-list control group (n = 130). BMI-SDS (SDS = adjusted for mean standard deviation score), waist circumference-SDS, hip circumference and sum of skinfolds were measured at baseline, at four and ten months follow-up (primary outcomes). Energy-balance related behaviours and process measures (not at baseline) were assessed with self-reports at baseline, one, four and ten months follow-up. We conducted multi-level-intention to treat-regression analyses.

Results
The control group decreased significantly more than the intervention group on BMI-SDS (β = 0.074, 95%CI: 0.008;0.14), and sum of skinfolds (β = 3.22, 95%CI: 0.27;6.17) (overall effects). The intervention group had a significantly higher decrease in self-reported non-active video game time (β = -1.76, 95%CI: -3.20;-0.32) and total sedentary screen time (Exp (β = 0.81, 95%CI: 0.74;0.88) than the control group (overall effects). The process evaluation showed that 14% of the adolescents played the Move video games every week ≥ 1 hour/week during the whole intervention period.

Conclusions
The in-home active video game intervention did not result in lower values on anthropometrics in a group of ‘excessive’ non-active gamers (mean ~ 14 hours/week) who primarily were of healthy weight compared to a control group throughout a ten-month-period. Some effects in the unexpected direction were found, with the control group showing lower BMI-SDS and skin folds than the intervention group. The intervention did result in less self-reported sedentary screen time, although these results are likely biased by social desirability. To advance active game research, more attention should be paid to other settings than home. For example, location-based mobile games hold promise as they take the player outside, but they are currently a neglected area of study in active games research.
Process evaluation of "Balance It": A serious game to promote healthy eating and physical activity among youth

Jorinde Spook¹², Theo Paulussen³, Gerjo Kok⁴, Pepijn Van Empelen³

¹Wageningen University, Wageningen, The Netherlands, ²Maastricht University / TNO, Maastricht, The Netherlands, ³TNO, Den Haag, The Netherlands, ⁴Maastricht University, Maastricht, The Netherlands

SIG: E- & m-health

Awards:

Purpose: Overweight among secondary vocational education students is a current and cumulating problem with negative health related consequences. Therefore, we systematically developed the serious self-regulation game intervention "Balance It" targeting students' overweight-related behaviors (i.e., dietary intake and physical activity). As interventions effectiveness is more likely when students are compliant with the protocol, we studied the self-reported and registered use of "Balance It".

Methods: In the pilot study, 29 students filled in the process evaluation (i.e., 31% of the intervention group), aged 17-18 years. To evaluate subjective experience of using the "Balance It" app, 32 items regarding the "Balance It" app in general were preceded by a stem: "What did you think of...". Response options ranged from 1 to 5 (very bad - very good and very stupid - very funny). Additionally, we analyzed the objective user data as registered by the "Balance It" system.

Results: Students were, on average, moderately positive about "Balance It". Ratings on the app in general (1 = very bad, 5 = very good) included e.g. layout (M = 3.59, SD = 1.09), self-prompting (M = 3.59, SD = .82), and autonomy (i.e., choosing their own task; M = 3.55, SD = .78). Ratings on the game elements (1 = very stupid, 5 = very funny) included e.g. a tutorial (M = 3.72, SD = .75), and competitive game play (M = 3.59, SD = .91). The use of the "Balance It" website and peer-support system was rather disappointing (7%). Registered data showed that "Balance It" users played 1.7 games on average (total games played: N = 771). These games mainly consisted of daily tasks (N = 671; 87%) and individual game play (N = 632; 82%). Goal accomplishment was more likely when participants were motivated (OR = 2.6, 95% CI 1.88-3.54), and less likely when they did not have the time (OR = 0.6, 95% CI .43-.89).

Conclusions: Despite the limited initial use of "Balance It", students were moderately positive about the serious self-regulation game intervention when they continued playing the game. As such, it can be concluded that motivation remains difficult to target.
Feasibility of a Paediatric Obesity Management e-health tool for Health Professionals

Joanne Henderson¹, Vanessa Shrewsbury², Louise Baur¹², Alexander Shirley¹

¹Weight Management Services, The Children’s Hospital at Westmead, Westmead, Australia, ²Discipline of Paediatrics & Child Health, University of Sydney, Sydney, Australia

SIG: E- & m-health

Purpose: Prior studies indicated a need to develop a flexible and accessible learning platform for health professionals in the education of childhood obesity. Weight4KIDS, a novel interactive eLearning tool for paediatric obesity management and promotion of healthy lifestyle habits, was designed to address this need. The study aimed to determine the feasibility, uptake, impact on learning outcomes and potential for enhancement of Weight4KIDS.

Methods: Weight4KIDS is a series of 11 e-learning interactive modules: a core module (basic assessment and initial management) and advanced modules (physical measurements, practical interventions, adolescent obesity, general medicine, endocrine, orthopaedic, nutrition, physical activity, sleep and psychosocial issues). The program is accessible online to all NSW Health staff. Health professionals from six New South Wales sites (three non-metropolitan) were invited to complete modules. Quantitative and qualitative data were collected via electronic questionnaires and back-end data collection. Participants’ knowledge on module topics was assessed at baseline. A post-training survey assessed participants' knowledge, views on module duration/content and intention to improve clinical practice.

Results: 202 participants completed the pre-module survey and 143 completed the core module with variable participant rates for the advanced modules (range: n=18 to 71). Results indicated that there was a statistically significant improvement (P<0.05; related-samples Wilcoxon Signed Rank Test) in participants pre and post-training knowledge scores in all modules. Most modules were completed during work time (58% to 84%), were of appropriate duration (81% to 100%) and detail (83% to 96%), and had very few associated technical difficulties. The core module took 20 minutes (median) [IQR: 13 to 37] to complete whereas for the advanced modules, the completion times across modules ranged from 2-10 minutes. The majority of participants were nursing staff (71-87%) with 55-65% from non-metropolitan sites. 74% to 93% indicated participation in the module learning prompted intention to improve clinical practice.

Conclusions: Improving health professionals’ knowledge and skills in the assessment and management of children and adolescents with obesity in a timely, flexible manner was achieved through Weight4KIDS. Opportunities for further improvement in accessibility lie in ease of access and potential use of a mobile app to deliver program content.
Assessing the moderating role of participatory design in serious game effectiveness: a meta-analysis of serious games for healthy lifestyle promotion

Ann DeSmet, Debbe Thompson, Tom Baranowski, António Palmeira, Maïté Verloigne, Ilse De Bourdeaudhuij

1Ghent University, Department of Movement and Sport Sciences, Ghent, Belgium, 2Baylor College of Medicine, USDA/ARS Children’s Nutrition Research Center, Houston, Texas, USA, 3University of Lisbon, Universidade Lusófona de Humanidades e Tecnologias, Faculty of Physical Education and Sports, & CIPER – Faculty of Human Movement, Lisbon, Portugal

SIG: E- & m-health

Awards:

Purpose. Serious digital games can be effective at changing healthy lifestyles, but large differences in their effectiveness exist. The extent to which users were involved in game design may contribute to game effectiveness, as it can increase fit with user preferences. Participatory design (PD), which represents active user involvement as informant (users are asked for input and feedback) or co-designer (users as equal partners in the design) early on and throughout the game development, may thus relate to higher game effectiveness. This paper examines the moderating role of PD in the effectiveness of serious digital games for healthy lifestyle promotion, in a meta-analysis.

Methods. Four databases were searched for peer-reviewed papers, in English, published or in press before October 2014, and using a (group-) randomized controlled trial design.

Results. Fifty-eight games evaluated in 61 studies were included. Serious digital games had positive effects on healthy lifestyles and their determinants. Unexpectedly, PD related to lower game effectiveness on behavior (Q=6.74, P<.05) than when users were only involved as testers. PD also related to lower game effectiveness on self-efficacy (Q=7.83, P<.05) than when users were not involved in game design. Some differences were noted depending on the specific role in PD (informant, co-design), and depending on the game design element. Games developed in PD were more effective in changing behavioral determinants when they had included users in design elements on game dynamics (β=0.215, 95% CI 0.075; 0.356, p<.01), and more specifically so as an informant (β=0.235, 95% CI 0.079; 0.329, p<.01). Involving users as informants in PD to create game levels also related to higher game effectiveness (Q=7.02, P<.01). Co-design related to higher effectiveness when used to create the game challenge (Q=11.23, P<.01), but to lower game effectiveness when used for creating characters (Q=4.36, P<.05) and the game world (Q=3.99, P<.05).

Conclusions. Findings do not support higher effectiveness of games developed in PD. However, significant differences existed among PD games. Since user involvement may be important in the intervention reach, adoption and implementation, further research and design efforts are needed to enhance effectiveness of serious games developed with PD.
Four stories of evidence-based interventions - life after an RCT: real life implementation, scalability, sustainability and translation to other settings.

Convenor:
Femke Van Nassau, EMGO, Amsterdam, The Netherlands

Discussant:
Stef Kremers, Department of Health Promotion, Maastricht, The Netherlands

Description:
Purpose:
The purpose of this symposium is to promote discussion on how we can encourage real life implementation, scalability, sustainability and translation of evidence-based programs. We will also discuss implementation evaluation and how to measure degree of implementation and sustainability.

Rationale:
In the last few decades, governmental and other funding agencies have prioritized the development and evaluation of evidence-based prevention programs to combat the major public health problem of obesity. Consequently, a large variety of healthy nutrition, physical activity promotion and sedentary behaviour reduction programs have been developed and evaluated. Unfortunately, the real-world implementation of these evidence-based programs is often disappointing. With the public health impact of these programs depending on their implementation and sustainability in practice, it is important to understand how scalability and sustainability can be promoted and evaluated.

Objectives:
This symposium aims to present and to discuss:
1) the process of moving from research idea, through feasibility/piloting and a randomised controlled trial to widespread real world implementation and translation to other settings;
2) how to measure if and to what extent a program was implemented as intended, and how this affected program effectiveness;
3) definitions and evidence from scaling up and sustainability literature, and the degree of sustainability and the elements that contribute to sustained implementation.
The symposium also aims to serve as a platform for the discussion of broader issues related to implementation and translation research.

Summary:
This symposium will illustrate the diversity in approaches in scalability and will be able to paint a rich picture of advantages and pitfalls of such approaches as well as contribute to methodological and theoretical directions for implementation and translation research.
Harriet Koorts will present the preparation for the scaling-up process of the Transform-Us! Project. Next, Sally Wyke will retrospective review the Football In Fans Training (FFIT) story of development, delivery and implementation from multiple perspectives. In addition, she will share the process of translating FFIT to other settings: prisons, rugby, and FFIT for women.
Femke van Nassau will address three important implementation research questions using data gathered during the natural dissemination of the DOIT program (Dutch Obesity Intervention in Teenagers). Finally, Patti-Jean Naylor will discuss definitions and evidence from the Action Schools! BC scale up and sustainability, and will discuss how to critically analyse degree of sustainability and the elements that contribute to sustained implementation.
Scalability of Transform-Us! to reduce children’s sitting and promote physical activity in Victorian primary schools

Harriet Koorts\textsuperscript{1}, Jo Salmon\textsuperscript{1}, Anna Timperio\textsuperscript{1}, Adrian Bauman\textsuperscript{2}, David Lubans\textsuperscript{3}, Chris Lonsdale\textsuperscript{4}, Nicky Ridgers\textsuperscript{1}, Lauren Arundell\textsuperscript{1}

\textsuperscript{1}Centre for Physical Activity and Nutrition Research (C-PAN), Deakin University, Melbourne, Australia, \textsuperscript{2}School of Public Health, University of Sydney, Sydney, Australia, \textsuperscript{3}Priority Research Centre in Physical Activity and Nutrition, University of Newcastle, Callaghan, NSW, Australia, \textsuperscript{4}Institute for Positive Psychology & Education, Faculty of Health, Australian Catholic University, NSW, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective
Transform-Us! is an efficacious behavioural and environmental intervention to increase children’s physical activity and reduce sedentary behaviour in the school and family setting. Following success of the Transform-Us! efficacy trial (2010-2013), the program will be disseminated and implemented over 5 years via the Victorian State Government and associated health and educational organisations. Our aim is to assess the real-world scalability and effectiveness of the program when implemented State-wide across primary schools in Victoria, Australia.

Methods
The study uses a quasi-experimental pre-post non-equivalent group design to assess the effectiveness of online program training via multiple dissemination routes in Victoria. Schools will be recruited via stakeholder organisations and teachers trained via an online or online combined with professional development approach. Mixed-method multi-level data will be collected from stakeholders, schools, teachers, parents and children to capture program uptake, effectiveness, adoption, implementation and maintenance at scale. Data will be collected pre-implementation, at baseline, 12, 24, and 36 months post-implementation. Organisational-level measures include stakeholder interviews, focus groups and surveys, and setting-level audits, surveys and interviews. State-wide dissemination, setting-level adoption, implementation and maintenance will be assessed. Effectiveness will be measured among a subsample of 20 primary schools (10 intervention, 10 control), stratified by SEIFA area. Primary outcomes include children’s objectively assessed physical activity and sitting time via ActivPAL accelerometers. Secondary outcomes include children’s academic attainment and teacher proxy reports of classroom behaviour. Formative evaluation will capture potential moderating effects of setting and implementer characteristics; organisational readiness and capacity to deliver, teacher self-efficacy, perceived value and program outcome expectancies.

Results
Data will be mapped against RE-AIM framework criteria to assess program reach, effectiveness, adoption, implementation and maintenance at scale. A propensity analysis will be used to assess the dose response relationship between program implementation and outcomes. Formative, process and outcome evaluations will be conducted over 5 years.

Conclusions
This study will determine the scalability and effectiveness of a successful school-based physical activity and sedentary behaviour intervention in a real-world context. Our findings will inform education policy and practice on effective and sustainable ways to modify school environments to promote physical activity and reduce sedentary behaviours population-wide.
Implementation evaluation of school-based obesity prevention programs in youth; how, what and why?

Femke van Nassau¹, Amika S. Singh¹, Willem van Mechelen¹, Johannes Brug², Mai J.M. Chin A Paw¹

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective
With the public health impact of evidence-based obesity prevention programs depending on their implementation in practice, it is important to understand if and to what extent a programme was implemented as intended, and how this affected programme effectiveness.

Methods
Using data gathered during the natural dissemination of the DOiT program (Dutch Obesity Intervention in Teenagers) three important implementation research questions will be addressed.

Results
1) How to promote implementation as intended?
To promote implementation as intended, it is important to address the potential mismatch between a programme and its implementers by identifying the facilitating factors and barriers for implementation and translate these into an implementation plan.

2) What happens during implementation?
The next task is adequate and systematic measurement of the implementation process. By measuring process indicators, such as reach, fidelity and dosage, researchers can document if the target population (e.g. youth at the schools) was reached, if adaptations to the programme were made and what part of the programme was implemented.

3) Why did my program (not) work?
Interpretation of the different implementation measures is needed to assess at what level implementation occurred (e.g. degree of implementation) and how implementation affected programme effectiveness. Also, in order to maximize the public health impact, a blueprint for dissemination of the programme should be developed. This blueprint should contain: 1) information on contextual conditions that are compulsory for implementation; 2) a description of core, or most essential, components of the programme; and 3) a description of the most critical, core components of the implementation plan that need to be executed in order to achieve effectiveness of the programme.

Conclusions
Answering the three proposed research questions will lead to better understanding of how to implement overweight and obesity prevention programs effectively. It means that science has to collaborate with practice in order to develop an implementation plan. It also means that one should evaluate the process of implementation by addressing both process indicators, as well as facilitating factors and barriers. Moreover, one should explore the key factors that are expected to be critical for achieving effectiveness during implementation.
S31.3

‘Rolling Out’ public health research evidence: a case study of Football Fans in Training from inception to implementation.

Sally Wyke1, Kate Hunt2, Cindy Gray1, Alastair Street1, Derek Allison4, Nivky Reid4

1Institute of Health and Wellbeing, University of Glasgow, Glasgow, UK, 2MRC/CSO Social and Public Health Sciences Unit, Institute of Health and Wellbeing, University of Glasgow, Glasgow, UK, 3Research Strategy & Innovation Office, University of Glasgow; Glasgow, UK, 4Scottish Professional Football League Trust, Glasgow, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Few weight management programmes are designed for men and those that do have low uptake. We addressed this problem in the UK with a weight management and healthy living programme delivered to groups of men by community coaches in Premier League Football Clubs. Football Fans in Training (FFIT) appeals to men through its content, style of delivery, and context (the top professional football clubs in Scotland). In this paper we describe the process of moving from research idea, through feasibility/piloting and a full pragmatic randomised controlled trial (RCT) to widespread ‘roll out’/implementation.

Methods: Retrospective review of the experience of development, delivery and implementation of FFIT from multiple perspectives. We reflect on the importance of working closely with a delivery partner, what we did well/less well, and identify lessons learned.

Results: The RCT demonstrated that FFIT was effective. Compared to no intervention participants lost nearly 5% of their bodyweight over 12 months and the programme was cost effective. FFIT has subsequently been funded for continuing deliveries in 33 football clubs in Scotland, to 1350 more men. Deliveries have been made in England as we are working with international partners to adapt and develop the programme to other sporting settings. Implementation was contingent on strong relationships with our delivery partner, the Scottish Professional Football League Trust (SPFLT), and with potential programme funders over a 5-year period; throughout this process we advocated a research-based approach. We have jointly developed an approach to ‘roll out’ in which the University hold the Intellectual Property for FFIT and licence SPFLT to provide training and quality assurance for new deliveries. Our experience underlines the importance of: close working with potential delivery partners from a very early stage; early identification of IP ownership and potential delivery models; and clear guidelines on what needs to happen (and when) to retain the integrity of an evidence-based programme during implementation phases.

Conclusions: Movement from research to widespread ‘roll out’ of an effective public health programme requires time, mutual commitment to complementary goals and open communication to develop understanding of researcher/stakeholder perspectives.
S31.4

Sustaining implementation of evidence-based interventions: what factors contribute to sustainability and what is the role of public health researchers?

Patti-Jean Naylor¹, Heather A. McKay²

¹University of Victoria, School of Exercise Science, Physical and Health Education, Victoria, Canada, ²University of British Columbia, Faculty of Medicine, Centre for Hip Health and Mobility, British Columbia, Canada

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Scale up and sustained implementation of effective health promotion interventions in real world settings with enough dose delivered over sustained periods of time has been seen as critical to achieving public health aims. An evidence-based school health promotion intervention (Action Schools! BC) has been scaled up and sustained in British Columbia Canada for a decade. Definitions and evidence from the scale up and sustainability literature, data from the Action Schools! BC trials, and Pluye, Potvin and Denis's (2004) work conceptualizing sustainability in public health (e.g. organizational routines, institutional standards, concomitant implementation and sustainability processes, strategic actors) will be used to critically analyse the degree of sustainability and the elements that contributed to sustained implementation. The role of research partnerships and evidence as well as challenges for researchers will be a key focus of the sustainability discussion.
The Impact of Physical Activity on the Brain and Executive Functions: How Do We Measure It?

Convenor:
Kimberley Lakes, University of California, Irvine, Irvine, CA, USA

Discussant:
Catherine Draper, University of Cape Town, Cape Town, South Africa, South Africa

Description:
Executive functions (EFs) may be a vital contributing component to human success in multiple facets of life. EFs are processes associated with attention, working memory, and inhibitory control. The relationship between physical activity (PA) and the brain has received increasing attention in recent years, supporting the notion of exercise as medicine. However, evidence indicates that not all forms of PA benefit EFs equally. Recent reviews have pointed out substantial differences in the effects of various types of exercise and PA, indicating that fitness training does not improve EFs, but cognitively complex forms of exercise (e.g., martial arts, yoga) do improve EFs. This research has provided a critical challenge to the field to better define PA interventions when examining effects on EF, which will improve the quality of research and our scientific understanding of the impact of PA on the brain.

While a closer examination of the content of interventions is critical to improving research in this field, it is also important to pay close attention to the methods used to measure EFs and how measurement design might impact research findings. In this symposium, we will present findings from studies using a wide range of tools to measure EFs in PA and exercise research. The tools discussed will include parent and teacher ratings of children’s EFs (including attention and inhibitory control); computer or iPad administered tests; examiner-administered tests (e.g., mental math tasks); observer ratings of children’s cognitive, affective, and motor control while completing a physical challenge course design to challenge EFs; and adolescents’ ratings of their abilities (attention, inhibitory control) in comparison to that of their peers. Moreover, we will describe the use of fMRI in studies of PA and will present findings from research using fMRI to investigate cortical activation changes with PA. The studies presented also will include results from research across the continuum of human development, from preschool-aged children to older adults, in multiple countries, and from many nationalities. Presentations will highlight the importance of considering individual and cultural characteristics when selecting appropriate measures of EFs. We will also address measurement of different skills that fall under the umbrella of EF, the correlations between these skills, and processes involved in selecting the best outcome measure for a particular study. Finally, we will illustrate the importance of using a multi-method, multi-source approach to measuring EF outcomes in research examining the impact of PA or exercise on the brain.

A Multi-Method, Multi-Source Approach to Measuring Executive Function Outcomes in Pediatric Exercise Research

Kimberley Lakes
University of California, Irvine, Irvine, CA, USA

SIG: Children and families

Awards:

Purpose: In this presentation, I will share data collected across multiple exercise intervention studies with children, illustrating a multi-method, multi-source approach to measuring executive functions, and the research value of a robust measurement design.

Methods: Research on the effects of physical activity on executive functions has used a variety of approaches to measuring outcomes. Seemingly contradictory research findings may be explained by both differences in the exercise interventions themselves as well as the tools used to measure outcomes. In a study with more than 200 elementary school children, we measured executive functions after an exercise intervention, using a novel observer-rated measure of self-regulation in response to a physical challenge course, parent and teacher ratings of attention and behavior, and child performance on an executive function task. In subsequent research with more than 100 older children and adolescents, we added a computer test of executive function to our battery of parent, teacher, and observer ratings and measured EFs before and after exercise interventions.

Results: Among parent and teacher measures of attention and inhibitory control, the most robust rating scales measure skills across a wide continuum, producing a normal distribution of scores. Measures that produced highly skewed distributions (having a ceiling effect) were more limited in their ability to detect significant differences following intervention. Rater observations produced highly generalizable and normally distributed scores and were among the most sensitive to change. Moreover, performance on executive function tasks provided valuable information regarding changes in particular executive functions following intervention and were strongly correlated with observer ratings. Parent, teacher, and observer ratings of attention in different contexts were significantly correlated with executive function task performance, providing evidence that they may all be tapping the same underlying skills.

Conclusions: Our results highlight the value of careful measurement design and the contribution of different types of measures (e.g., rating scales, computer-administered tests) and different sources of information (e.g., parents, teachers, blinded observers). A multi-source, multi-method design, using instruments carefully designed to produce highly reliable and valid scores is necessary to further our understanding of the effects of exercise intervention on executive functions.
Functional Magnetic Resonance Imaging as a Tool for Determining Changes in Executive Functions with Exercise

Kelli Sharp, Robert Gramer, Suzy Kim, Stephen Page, Steve Cramer

University of California, Irvine, Irvine, CA, USA

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: This presentation investigates the feasibility of using functional magnetic resonance imaging (fMRI) to measure cortical changes in executive function with exercise. Specifically, data will demonstrate how physical activity and aging modify cortical activation patterns.

Methods: Brain function has been studied as a determinant of clinical status and may be an important factor for understanding cortical changes with exercise. We investigated a total of 32 participants with incomplete spinal cord injury (SCI) and healthy age-matched controls. Each underwent a fMRI (3 Tesla) session and were encouraged to imagine themselves walking while performing the dorsiflexion task.

Results: Our results determined feasibility of using fMRI for measuring cortical changes with a simple task like dorsiflexion. We focused on dorsiflexion due to the fact that it is a key component in proper execution of the gait cycle. Ankle movement was associated with activation of bilateral primary and secondary sensory and motor areas in both subject groups that was consistently larger among subjects with SCI. Direct comparison of the two groups was concordant, showing significantly greater activation in subjects with SCI in several regions of primary sensorimotor cortex of the right hemisphere. In addition, we found an increase in activation in bilateral prefrontal brain areas when compared to control subjects in order to complete the task.

Conclusions: Our results highlight the importance of using fMRI as a measure of brain function and cortical changes with physical activity and describe the cerebral response to generating efferent activity. These findings elucidate the feasibility for utilizing fMRI and suggest that cerebral events are a significant determinant of brain function factors that might be important to developing and perhaps individualizing therapeutic interventions involving physical activity.
The Relationship between Physical Activity and Executive Function: Different Answers from Different Approaches to EF Measurement

Steven Howard, Anthony Okely, Dylan Cliff

University of Wollongong, New South Wales, Australia

SIG: Children and families

Awards:

Purpose: An area of recent growth in physical activity research has involved investigating effects of physical activity not just on physical and health outcomes, but also cognitive outcomes. Particular interest has been directed toward executive functions (EFs), given mounting evidence for their relation to school readiness, academic success and learning (e.g., literacy, numeracy), as well as social and emotional outcomes (e.g., theory of mind, moral conduct), and a range of developmental disorders (e.g., ADHD). However, paralleling the EF literature more broadly, there remains little agreement on how to best capture children’s emerging EF abilities, especially in the early years.

Methods: To illustrate this issue and make recommendations for future research, this presentation will provide an analysis and critical appraisal of executive function (EF) data collected in the context of our physical activity (PA) research (i.e., habitual, intervention) using a variety of common approaches to EF measurement in the early years. Specifically, data from traditional EF task-based approaches and more contemporary approaches (i.e., the Early Years Toolbox) will be contrasted using data from a large habitual PA study and PA intervention study.

Results: These data will be used to highlight the problems associated with the common practice of adopting traditional EF measures in the context of PA research, especially with preschool-aged children, as well as suggest possible ways forward. Specifically, results of these two studies indicate that current task-based approaches to EF measurement can lead to spurious and counter-intuitive results that appear to be best explained by issues in the EF measurements (rather than genuine products of PA effects).

Conclusions: Analyses of these data indicate that purposefully designed early years measures, such as the Early Years Toolbox, can provide enhanced validity, reliability, developmental sensitivity, and sensitivity to change, which is vital to detect genuine cognitive change associated with PA. More than advocating for a particular set of measures, this presentation will conclude with considerations that researchers can apply in the selection of EF measures.
Establishing the Feasibility of Executive Function Assessments for Use With South African Preschool Children

Caylee Cook¹, Steven Howard², Catherine Draper¹³

¹University of Cape Town, Cape Town, South Africa, South Africa, ²University of Wollongong, New South Wales, Australia, ³University of the Witwatersrand, Johannesburg, South Africa

SIG: Children and families

Awards:

Purpose: This presentation investigates the feasibility of executive function (EF) assessments for South African (SA) preschool children from a range of income settings, by comparing iPad-based measures from the Early Years Toolbox (EYT), to paper-based measures.

Methods: Early childhood EF research is very limited in SA, where this is a wide range of income and cultural settings, thus making the selection of a measurement tool that can be uniformly employed across such a range of settings, rather complex. Furthermore, in early childhood, a task's dependency on numeracy and literacy skills may impede the true component of EF being measured. This issue is pertinent in many low-income SA settings where the early education environment is disadvantaged, contributing to poor numeracy and literacy skills in young children.

IPad-based and paper-based measures of EF have been piloted with children (3-5 years old, n=80) in preschools from high, middle and low-income areas around Cape Town. Where necessary, measures have been translated into local languages, and a fieldworker has been present to further facilitate communication. The EYT measures assess inhibition, visual-spatial working memory and cognitive flexibility. These are being compared to paper-based tools assessing these same EF components, from the School Readiness and Transition Study Executive Functions Battery.

Results: Results thus far have shown high ceiling effects on the paper-based measures, specifically in the go-no-go and card sort task. There is also a significant reliance on literacy skills with the forward word span task. The EYT on the other hand has shown a greater variation in results, with no floor or ceiling effects observed. Unfamiliarity with the iPad is noticeable with some children from low-income settings; however the practice trial is sufficient for the children to accurately complete the tasks needed. The language of the instructions on the EYT tasks has been shown to be an important influence of performance.

Conclusions: The EYT has proved to be a feasible assessment tool that can be used across a range of income settings and cultures in SA, and can be used to assess EF as an outcome measure in intervention studies with preschool children.
Objectively measured physical activity in European children and adolescents – methodological advancements and new results from the IDEFICS-/I.Family cohort

Convenor:
Angie Page, Centre for Exercise, Nutrition & Health Sciences, Bristol, UK

Discussant:
Esther Van Sluijs, University of Cambridge, Cambridge, Cambridgeshire, UK

Description:
Title: Objectively measured physical activity in European children and adolescents – methodological advancements and new results from the IDEFICS-/I.Family cohort

Purpose: This symposium will illustrate the opportunities and challenges that large cohorts with accelerometry data provide using the IDEFICS-/I.Family cohort. This is a large dataset of longitudinal accelerometer measurements, body composition and a range of health outcomes in children and adolescents in eight European countries.

Rationale: Large cohort studies that include accelerometer derived physical activity measures allow us to advance our knowledge in relation to physical activity surveillance and the relationship between physical activity and health outcomes. However methodological challenges remain when interpreting accelerometer data. This session uses data from IDEFICS/I.Family to demonstrate these advances as well as new solutions to interpreting complex data to deliver public health outcomes.

Objectives: To (1) discuss the cross-sectional associations between PA and health outcomes, (2) describe the variation of activity levels across different European countries as well as trajectories of activity levels from childhood to adolescence, (3) analyse the longitudinal association of PA with different anthropometric indicators of body composition and (4) address measurement issues by presenting a novel statistical modelling approach.

Summary: The first presentation will introduce the IDEFICS-/I.Family cohort study and summarise key findings to-date regarding PA and various health outcomes. The second presentation will describe the variation of PA levels of children and adolescents across eight European countries from a longitudinal perspective. The third presentation will discuss the bi-directional prospective association between PA and various measures of body composition. The fourth presentation will introduce new statistical approaches to model objectively measured PA data that allow for a more precise classification of PA levels in children. An external discussant will then frame a discussion in relation to current debate and other large physical activity (PA) datasets including the International Children’s Accelerometry Database (ICAD).

Format: Angie Page (UK) will chair the session and briefly outline the opportunities and challenges that large accelerometer datasets provide (2 min.) 1) Iris Pigeot (Germany) will present the study design and some key findings regarding PA and health outcomes in children (15 min. + 2 min Q&A). (2) Ashley Cooper (UK) will describe the international variation of PA levels in children and adolescents (10min. + 2min. Q&A). (3) Ole Sprengeler (Germany) will present the longitudinal analysis of the association of PA and body composition (10min. + 2min. Q&A). (4) Norman Wirsik (Germany) will present new modelling approaches to improve the classification of PA levels in children (10min. + 2min. Q&A). (5) Esther van Sluijs (UK) will reflect on these previous presentations and chair the final discussion (20min.).
The IDEFICS/I.Family cohort: associations between physical activity and health outcomes

Iris Pigeot\textsuperscript{1}, Yannis Pitsiladis\textsuperscript{2}, Kenn Konstabel\textsuperscript{3}, Diana Herrmann\textsuperscript{1}, Wolfgang Ahrens\textsuperscript{1}

\textsuperscript{1}Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany, \textsuperscript{2}University of Brighton, Brighton, Eastbourne, UK, \textsuperscript{3}National Institute for Health Development, Tallinn, Estonia

**SIG:** Children and families

**Awards:**

**Purpose:** The I.Family study investigates food choice, physical activity (PA) and other lifestyle behaviours in relation to health outcomes such as obesity and metabolic disorders in children and adolescents. By considering the social and the built environment I.Family aims to identify targets for effective interventions and to support policy development.

**Methods:** I.Family builds on the success of the IDEFICS cohort established in 2007 with 16,228 children recruited from eight European countries aged 2 to 9.9 years at the first examination. Approximately 7,000 IDEFICS children and more than 2,500 siblings participated in a second follow-up examination as many experienced the transition from childhood to adolescents. Parents reported family structure and familial influences. Additional assessments such as fMRI, sleep quality and PA related to the built environment were conducted in contrasting groups where children with favourable weight trajectories were compared with children with an unfavourable trajectory.

**Results:** Approximately 50% of the children and 18% of their parents volunteered to wear an accelerometer for seven consecutive days. Baseline data revealed that only about 15% of the children met the recommendation of 60 minutes moderate-to-vigorous (MV) PA per day (Evenson cut-offs, 60 sec epoch), ranging from less than 10% in Italy and Cyprus, to more than 20% in Sweden and Germany. The average duration of MVPA/day increased from 25 min at the age of 2-2.9 (both boys and girls) to 51 min in boys and to 39 min in girls at the age of 7-7.9 years. The duration of MVPA seemed to level off or even decrease above the age of 8 years. The prevalence odds ratio of being overweight or obese was 1.56 (95% confidence interval 1.29-1.90) among children with less than 30 minutes MVPA/day as compared to children meeting the PA recommendations. We observed a beneficial effect of weight bearing PA on bone stiffness that increased by 1% per 10 minutes of MVPA/day whilst sedentary time was negatively associated with bone stiffness.

**Conclusions:** Our data confirm the beneficial effects of PA on child health, whilst the majority of European children fail to meet the current PA recommendations.
**S33.2**

**Consistency in cross-country differences in physical activity: From IDEFICS to I.Family**

Ashley Cooper¹, Angie Page¹, Kenn Konstabel², Byron Tibbitts¹, Iris Pigeot³, Wolfgang Ahrens³

¹University of Bristol, Bristol, UK, ²National Institute for Health Development, Tallinn, Estonia, ³Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany

**SIG:** Children and families

**Awards:**

**Purpose:** To uniquely investigate whether differences in physical activity and sedentary time across 8 European countries are consistent from childhood to adolescence.

**Methods:** Data from 3944 children (1945 boys; 3944 girls) aged 11.49 ± 2.38 years from the I.Family study were compared to 7684 (3842 boys; 3842 girls; aged 6.92 ± 2.62 years) in the same cohort (IDEFICS study). Physical activity (PA) was assessed by accelerometer (Actigraph) using the same protocol in 8 European countries (Belgium, Cyprus, Estonia, Germany, Hungary, Italy, Spain and Sweden). Only participants with at least one weekday and one weekend day, and 8 hours of data were included in the analyses.

**Results:** For I.Family, physical activity varied by up 29% across European countries and was generally lower in Southern European countries compared to Central and Eastern European countries. Consistent with findings from younger children in the same cohort (Konstabel et al. IJO 2014 38: S135-432) physical activity levels were lowest in Italy (proportion of time in moderate-to-vigorous PA (MVPA) (3.46%) and sedentary (57.16%)) in contrast to Belgium, where children spent 5.8% of time in MVPA and 50.97% sedentary. Boys were consistently more active than girls across the cohort. Relative rankings of countries were consistent from IDEFICS to I.Family although in some countries, notably Germany, relative activity was lower in I.Family compared to IDEFICS.

**Conclusions:** Very few studies have objectively measured longitudinal physical activity data across a range of countries in Europe. These findings reinforce the substantial differences in physical activity between European countries and that these remain relatively stable over time for most but not all countries.
The longitudinal association between objectively-measured PA levels and body composition in European children.

Ole Sprengeler¹, Norman Wirsik², Angie Page², Ashley Cooper², Wolfgang Ahrens¹
¹Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany, ²University of Bristol, Bristol, Germany

SIG: Children and families

Awards:

Purpose: Currently approximately 20% of children and adolescents in developed and developing countries are overweight or obese and few children and adolescents achieve the recommended physical activity (PA) level of at least 60 minutes per day of moderate-to-vigorous PA (MVPA). Although PA is known to be beneficial for mental and physical health, its role regarding the prevention of overweight is still unclear. This paper will investigate the longitudinal associations of objectively measures PA and indicators of body composition based on data from the IDEFICS/I.Family cohort.

Methods: Accelerometer measurements over three consecutive days were available for approximately 12,400 children, with 7,900 having one measurement episode and 4,500 having at least two measurements episodes. Longitudinal bi-directional associations between PA and various markers of body composition were investigated using multi-level mixed models to calculate regression coefficients (B) and 95% confidence intervals (CI). Considered markers of body composition were body mass index (BMI), fat mass index (FMI) and fat free mass index (FFMI).

Results: In the first analysis BMI was regressed on PA, showing a negative association between MVPA (min/day) and BMI z-score (β=-0.003; CI=(-0.0037; -0.0025)). When MVPA (min/day) was then regressed on BMI a negative association (β=-2.32; CI=(-2.59; -2.03)) was also observed. The longitudinal change in BMI z-score regressed on PA showed no significant associations, but the BMI z-score predicted a longitudinal change in MVPA (β=-1.61; CI=(-2.12; -1.09)). Analyses were further conducted investigating the direction of association between different PA levels and FMI and FFMI.

Conclusions: Although negative associations between PA levels and BMI were confirmed in the cross-sectional analysis, the longitudinal analysis revealed that higher BMI z-score predicted lower PA levels at follow-up but high PA levels did not predict lower BMI z-scores.
Expectile regression and hidden Markov models to improve quantification of physical activity using accelerometer data

Norman Wirsik¹, Fabian Sobotka², Vitali Witowski¹, iris Pigeot¹
¹Leibniz Institute for Prevention Research and Epidemiology – BIPS, Bremen, Germany, ²University Oldenburg, Oldenburg, Germany

SIG: Children and families

Awards:

Purpose: Accelerometers have become the method of choice to objectively measure physical activity (PA) and are now widely used in population-based studies. Various cutpoints are commonly used to classify recorded impulse counts, i.e. to identify time intervals, so-called bouts, during which the subject remains within one activity range. Here, expectile regression with an applied L₀-penalty and hidden Markov models (HMM) are proposed to improve the cutpoint method to accomplish a better identification of the sequence of modes of PA and thereby enhance the measurement of PA.

Methods: 1,000 days of accelerometer data for 1 and 5 seconds epochs were simulated based on previously collected labeled data. In simulated data the actual sedentary behaviour and activity range of each count is known. The cutpoint method is compared with HMMs based on the Gaussian distribution (HMM[Gauss]) and expectile regression (EXPECT) with regard to misclassification rate (MCR), bout detection and computer runtime.

Results: For 1 second epochs the cutpoint method had an MCR of about 18%, followed by HMM[Gauss] with 16% and EXPECT with 10%. The average identified number of bouts ranged from 10,300 for the cutpoint method to 2,800 for HMM[Gauss] and 34 bouts for EXPECT, while the mean in the simulated data was 42. For 5 seconds epochs the variance decreased and results for all methods improved. The cutpoint method had an MCR of about 9%, followed by HMM[Gauss] with 6% and EXPECT with less than 2%. Also the mean number of identified bouts decreased to about 1,200 for the cutpoint method, 271 for HMM[Gauss] and 56 for EXPECT. Runtime varied between 0.5-3 seconds (cutpoint), 2.0-10.5 minutes (HMM[Gauss]) and 14.0-70.5 minutes (EXPECT).

Conclusions: HMM-based methods as well as expectile regression may more accurately classify activity bouts than the traditional cutpoint method when applied to simulated data. Both methods may thus improve the modeling of accelerometer data. Comparing these new methods, expectile regression showed better performance with regard to all considered quality measures, at the expense of increased runtime.
"Physical activity for health in Africa: the promise, the progress, the challenges"

Convenor:
Estelle Lambert, ESSM, Health Sciences, University of Cape Town, Cape Town, South Africa

Discussant:
Frederick Marais, Deputy Director: Wellness, Health Programmes, Western Cape Government, Cape Town, South Africa

Description:
Background: This symposium builds on the work presented in 2015, which spoke to promising developments for physical activity and health promotion in the African Physical Activity Network (AFPAN). From the recent Global Burden of Disease Study, we know that physical inactivity, even in the African region, ranks in the top 11-16 of risk factors, for disability-adjusted life-years (Lim et al., Lancet 2012; 380: 2224–60). However, the African region may also be characterized by cultural and economic diversity, rapid urbanization, often into poverty, the co-existence of chronic, communicable and non-communicable diseases, and the juxtaposition of food insecurity with obesity, primarily in women. Studies linking car ownership and attributes of the built environment to inactivity and obesity (Shoham et al., BMC Public Health. 2015, Oyeyemi et al., Am J Health Promot. 2013), and the concerning levels of physical inactivity in youth in some countries in the region (Tremblay et al., J Phys Act Health. 2014), attest to the physical activity “transition” and emphasise the need for interventions, ranging from policy initiatives concerning physical education and national physical activity plans, to culturally-appropriate, community-based physical activity programs, sport-for-development initiatives, or physical activity interventions linked to the prevention and control of non-communicable diseases.

Problem statement: We are continually reminded that there is a paucity of data regarding physical activity interventions from LMICs, particularly from Africa. Where there are initiatives and programs, for example, from non-profit organisations, there is often little by way of evaluation, and an ongoing need for "practice-based evidence". This symposium brings together such evidence from various member countries from the African Physical Activity Network, as well as highlighting the difficulties surrounding implementation.

Results: We will provide specific examples of interventions and evaluated programs designed to promote physical activity, including published literature and work in progress from the region. These range from national and regional coalitions, such as Exercise is Medicine (Ghana) and policy developments (Ghana, South Africa, Kenya), to programs and interventions in various sectors (education, transport, primary health care, and sports.) (South Africa and Mozambique). Moreover, we will specifically focus on some of the challenges encountered in implementing community-based programs in the region (South Africa and Mozambique).

Conclusion: The African region is moving toward the development and implementation of national physical activity plans and policies, focused on settings-based approaches to addressing the growing problem of inactivity, and has piloted various community-, worksite-, school-, sport-for-development and primary-healthcare interventions and programs. Some specific challenges of implementing such programs in low-resourced settings are addressed, including the importance of bespoke interventions, culturally adapted for our region. Further, there is a recognized need to address the attributes of the built environment and active travel to further promote physical activity in Africa. This symposium provides current and salient examples of successful implementation, along with the challenges for such programs and strategies in the region.
S34.1

Environmental & Policy Approaches To Physical Activity Promotion in Ghana  Dr. Richmond Aryeetey (University of Ghana), Professor Seidu Sofo (Southeast Missouri State University), George Gyamfi, John Nartey and Professor Reginald Ocansey (Active Living & Wellness Alliance Group)

Richmond Aryeetey1, Seidu Sofo2, George Gyamfi3, John Nartey4, Reginald Ocansey5

1University of Ghana, Accra, Ghana, Ghana, 2SouthEast Missouri State University, Cape Girardeau, Missouri, USA, 3Active Lifestyle and Wellness Group, Nungua (SKM), Ghana

SIG: Policies and environments

Awards:

Objective: In this paper, we discuss national coalitions and policy developments for physical activity and health promotion in Ghana. These are considered along with the accompanying challenges, and a “road map” for the development of a national physical activity plan will be presented. Results: In Ghana, physical activity is recognized as a key component of optimal health and wellbeing. The Ministry of Health identified regular physical exercise as a core health behavior in the national health policy and operationalized the adoption of "Exercise Is Medicine" through the Regenerative Health Program. Educational and competitive sports are also supported by the government, through the Sports and Education ministries, as well as from the activities of non-profit organizations. However, there is limited coordination of these programs. Another key challenge to physical activity participation is the lack of conducive and safe environments for outdoor activities. Limited evidence indicates poor enforcement of city development regulations which otherwise, have been designed to ensure a safe environment for outdoor activities such as walking and biking. Ongoing rapid changes in the built environment, particularly in urban Ghana, call for a more cohesive plan for creating and sustaining physical-activity-friendly urban settings. Conclusion: The Active Living & Wellness Alliance Group (ALWAG) seeks to lead the way in developing a national physical activity promotion plan in partnership with key stakeholders in health, sports, education and civil society.
Methodological solutions for exercise interventions in Africa: the Mozambican experience

Antonio Prista, Timoteo Daca, Lucilia Mangona, Francisco Tchonga, Jorge Uate, Amilcar Tovel, Célia Ruthe, Edmundo Ribeiro

Núcleo de Investigação em Actividade Física e Saúde, FEFD-CIDAF, Universidade Pedagógica, Maputo, Mozambique

SIG: Policies and environments

Background: Urbanization in Africa is taking place at a rapid rate, and in many cases in a non-planned manner. Literature suggests that rapid urbanisation produces a negative effect on several health factors, such as the growth of non-communicable diseases and its associated risk factors. These include the increase in sedentary lifestyles and of particular concern, disturbing secular trends showing a decrease in physical activity and cardiorespiratory fitness in Mozambican youth (dos Santos et al., Int J Environ Res Public Health. 2014 Oct 21;11(10):10940-50). Data from several countries from the African continent have demonstrated that physical inactivity-associated pathologies are increasing in almost all cities, with a resultant shift in the burden of disease from predominantly infectious diseases to that of a dual burden of both infectious and non-communicable diseases. Therefore, Africa is undergoing a rapid epidemiological transition.

Objective: This calls for an urgent solution to promote physical activity at different age levels and across different settings. Apart from epidemiological studies, our research group in Maputo, Mozambique has been conducting research on physical activity interventions, investigating the most appropriate methods to implement physical activity and sports interventions in different populations within the country. Results: These populations include aging adults, adults, adolescents and children as well as special populations such as HIV+ (The Open AIDS Journal, 2015, 9, (Suppl 1: M5) 89-95), diabetics and metabolic syndrome groups. While these interventions aim to promote retention and well-being for the participants, the main focus is on the biological effect of physical activity and exercise. Conclusion: The proposed communication will show the results and lessons learnt from those intervention studies, representing evidence from Southern Africa.
**S34.3**

**Physical activity interventions in low resourced communities: From engagement to implementation**

Sarah J Moss, GR Oviedo, M Cameron

PhASRec, North West University, Potchefstroom, Nortwest Province, South Africa

**SIG:** Policies and environments

**Awards:**

**Purpose:** Limited supervised physical activity interventions programs are presented within the public health sector of South Africa. The aim of this presentation is to present the challenges faced when introducing regular physical activity programs in low resourced communities in South Africa.

**Methods:** Qualitative data collected through practical experience from introducing physical activity interventions in low resourced communities, discussions with stakeholders, government departments and health care workers as well as participants in research projects will be presented against the background of the current public health care focus and policies in South Africa. The results will be a written account of experiences from researchers and government officials.

**Results:** Results from interviews, practical experience and discussions with stakeholders will report on the current structures available within the health care system of South Africa with regards to implementing regular physical activity in low resourced communities. The absence of trained professionals in physical activity and lifestyle will be discussed, barriers experienced when engaging with communities to introduce physical activity and the realities of the community that is engaged with when introducing regular physical activity interventions.

**Conclusions:** The findings from this study will contribute to the understanding of the challenges within the South African context when introducing physical activity interventions with the purpose to change behaviour related to lifestyle. Information obtained with this study will inform organisations on the challenges to be expected when implementing physical activity in low-resourced communities. In order to obtain the buy-in of the community, engagement with the community is a prerequisite together with empowering the community to ensure sustainable change.
**Lessons learned from physical activity interventions and promotion initiatives in South Africa: From policies to programs, public to private sector, texting to talking, informing to incentivising, measuring to motivating**

**Estelle Lambert¹, Clare Bartels², Lisa Miclesfield³, Catherine Draper⁴, Tracy Kolbe-Alexander⁵, Kirsty Bobrow⁶, Avi Josephs⁷, Frederick Marais⁸**

¹Division of Exercise Science and Sports Medicine, Department of Human Biology, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa, ²Developmental Pathways to Health Research Unit, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa, ³Centre for Research on Exercise, Physical Activity and Health (CRExPAH), School of Human Movement Studies, University of Queensland, Brisbane, Australia, ⁴Discovery Vitality, Johannesburg, South Africa, ⁵Chronic Disease Initiative in Africa, Department of Medicine, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa, ⁶Deputy Director: Increasing Wellness Chief Directorate: Health Programmes Western Cape Government: Health, Cape Town, South Africa

**SIG:** Policies and environments

**Awards:**

**Objective:** The conceptual framework adapted from the behavior change wheel (Michie S et al., Implement Sci. 2011) will be used to showcase physical activity (PA) intervention and promotion initiatives in South Africa, and reflect on how these approaches impact on opportunity, capability and motivation concerning PA behavior. **Methods/Results:** We will begin with policy initiatives, and compare and contrast the less-than-successful attempts at adoption of a national physical activity plan against PA embedded in the National Strategic Plan for Prevention and Control of NCDs 2013-17 and the recently adopted National Strategy for Prevention and Control of Obesity in South Africa (2015-2020) (http://www.sancda.org.za/wp-content/uploads/2015/09/National-Strategy-for-prevention-and-Control-of-Obesity-4-August-latest.pdf). We will examine results from several school-based programs, from whole-of-school interventions, targeting curriculum, policy and the environment (de Villiers et al., BMC Public Health. 2015, Jacobs and Mash, SA Journal of Family Practice, 2013; Naidoo and Coopoo, AJPHERD, 2012) which showed limited, positive changes on self-efficacy and PA behavior, to simple, low-cost, environmental upgrades (Walter CM, AJPHERD, 2014), where “activity-friendly environments, including playground markings and loose equipment” were effective in changing PA behavior. We introduce 4 protocols for PA interventions in the adult, employed population, one of which is in the private sector. These include health risk assessment with tailored print communication and SMS-text messages in teachers (South African National Educator Wellness Study, SA-NEWS), an intervention involving brief, behavioral counseling with motivational-interviewing compliant language by biokineticists in hypertensive and diabetic patients in the public sector, and a pedometer-based intervention for nurses, based on results of qualitative and quantitative formative assessment (Phiri et al. BMC Nurse 2014). We will report back on a prospective trial to incentivize PA, by a private health insurer, incorporating behavioral economics, which showed communication to be as effective as incentives (Patel, personal communication). Finally, we will present an example of a whole-of-government approach, at provincial level, engaging health champions, to promote PA and other lifestyle behaviors, under the Western Cape on Wellness! (WoW!) initiative. **Conclusions:** Each of these examples provides insights regarding factors influencing the successful implementation of PA policies and programs in a country with vast differences in socioeconomic conditions, culture, language, education and access.
Increasing physical activity and reducing sedentary time in older adults: development and implementation of interventions

Convenor:
Sebastian Chastin, Glasgow Caledonian University, Glasgow, UK

Discussant:
Paul Gardiner, The University of Queensland, Brisbane, Australia

Description:
Purpose: To give an overview of interventions to reduce sedentary time or increase physical activity in older adults, with a specific focus on the development, feasibility testing as well as effectiveness of such interventions.
Rationale: Worldwide, the population of older adults (aged 60 years and older) is rapidly increasing. Aging induces an increase in the prevalence of major chronic diseases, inevitably resulting in a large medical burden and rise in health care costs. Regularly engaging in physical activity, as well as reducing prolonged periods of sedentary time is known to lower the risk for developing several non-communicable diseases. Consequently, as physical activity declines with increasing age, and sedentary time increases, it is crucial to develop and implement interventions for older adults, focusing on these behaviors. Such interventions should be feasible and tailored to the needs and wishes of older adults, in order to maximize the probability for effectiveness.
Objectives: This symposium aims to
1) Give an overview of interventions to increase physical activity or decrease sedentary behavior in older adults.
Different stages of intervention development and implementation (creation, feasibility testing and effect evaluation) will be included
2) Give an overview of different strategies to develop interventions (e.g. co-creation), different methods for delivery (e.g. eHealth, face-to-face sessions) and different theoretical frameworks (e.g. self-regulation theory).
3) Provide a forum to discuss about the challenges that are inherent to health research in older adults and about which intervention strategies may work best in older adults
4) Discuss implications for further research and practice based on the findings

Summary:
Sebastian Chastin will introduce the symposium and explain the need to conduct behavioral interventions in older adults. Calum Leask will focus on ‘co-creation’ as a strategy to develop a personalized intervention to reduce sedentary time. Juliet Harvey will present on the feasibility of using activity monitoring technology to reduce sedentary time in older adults living in sheltered housing complexes. Next, Lucy Lewis will focus on the feasibility and effectiveness of an incremental goal setting intervention to reduce sitting time. Finally, Delfien Van Dyck will present about the effectiveness of a self-regulation eHealth intervention to increase physical activity in recently retired older adults. Paul Gardiner will lead the general discussion, with specific attention for the challenges that can be experienced during intervention development and implementation in older adults.

Format:
Chair: Sebastian Chastin
Presenters: Calum Leask, Juliet Harvey, Lucy Lewis, Delfien Van Dyck
Discussant: Paul Gardiner
Co-creating a tailored intervention to reduce sedentary behaviour in older adults

Calum Leask¹, Dawn Skelton¹, Marlene Sandlund², Sebastien Chastin¹

¹Glasgow Caledonian University, Glasgow, Scotland, UK, ²Department of Community Medicine and Rehabilitation, Umea University, Umea, Sweden

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose
Older adults are the most sedentary segment of society and recently, reducing sedentary behaviour (SB) has become a public health priority. There are currently few models of interventions aiming to lower SB in this population. As SB is ubiquitous throughout the day, interventions need to modify the daily routine. Therefore, an intervention will need to be tailored to an individuals’ context and circumstances to improve adherence and lead to sustained positive health action. The aim of this study was to explore if co-creation could be an effective strategy to develop a personalised intervention to empower older adults to identify and reduce prolonged SB.

Methods
Eleven community dwelling older adults (5 men, mean age = 73.9 years) were recruited from a database of Research Volunteers. The process was based on participatory appreciative action research (PAAR) and involved older adults working together through 10 interactive workshops. Each workshop had a specific focus (eg. awareness raising, feedback, self-monitoring) and between workshops, participants carried out research fieldwork tasks which they presented back to the group. Data was collected using field notes, video recording and worksheet tasks. Analysis was conducted using a qualitative content analysis approach.

Results
Participants developed the “Are you up for it?” manual: an intervention manual interweaved throughout a daily diary. Key elements of the manual included: 1) education of the concept and benefits of interrupting SB; 2) introducing the concept and categorisation of an individuals’ own reasons to interrupt SB (assets); 3) a daily diary with a corresponding table to facilitate identification of prolonged SB and assets 4) action planning of when and how to reduce recognised prolonged SB; 5) reviewing the effectiveness of increased sedentary interruptions. Characteristics of the tool which are tailorable include: the manual size, frequency of action planning, assets most frequently used and SB deemed modifiable based on the context.

Conclusions
This study presents a novel approach towards developing a tailored intervention to reduce SB in older adults. The manual allows personalisation based on individual preferences and therefore increases the likelihood of observance. This intervention should now be implemented in a similar demographic to assess its effectiveness.
**SOS Study: Stomp Out (prolonged) Sitting in older adults living in sheltered housing complexes using activity monitor feedback.**

Juliet Harvey, Sebastien Chastin, Dawn Skelton  
Glasgow Caledonian University, Glasgow, Scotland, UK

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Purpose:** This study aimed to determine the feasibility of using activity monitoring technology and real time or follow-up feedback to assist older adults living in sheltered housing complexes to reduce their sedentary behaviour (SB).

**Methods:** Participants were recruited and randomized into 2 groups. They were monitored continuously over 14 weeks with an activPAL. On weeks 2, 6 and 10 both groups had face-to-face hour long discussions about their SB and their pattern of SB. One group had the addition of real-time feedback on their SB, via a vibrational feedback function within activPAL (VTap) which activated when they sat continuously for a set time period. The primary outcome was SB pattern and secondary outcomes were physical function and self-reported wellness. The participants also reported motivators and barriers by means of self-report questionnaire returned on week 5, 10 and 14.

**Results:** 36 participants were recruited, 23 were available at baseline and 12 completed to 3 month follow-up. The VTap group tended to display more favourable outcomes at baseline and throughout the study. No significant reduction in sedentary time or change in pattern were observed in either group at the end of the intervention. There were, however, significant improvements in timed up and go (-3 seconds, P=0.30) and sit to stand (2 stands more, P=0.027) scores with no significant effect of the group. SB was highly variable throughout the study, reflecting health and other personal issues. Motivators to change included the feeling of doing something for one’s health, awareness of behaviour and gaining a sense of achievement; barriers were mostly due to not feeling physically or mental able at that time.

**Conclusions:** The dropout rate is reflective of the frailty of the older adults recruited. The attrition and variability is probably responsible for the lack of significant change in SB despite improvement in functional capacity. It is not possible to tell objectively which of the two methods was most effective, however those in the VTap group tended to report more favourable accounts. Subjective responses from the participant and tailoring to the participants changing circumstances are crucial to successful intervention in frail older adults.
Small steps: effectiveness and feasibility of an incremental goal-setting intervention to reduce sitting time in older adults

Lucy Lewis¹², Alex Rowlands²³, Paul Gardiner⁴, Martyn Standage⁵, Coralie English²⁶, Tim Olds²

¹School of Health Sciences, Faculty of Medicine, Nursing and Health Sciences, Flinders University, Adelaide, Australia, ²Alliance for Research in Exercise, Nutrition and Activity (ARENA), Sansom Institute for Health Research, University of South Australia, Adelaide, Australia, ³Diabetes Research Centre, University of Leicester, Leicester Diabetes Centre, Leicester General Hospital, Leicester, UK, ⁴The University of Queensland, School of Public Health, Faculty of Medicine and Biomedical Sciences, Brisbane, Australia, ⁵Department for Health, University of Bath, Bath, UK, ⁶School of Health Sciences, University of Newcastle, Newcastle, New South Wales, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: This study aimed to determine the feasibility and effectiveness of the ‘Small Steps’ program, an incremental goal setting intervention to reduce sitting time in older adults. The research question was: what is the feasibility and effectiveness of a theory-informed program to reduce sitting time in older adults?

Methods: Design: This study used a pre-experimental (pre-post) design. Participants: Thirty non-working adults (≥60 years) were recruited. Intervention: Participants attended a one hour face-to-face session and were: guided through a review of their self-reported sitting time; provided with normative feedback on sitting time; and assisted with setting goals to reduce both total sitting time and bouts of prolonged sitting. Participants chose six goals and integrated one per week incrementally for six weeks. Measures: Sitting time and bouts of prolonged sitting (≥30 minutes) were measured objectively for seven days (activPAL3c inclinometer; PAL Technologies, Glasgow, UK) pre- and post-intervention. During these periods, a 24-hour time recall instrument was administered by computer-assisted telephone interview. Analysis: Paired t-tests (2 tailed) with sequential Bonferroni corrections were completed for all variables (α=0.05). Effect sizes (Cohen’s d) were calculated for each outcome and interpreted as small 0.20 to <0.50, medium 0.50 to < 0.80, and large ≥ 0.80.

Results: Twenty-seven participants completed the assessments (71.7±6.5 years, 63% female). Post-intervention, objectively-measured total sitting time significantly reduced by 51.5 min/day (p=0.006; d=-0.58) and bouts of prolonged sitting by n=0.8 per day (p=0.002; d=-0.70). Objectively-measured standing time increased by 38.5 min/day (p=0.006; d=0.58), Participants self-reported spending 59.5 min/day less sitting (p<0.001; d=-0.77), 32.2 min/day less watching television (p=0.005; d=-0.59) and engaging in more light (p=0.01; d=0.53) and moderate-to-vigorous (p=0.02; d=0.46) physical activity. Participant uptake of the study was very high (97% of eligible potential participants enrolled in the study) and retention was high (90%). Participants were highly satisfied with the program.

Conclusion: The ‘Small Steps’ program is a feasible and promising avenue for behavioural modification to reduce sitting time in older adults. This study has implications for the design of interventions to reduce sitting time in future larger controlled trials.
S35.4

**MyPlan 1.0: Effectiveness of a self-regulation eHealth intervention to increase physical activity in recently retired Belgian adults**

_Delfien Van Dyck³, Jolien Plaete¹, Greet Cardon³, Geert Crombez³, Ilse De Bourdeaudhuij³_

¹Department of Movement and Sports Sciences, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium, ²Research Foundation Flanders, Brussels, Belgium, ³Department of Experimental-Clinical and Health Psychology, Faculty of Psychology and Educational Sciences, Ghent University, Ghent, Belgium

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Purpose:** The transition to retirement is an important stage in an adults' life, typically introducing a decline in total physical activity (PA), caused by a decrease in work-related and transport-related PA that is not sufficiently compensated by an increase in leisure-time PA. However, as more time becomes available, retirement offers opportunities to develop a healthy lifestyle and is an ideal stage to implement PA interventions. Recently retired adults are a very specific target group with individual needs and wishes regarding PA, thus a personalized intervention is needed. Consequently, we developed the eHealth intervention 'MyPlan 1.0' based on the self-regulation theory and tested the effectiveness of this intervention to increase PA in recently retired Belgian adults.

**Methods:**

_Design:_ This study was a randomized controlled trial with three measurement moments/modules (baseline - one-week follow-up - one-month follow-up).

Participant: In total, 289 recently retired adults (>6 months, <5 years) confirmed participation (intervention group: n=120; control group: n=169). Eighty-nine and 151 participants of the intervention and control groups respectively, completed all three modules.

_Intervention:_ The intervention group filled in evaluation questionnaires, and received 'MyPlan 1.0.', a self-regulation intervention focusing on both pre- and post-intentional processes for behaviour change. The control group only filled in evaluation questionnaires.

_Measures:_ Self-reported physical activity was assessed in each of the three modules using the long IPAQ, usual week version.

_Analysis:_ Repeated measures MANOVA analyses were conducted in SPSS 22.0.

_Results:_ One the short-term (baseline - one-week follow-up), a significant positive intervention effect was found for walking for transport (p<0.01). On the intermediate-term (baseline - one-month follow up), (marginally) significant positive effects were found for walking for transport (p<0.01), leisure-time walking (p<0.10), leisure-time vigorous PA (p<0.01), moderate-intensity gardening (p<0.10) and work-related vigorous PA (p<0.10).

Conclusion: The current results add evidence for the effectiveness of eHealth interventions in older adults and confirm the added value of using a self-regulation perspective in this specific population group (recently retired adults). In future studies, long-term follow-up should be included to examine if the effects persist over a longer period.
**Food policy and systems change: how to monitor and evaluate changes in the global food supply**

**Convenor:**  
Lindsey Smith Taillie, University of North Carolina-Chapel Hill, Chapel Hill, NC, USA

**Discussant:**  
Daniel Taber, U. Texas Health Science Center at Houston, Austin, TX, USA

**Description:**  
Purpose: The global food system is evolving rapidly as countries implement obesity-preventive food policies and businesses adapt in response, creating unique challenges for evaluating policy change. The purpose of this symposium is to present innovative tools and methods to evaluate changes in the food supply in response to food policy on a local, national, and international scale.

Rationale: Oftentimes, food policies are enacted across an entire region or country, making it difficult to assess subsequent changes in food systems, including adaptations in price and formulation as well as downstream effects on food purchases, diet intake, and health. Yet, there has been little discussion about strategies to evaluate large-scale food policy and systems change. This symposium will review studies using a range of natural experimental methods and innovative measurement tools to evaluate systems change in response to food policies across a range of stakeholders, including food retailers, producers, and consumers.

Objectives: By the end of the session, participants will have a better understanding of: a) recent food policy evaluations; b) types of data used; c) novel measurement and analytic techniques; and d) concerns with such approaches, and how to overcome them.

Summary: The session is designed to highlight different stages of creating, monitoring, and evaluating systems change across a range of stakeholders. Dr. Peeters will begin with a study on evaluating changes in food sales in hospitals after implementation of state-supported healthy food guidelines in Australia. Subsequently, Dr. Taylor and Dr. Dunford will each present studies exploring tools and methods to monitor product reformulation in response to food policies across the globe. Finally, Dr. Taillie will discuss the effects of Mexico’s 8% nonessential food tax on food purchases. The symposium will conclude with a discussion, led by Dr. Taber, on how to overcome the difficulties of evaluating global food system change.

**Format:** The introduction will be 5 minutes, followed by 4 12-minute presentations and a 20 minute discussion.

**Introduction:** Dr. Lindsey Smith Taillie (US)

**Presentation 1:** Dr. Anna Peeters, Deakin University (Australia)

**Presentation 2:** Dr. Christopher Taylor, The Ohio State University (US)

**Presentation 3:** Dr. Elizabeth Dunford, The George Institute for Global Health (Australia; South Africa)

**Presentation 4:** Dr. Lindsey Smith Taillie, University of North Carolina-Chapel Hill (US, Mexico)

**Discussant:** Dr. Daniel Taber, University of Texas Health Science Center at Houston (US)
Supporting retailer-led changes to the food environment

Anna Peeters¹², Kathryn Backholer¹², Tara Boelsen-Robinson¹², Miranda Blake¹², Kirstan Corben³
¹Deakin University, Geelong, Victoria, Australia, ²Monash University, Melbourne, Victoria, Australia, ³Alfred Health, Melbourne, Victoria, Australia

SIG: Policies and environments

Awards:

Purpose: Community retail settings are a relatively untapped source for the improvement of our food environment. We have been working with a number of community food retailers in Victoria, Australia, to build the evidence base for the impact of specific healthy food policies in retail settings both for health and in terms relevant to the retailer. Here we present an evaluation of the introduction of healthy food guidelines for vending machines across a health service.

Methods: In 2012 state-supported healthy food guidelines were implemented across the health service, and included changes to vending product availability, placement and promotion based on a traffic light labelling system. In partnership with the health network, we analysed trends in sales of all vending products, and products by type and traffic light category over a six-year period spanning the implementation date. Volume and dollar sales in the three years post implementation of the guidelines were compared to the three years prior to its implementation using interrupted time series analysis. We compared these trends to those from a similar hospital that had not introduced healthy food guidelines. Interviews were conducted with staff involved in policy implementation.

Results: After introduction of the healthy food guidelines, sales of red food and drink (consume rarely and in small amounts) decreased substantially, by around 50%, while sales of green (healthiest choice) and amber (consume in moderation) products more than doubled. Overall, income decreased marginally by around 10%, assuming no change in commission rates. Clear substitution was observed from large packets of savoury snacks to smaller packets, and from sugary drinks to water.

Conclusions: To support community food retailers to implement healthy food strategies it will be critical to demonstrate that the strategy has the intended effect of improving consumer food and beverage choices, and that overall profits are not negatively affected, that maintenance of the policy is not overly burdensome to staff, and that the policy is viewed as acceptable to consumers. In this example, the introduction of healthy food guidelines had a clear impact on the quality of the food and drink purchased with minimal impact on profits.
From Shelf to Health: Product Reformulations in Cookies Impacts the Public Health Consumption Estimates of Saturated Fat and Sugar Intakes

Christopher Taylor, Rosanna Watowicz, Colleen Spees, Neal Hooker
The Ohio State University, Columbus, OH, USA

SIG: Policies and environments

Awards:

Purpose:
Numerous factors drive changes in the food supply, including health trends and food policy. This evolution presents a challenge for dietary assessments and nutrition monitoring. The public health impact of extremes in nutritional composition of items in the food supply is particularly difficult to evaluate. Therefore, this innovative study overlayed the changes in nutritional composition of cookies from a commercial database of food product innovation with national nutrition monitoring data to estimate the potential public health impacts of product innovation and reformulation.

Methods:
Nutritional data describing product-level innovation for 3,308 cookies from the 2005-12 Mintel Global New Products Database (GNPD) was combined with nationally-representative consumption estimates from 2005-12 National Health and Nutrition Examination Survey. GNPD product data were cleaned and matched to the 115 cookie sub-categories used in NHANES. Aggregated minimum, maximum, mean and median estimates from each cookie type were appended to individual intake data to estimate the traditional NHANES and GNPD-based nutrient intakes for cookies per person per day (n=6,566).

Results:
National estimates from NHANES closely mirrored the GNPD mean and median product profiles; however, NHANES had higher sodium and lower saturated fat estimates than the central tendencies of GNPD estimates. Cookie intakes predicted from minimum and maximum GNPD trends had a considerable impact on estimating the saturated fat and sugars to offset the industry removal of trans fat during this time. Temporal changes in product innovation were also evident, with broader chasms forming between the minimum and maximum content of energy, saturated fat, sugar and sodium in the later cycles.

Conclusions:
These data indicate that the reformulation of cookies in response to the reduction or removal of trans fat produced several cascading negative effects in nutrition composition. Furthermore, these data demonstrate the magnitude of the potential influences that product variability could produce, positive or negative, in the reformulation process. Product innovation can influence national consumption estimates when these products comprise a critical mass of the US food supply.
Utilizing smartphone technology to monitor improvements in the healthiness of the food supply

Elizabeth Dunford¹,², Michelle Crino¹, Bruce Neal²

¹The George Institute for Global Health, Sydney, New South Wales, Australia, ²University of North Carolina-Chapel Hill, Chapel Hill, NC, USA

SIG: Policies and environments

Awards:

Purpose: To date, there has been little success in efforts to stem the tide of diet-related ill health attributable to increased availability of highly processed foods providing high levels of saturated fat, sugar and salt. Central to the challenge faced by policymakers is the absence of good data to properly define, understand or respond to the problem.

Methods: The Food Monitoring Group was established in 2010 with the objective of collecting data describing the nutritional composition of the global packaged food supply. The Group harnessed smartphone technology to develop a database that contains brand-specific information on the nutritional composition of >250,000 foods globally.

Results: Data have been used to monitor the global food supply. Data from Australia were used to monitor implementation of the Food and Health Dialogue sodium reduction targets (a joint food industry/government initiative). Comparisons of sodium levels over time exposed the limited progress in achieving the targets, with data presented at the individual company level. Data from India highlighted the incompleteness of nutritional labelling as another key issue in the field and was used to push government to better enforce existing labelling standards in the country. Data are also being used to fuel the FoodSwitch Smartphone application, which allows consumers in Australia, NZ, the UK, China, India and South Africa to scan barcodes of food items in-store and be directed to healthier brands of similar products. Crowd-sourced data from the app is used to drive improvements in national food supplies, and in the case of South Africa is linked with food purchase data to identify where the population intake of salt, sugar and fat is coming from and therefore where reformulation policies should be targeted.

Conclusion: Smartphone technology has helped collect large amounts of information about the healthiness of the food supply. These data have been used for monitoring of nutritional content of foods, government initiatives to improve the food supply, and existing labelling initiatives. Data have also been used to educate consumers through the FoodSwitch smartphone application, which in turn helps crowd-source additional food supply data, allowing for low-cost, real-time tracking of global food supply healthiness.
Evaluation of Mexico's 8% Non-Essential Food Tax on Food Purchases

Carolina Batis¹, Juan Rivera¹, Barry Popkin², Lindsey Smith Taillie²

¹Instituto Nacional de Salud Publica, Cuernavaca, Morelos, Mexico, ²University of North Carolina-Chapel Hill, Chapel Hill, NC, USA

SIG: Policies and environments

Awards:

Purpose: In an effort to prevent continued increases in obesity and diabetes, in January 2014, the Mexican government implemented an 8% ad valorem tax on nonessential foods with energy density ≥ 275 kcal/100g. Limited rigorous evaluations of food taxes exists worldwide. The purpose of this presentation is to document one-year changes volume of taxed and untaxed food purchases, and demonstrate how counterfactual simulations can be used to examine a national food policy.

Methods: We used data from the Nielsen Company's Mexico Consumer Panel Services, a commercial panel with detailed information on household's purchases (n=6253). The volume of purchases of taxed and untaxed foods from January 2012 to December 2014 was analyzed using a longitudinal, fixed-effects model that accounted for pre-tax trends and controlled for household characteristics and contextual factors. We then used counterfactual simulations to compare projected pre-tax trends observed post-tax trends in purchases. We also stratified by socio-economic status (SES). Preliminary results are ready with final results after an evaluation advisory committee review in March.

Results: The mean volume of purchases of taxed foods declined by over 5% beyond what would have been expected based on pre-tax trends, with no corresponding change in purchases of untaxed foods. Low socio-economic status households showed greater response to the tax than did middle or high socio-economic status households. Among the taxed foods analyzed, salty snacks and cereal based sweets had the largest decline, whereas ready-to-eat cereals and non-cereal based sweets showed smaller declines.

Conclusions: The results suggest that the tax accomplished its aim of disincentivizing the purchases of nonessential energy dense foods. These results have global implications; however the impact of this tax on overall dietary quality and food purchase patterns remains to be studied.
How to develop an app targeting health behavior - the do’s and don’ts

Convenor:
Anouk Middelweerd, VU Medical Center Amsterdam, Amsterdam, United States

Discussant:
Carol Maher, University of South Australia, Adelaide, Australia

Description:
Purpose: The purpose of the symposium is to discuss four different approaches to develop app-based interventions targeting physical activity, sedentary behavior and sleep.
Rationale: Smartphones and (health) apps are popular, not only among consumers but also for health interventions and scientific research. Because of the ubiquitous nature of smartphones, their built-in sensors and their ability to connect with the internet or third-party sensors, smartphones offer the possibility to monitor the behavior continuously, provide personalized, real-time and context specific feedback. Previous content analyses have shown that existing health app are rarely based on theory and include only a limited selection of behavior change techniques. Consequently, there is a need for more theory- and evidence-based apps. However, developing health apps is a complex process and includes potential pitfalls such as technical and privacy issues and limitations. Furthermore, collaborations with the industry or computer science are warranted, but could complicate the development process. Therefore, it is important that researchers involved in app development share their expertise and experiences in order to advance the field.
Objectives: The main aims of this symposium are: (1) to discuss four different approaches in app development, including collaborations with the industry or artificial intelligence; (2) to provide a forum to discuss potential difficulties or pitfalls, to exchange experiences and knowledge; and (3) to discuss implications for further research and practice.
Summary:
The presentations in sequence will be:
1. 1st presenter (Ghent, Belgium): The development of ActiveCoach: a mobile app to promote an active lifestyle in low educated working young adults
2. 2nd presenter (Auckland, New Zealand): The TODAY smartphone application: A dynamic intervention targeting the activity profile.
3. 3rd presenter (Newcastle, Australia): Exploring the process of researchers and industry teaming up to create a lifestyle behaviour change app.
4. 4th presenter (Amsterdam, The Netherlands): Development of Active2Gether: Innovative and smart coaching strategies to promote physical activity – A collaboration with Artificial Intelligence

Format:
A short introduction (5 min) on the rationale, purpose and format of the symposium will be given by the chairperson (Amsterdam, The Netherlands). After the four presentations (each 10 min), the discussant will provide an overview of the main issues of the presentations and will facilitate a general discussion (30 min).
Development of ActiveCoach: a mobile app to promote an active lifestyle in low educated working young adults

Dorien Simons1,2, Ilse De Bourdeaudhuij1, Peter Clarys3, Corneel Vandelanotte2, Benedicte Deforche1

1Ghent University, Ghent, Belgium, 2CQUniversity, Rockhampton, Queensland, Australia, 3Vrije Universiteit Brussel, Brussels, Belgium

SIG: E- & m-health

Awards:

Purpose: Working young adults (18-26yrs) who did not follow higher education have a lower socio-economic status, increasing their risk for inactivity. Because of their popularity among young adults, smartphones and apps have great potential as a health promotion delivery strategy. This study describes the development of a smartphone-based intervention to promote an active lifestyle, through physical activity and active transport, in working young adults.

Methods: A stepwise approach, guided by the Intervention Mapping Protocol, was used. First, five focus groups (n=34) were conducted to explore opinions of working young adults towards mobile technologies and their use to increase physical activity levels and towards potential aspects of a smartphone-based intervention. Determinants of physical activity and active transport were also questioned. Based on the results, a first draft of the ActiveCoach app was developed. Next, the content of the ActiveCoach app was checked by working young adults and a usability test of the first draft was conducted in a small sample of working young adults (n=10). Afterwards, the app was adjusted and refined.

Results: Based on previous research, the conducted focus groups and the Attitude-Social influence-self-Efficacy (ASE) model, following determinants were identified as important for promoting an active lifestyle in working young adults: self-efficacy, social support, knowledge, perceived barriers and perceived benefits. To translate these constructs into practical methods, six Behavior Change Techniques (self-monitoring, goal-setting, feedback on performance, instruction on how to perform the behavior, information about health consequences and prompts/cues) were selected as key features for the app. Consequently, the ActiveCoach app was developed including tracking of physical activity and active transport via a wearable activity tracker (Fitbit). ActiveCoach users choose to focus on either physical activity or active transport. During eight weeks, they receive weekly tailored goals (based on their baseline activity level) with feedback on goal achievement and questions about perceived barriers. In addition, they receive weekly tailored practical tips and facts, based on the ASE-model determinants, to help them increase the chosen health behavior.

Conclusions: The stepwise and theory-based approach was important to develop a mobile app to promote an active lifestyle in low educated working young adults.
The TODAY smartphone application: A dynamic intervention targeting the activity profile.

Ralph Maddison¹ ², Artur Direito¹

¹National Institute for Health Innovation, University of Auckland, Auckland, New Zealand, ²Centre for Physical Activity and Nutrition Research, Deakin University, Melbourne, Australia

SIG: E- & m-health

Awards:

Purpose: To develop and evaluate the proof of concept of a smartphone application (app: TODAY) delivered intervention on the activity profile (i.e. proportion of time spent in sedentary and physically active behaviours) in free-living individuals.

Methods: Formative and qualitative research methods were used to develop and test the proof of concept of a dynamic smartphone app to modify people’s sedentary (SB) and physical activity (PA) behaviours. Two theoretical approaches (Intervention Mapping and the Behavioral Intervention Technologies Framework) were used to develop the app and behavioural content. The intervention comprises 3 main components: 1) automated capture of the PA and SB of individuals via an existing smartphone app (The Art of Living app), 2) classification of the individual into an activity profile according to their PA and SB, 3) behaviour change content delivery in a tailored (according to the activity profile) and dynamic fashion via the proof of concept app.

A pilot study was conducted in adults (n=20). Participants completed an online registration and downloaded the two smartphone apps onto their device. After 1 week of collecting activity data, the TODAY app categorized people to one of three activity profiles (couch potato, potterer, techno-active), and provided intervention content (e.g. suggestions to increase activity/break sedentary behaviour) for a total of 8 weeks. Outcomes: Objectively assessed activities were collected throughout the study. At the end of the study participants completed a short survey to self-report use of the app and acceptability.

Results: Initial proof of concept was confirmed. The TODAY app was able to classify participants to one of three activity profiles, which changed over time. Overall, participants liked the app, but felt that it required greater sophistication. App usage varied between participants; however it was considered acceptable. Ideas for future development were provided and will be outlined in this presentation.

Conclusions: It is possible to develop a dynamic smartphone app that provides tailored strategies targeting an individual’s activity profile (proportion of time spent in sedentary and physically active behaviours); however subsequent iteration is needed to enhance behaviour change and participant interaction.
Exploring the process of researchers and industry teaming up to create a lifestyle behaviour change app.

Mitch Duncan¹, Corneel Vandelanotte², Stewart Trost³, Amanda Rebar², Naomi Rogers², Nicola Burton⁴, Luke Kellett⁵, Wendy Brown⁴

¹School of Medicine and Public Health, University of Newcastle, Newcastle, Australia, ²CQUniversity, Rockhampton, Queensland, Australia, ³Queensland University of Technology, Brisbane, Queensland, Australia, ⁴The University of Queensland, Brisbane, Queensland, Australia, ⁵Headjam creative agency, Newcastle, Australia

SIG: E- & m-health

Awards:

Purpose: Design is an important part of mHealth interventions. It incorporates aesthetics or 'look and feel' of the intervention platform, the user interaction with the platform and the design of the database that drives the functionality and data reporting capabilities. Frequently the design of mHealth interventions focus on one part of this at the expense of others due to limited time, funding or expertise within the team. This presentation examines key aspects of the design journey for the Balanced app - a self-monitoring platform that aims to improve physical activity, sitting and sleep behaviours of adults - and the collaborative process between an academic research team and a commercial design company engaged to develop the app.

Methods & results: The design company was engaged as they provided expertise on all three phases of app design. Before phase 1 occurred intellectual property issues had to be resolved, requirements on timelines, provision of the final product and source code had to be resolved. Phase 1 & 2: The research team presented their initial designs and vision for the app to the design company who subsequently developed into a concept brief for feedback. Six iterations of the brief were required to achieve the optimal design aesthetics and user experience. During this process regular discussion of the rational for certain design decisions needed to be clearly articulated and two way education was required (eg. research team on design principals and decisions, design team on research methods and protocols). Important design decisions involved the method of app development (eg. native, responsive design website, or hybrid) and their pros and cons will be highlighted. Phase 3: involved ensuring that the database captured relevant and sufficient data on usage parameters. Key issues in this phase involved dealing with questions of 'why so much data and what for' from the design team and the research team checking data quality and format.

Conclusions: The presentation will conclude with discussions timelines, and the pros and cons of working with commercial design teams to develop mHealth intervention platforms.
Development of Active2Gether: Innovative and smart coaching strategies to promote physical activity - A collaboration with Artificial Intelligence

Anouk Middelweerd¹, Saskia te Velde¹, Aart van Halteren²³, Michel Klein², Johannes Brug⁴
¹VU Medical Center Amsterdam/ EMGO Institute for Health and Care Research, Amsterdam, The Netherlands, ²Vrije Universiteit Amsterdam, Amsterdam, The Netherlands, ³Philips Research, Eindhoven, The Netherlands

SIG: E- & m-health

Awards:

Purpose: The aim of the Activ2Gether (A2G) app, is to contribute to empowering young adults to be and remain physically active. A2G makes use of personalized, real-time and context specific feedback and an activity tracker (Fitbit). A2G uniquely combines behavior change techniques with a model-based reasoning system in order to provide context specific coaching messages.

Methods: A systematic approach was used to develop the app. It surpasses existing apps as the coaching messages are theory- and literature- based and tailored to individual psychological and social determinants (e.g. outcome expectations, self-efficacy, social support) of physical activity as well as to the physical and social context. The messages are based on proven behavior change techniques (e.g., self-monitoring, goal-setting, social-comparison) and are framed in an autonomy-supportive style. One of the fundamental components of the app is the reasoning engine, that analyses and interprets the data and personalizes coaching strategies. The reasoning process can be split up into four key parts: (1) assessment of the user's phase (2) detection of opportunities for improvement, (3) selection of determinants and (4) sending coaching messages. In order to send tailored and context-specific messages, data from different sources will be combined and interpreted meaningfully. Therefore the app automatically collects three types of data, i.e. GPS coordinates, step activity, stairs. This data is used to derive various kinds of other information, such as speed, the distance traveled per time unit, frequent locations visited, activity level, transportation mode that subsequently can and will be used to personalize the coaching messages.

Analysis: An outcome and a process evaluation by means of mixed models and latent class growth analysis will be conducted to estimate and interpret the (lack of) effect of the A2G intervention on levels of weekly MVPA and to evaluate the underlying processes with .

Conclusion: A2G uniquely uses a model-based reasoning system and uses novel approaches for context detection. Consequently, the Active2Gether intervention will be a personal coach that provides tailored and context-specific coaching messages.

This research is supported by Philips and Technology Foundation STW, Nationaal Initiatief Hersenen en Cognitie NIHC under the Partnership program Healthy Lifestyle Solutions.
How can we influence parents and their behaviors through interventions targeting improvement of children’s energy balance-related behaviors?

Convenor:
Trina Hinkley, Deakin University, Centre for Physical Activity, Burwood, Victoria, Australia

Discussant:
Stef Kremers, Department of Health Promotion, Maastricht Uni, Maastricht, The Netherlands

Description:
Purpose: This symposium describes new evidence on the factors which may encourage parental involvement and effect behavior change in interventions targeting youth’s (ages 6-18) energy balance-related behaviors, including physical activity, sedentary behavior and healthy diet.
Rationale: Given the significant associations between parenting styles, parenting practices and parental self-efficacy with children’s energy balance-related behaviors, parents are indicated as one of the key actors for behavior change within youth. Therefore, it is generally recommended to actively involve parents in youth behavior change efforts. However, it is difficult to determine from previous family-based interventions which strategies are most effective in engaging parents in interventions and in effecting behavior change in them and their children. This is partly driven by issues such as heterogeneity in study design, study quality, outcome variables, measurement instruments, and poor intervention descriptions. Since parents are one of the most important environmental actors in influencing youth’s energy balance-related behaviors, new insights about parental involvement in energy balance-related behaviour interventions are essential.
Objectives: This symposium aims to provide topical evidence arising from recently implemented and evaluated interventions which focus on parents and target energy balance-related behaviors in children and young people aged 6-18 years. Specific objectives are to:
- Identify effective strategies to involve parents in such interventions
- Examine which strategies effect change in parents and their behaviors
- Learn more about the importance of parenting practices and parental self-efficacy in changing youth’s energy balance-related behaviors

Summary: Data from family-based interventions will be presented to learn more about the effectiveness of four obesity prevention family-based interventions targeting energy balance-related behaviors in youth to identify effective strategies for parental engagement.
The Effect of an online Video Intervention ‘Movie Models’ on specific Parenting Practices and Parental Self-efficacy related to Children’s healthy Diet, Physical Activity and Screen-time: a Randomized Controlled Trial

Sara De Lepeleere, Ilse De Bourdeaudhuij, Greet Cardon, Maité Verloigne
Department of Movement and Sport Sciences, Ghent University, Ghent, Belgium

SIG: Children and families

Awards:

Purpose: We investigated the effect of a health promoting online video intervention ‘Movie Models’ on children’s diet, physical activity (PA) and screen-time, and on specific parenting practices and parental self-efficacy related to these parenting practices. The online videos are delivered to parents of primary schoolchildren and were based on real-life scenarios.

Methods: A two-armed, controlled cluster-randomized trial design was used. Parents of primary schoolchildren were recruited between November-December 2013 by spreading an appeal in social media and by contacting primary schools. The participants were randomly allocated to an intervention (n=119) or waiting-list-control group (n=119). Participating parents were predominantly of high socio-economic status (SES) (83.1%), and only 6.8% of children were overweight/obese. Intervention group participants were invited to watch online videos for four weeks. Specific parenting practices, parental self-efficacy, healthy diet, PA and screen-time of the child were assessed at baseline (T0), and one (T1) and four (T2) months post baseline. Repeated Measures Anovas were used to examine intervention effects. The potential moderating effect of age and gender of the child, and parental SES was also examined.

Results: Between T0 and T2, no significant intervention effects were found on children’s healthy diet, PA or screen-time. Most significant intervention effects were found for more complex parenting practices (e.g. involving your child in household chores (F=4.78; p=0.03)). Subgroup analyses showed that the intervention had more effect on the actual parenting practices related to healthy diet, PA and screen-time in parents of older children (10-12 years old), whereas intervention effects on parental self-efficacy related to those behaviors were stronger in parents of younger children (6-9 years old).

Conclusions: ‘Movie Models’ was effective in increasing some important parenting practices and parental self-efficacy related to healthy diet, PA and screen-time in children. Therefore, the current study is an important first step in promoting effective parenting-related factors, and possibly increasing children’s healthy diet and PA, and decreasing screen-time.
**Parent Outcomes of the Healthy Home Offerings via the Mealtime Environment (HOME) Plus Trial**

Jayne A Fulkerson  
*University of Minnesota, Minneapolis, MN, USA*

**SIG:** Children and families

**Awards:**

**Purpose:** To describe parent outcomes of the HOME Plus program, the first family-meals focused program using a randomized controlled trial (RCT) design to prevent childhood obesity.

**Methods:** The RCT included 160 parents (152 women; M=41.4 years; 76% white; 61% overweight) of 8-12 year old children (47% girls, M=10.4 years; 66% white; 45% overweight). Families were randomized to an intervention group (n=81) or a control group (n=79). Designed using Social Cognitive Theory, the HOME Plus intervention program aimed at enhancing meal planning and preparation skills through nutrition education and active learning with family members. The program was delivered in 10 monthly sessions to multiple-family groups in community settings. In addition, five tailored motivational goal-setting phone calls were conducted with parents. General linear models examined post-intervention parent BMI, meal planning and cooking skills, self-efficacy regarding portion size knowledge and healthful cooking, role modeling of healthful eating, restrictive feeding practices, and family problem solving by condition, adjusted for baseline values and demographic characteristics (race/ethnicity, age and economic assistance).

**Results:** Parent attendance at sessions was moderately high (average of 68% across 10 sessions) and goal-setting call attendance was high (average of 87% across 5 calls). At post-intervention, compared with control parents, intervention parents had significantly higher cooking skill scores and self-efficacy about portion size knowledge (p<0.01). Positive trends were seen for self-efficacy for cooking healthfully, meal planning, and family problem solving (p<0.15); no statistically significant effects were observed for other parent outcomes.

**Conclusions:** Promoting frequent and nutritious family meals and snacks using a family-focused, hands-on approach may provide parents with essential skills to promote healthful dietary behaviors in 8-12 year old children. The one-on-one goal-setting calls were also valued by parents as the calls occurred at convenient times, allowed them to set family-specific goals and evaluate them over time.
Can a mobile reward-based serious game targeting adolescents' snacking behaviours have additional effects on the home availability of snacks?

Wendy Van Lippevelde, Jolien Vangeel, Nathalie De Cock, Steven Eggermont, Caroline Braet, John Van Camp, Lea Maes, Benedicte Deforce

Department of Public Health, Ghent University, Ghent, Belgium, Leuven School for Mass Communication Research, KU Leuven, Leuven, Belgium, Department of Food safety and Food quality, Ghent University, Ghent, Belgium, Department of Developmental, Personality and Social Psychology, Ghent University, Ghent, Belgium

SIG: Children and families

Awards:

Purpose: As a high intake of energy-dense snacks is common in adolescents and has been related to overweight, prevention actions focusing on this are necessary. Interventions until now had limited effects on adolescents' nutrition patterns. Therefore, the REWARDproject developed an intervention with innovative methods and an attractive channel for adolescents -a reward-based serious game- to trigger healthy snack choices in adolescents. Earlier studies highlighted the significant influence of parents and the home food environment on dietary intake in youth. It has been shown that parents and their parenting practices -including the purchase of food products and thus home availability- can best be targeted through their children. Therefore, the purpose of this study was to investigate if the REWARD intervention in adolescents had effects on the snack availability at home.

Methods: The intervention will tested in a pair-matched controlled pre-post-follow-up design in the winter/spring of 2016. The intervention will be conducted in three secondary schools among 800 adolescents, while 800 students in three matching schools will selected as a control setting. The intervention groups will be exposed to a 4-week serious game intervention, the control group will receive the usual school curriculum. The intervention will be developed according to the Intervention Mapping Protocol and will be based on the dual process model which incorporates strategies to influence both the automatic pathway (i.e., operant learning theory) and the conscious pathway (i.e., a focus on certain determinants). In addition, the game development will be based on theoretical and empirical evidence regarding important game motivation and dynamics to engage in game play. Self-reported data of adolescents will be used to assess snack intake, home food availability, parental modeling, monitoring, and rule setting. Multilevel repeated measures will be performed using MLwiN version 2.30.

Results: The results of the effect evaluation will be ready by spring 2016.

Conclusions: If these additional effects on the home food environment prove to be significant, this could offer a new way to try and change the home food environment and parental practices.
Why do active children have better mental health? The mechanistic evidence

Convenor:
Stuart Biddle, Victoria University, Melbourne, Australia

Discussant:
David Lubans, University of Newcastle, Newcastle, Australia

Description:
PURPOSE:
The purpose of this symposium is to explore the mechanisms that link physical activity with mental health outcomes in children and present a conceptual model to guide future research in this area.

RATIONALE:
Previous systematic reviews and meta-analyses have established that physical activity is positively associated with better mental health in children and causal relationships for a range of outcomes are now being established. This includes research assessing cognitive function (e.g. intellectual development), psychological well-being (e.g. depression, anxiety) and mental well-being (e.g. self-concept, happiness, resilience). However, heterogeneity of the results from studies incorporating various intervention methods and taking place in different settings suggests that generic statements regarding the benefits of physical activity on mental health may be misplaced. Our understanding of the complexity of this relationship is now beginning to emerge and numerous potential mechanistic factors have been identified. These include various neurobiological, psychosocial and behavioural pathways. However, there has been no previous collation or critical review of the evidence for the potential mediating factors in the causal pathways between childhood physical activity and mental health.

OBJECTIVES:
The aims of this symposium are:
i) To present the results of a series of parallel interrelated systematic reviews of potential neurobiological, psychosocial and behavioural mechanisms that mediate the relationship between physical activity and specific mental health outcomes in children;
ii) To debate the relative merits and potential interaction of known and hypothesised mechanistic pathways between physical activity and various mental health outcomes during childhood;
iii) To present a conceptual model that illustrates the existing evidence for mechanistic pathways and provides a framework for future research into developing physical activity interventions targeted at specific mental health outcomes.

SUMMARY:
This symposium dissects several components of a complex project and then reconstructs the pieces to inform best-practice and future research. It will commence with a brief summary of the existing evidence for the impact of childhood physical activity on mental health and justify why further exploration of the underlying mechanisms is important. This will be followed by three presentations on the evidence for various neurobiological, psychosocial and behavioural mechanistic pathways linking physical activity to numerous mental health outcomes. Finally, the discussant will present a conceptual model that provides an overview of the results presented and several novel hypotheses that are yet to be reported in the literature. We anticipate that this will provide an evidence-based framework for intervention development and an emerging research agenda.
Neurobiological Mechanisms Responsible for the Effects of Physical Activity and Fitness on Mental Health in Young People

Justin Richards¹, Charles Hillman²
¹University of Sydney, Sydney, Australia, ²University of Illinois, Urbana-Champaign, USA

SIG: Children and families

Awards:

PURPOSE:
The purpose of this paper is to assess if the effect of physical activity on mental health outcomes is mediated by changes in neurobiological factors in young people. There has been no previous collation or critical review of the evidence for potential neurobiological mechanisms in the causal pathways between childhood physical activity and mental health.

METHODS:

Design: Systematic review and meta-analysis

Search strategy: Registered with PROSPERO (CRD42015024116) and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Six electronic databases (Psychinfo, SCOPUS, Ovid Medline, SportDiscus, Embase) were searched up to July 2015. The reference lists of recently published reviews and included articles were also screened.

Inclusion: i) Aged 5-18 years; ii) Experimental or quasi-experimental design; iii) Quantitatively assessed changes in neurobiological mechanisms; iv) Quantitatively assessed changes in cognitive function, psychological ill-being or mental well-being.

Exclusion: i) Learning and/or motor developmental disorders, ii) Interventions <1 week duration.

Analysis: Data extraction and risk of bias assessment was conducted independently by two researchers. Meta-analyses of the effect of physical activity on potential mechanisms and mental health outcomes was completed if there were sufficient data.

RESULTS:

From 11,356 titles, 97 full texts were reviewed and 11 studies were included in the analyses. We found evidence that indicates the impact of physical activity on some mental health outcomes is mediated by changes in several neurobiological factors. Specifically, participation in physical activity appears to increase basal ganglia and hippocampal volume and neural responsiveness. These factors have subsequent cognitive and mental health implications. There is also evidence that participation in physical activity influences central endorphin and neuro-transmitter levels that may directly influence various mental health outcomes.

CONCLUSIONS:

This is the first systematic review to examine potential neurobiological mechanisms responsible for the effects of physical activity on mental health in young people. It appears that the impact of physical activity on brain volume and neural activity may mediate subsequent cognitive and mental health outcomes. These results may enable more targeted intervention development, but should not be considered in isolation from other psychosocial and behavioral mechanisms.
Psychosocial Mechanisms Responsible for the Effects of Physical Activity and Fitness on Mental Health in Young People

Guy Faulkner, Mark Beauchamp
University of British Columbia, Vancouver, Canada

SIG: Children and families

Awards:

PURPOSE: The purpose of this paper is to assess if the effect of physical activity on mental health outcomes is mediated by changes in psychosocial factors in young people. There has been no previous collation or critical review of the evidence for potential psychosocial mechanisms in the causal pathways between childhood physical activity and mental health.

METHODS:

Design: Systematic review and meta-analysis

Search strategy: Registered with PROSPERO (CRD42015024116) and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Six electronic databases (Psychinfo, SCOPUS, Ovid Medline, SportDiscus, Embase) were searched up to July 2015. The reference lists of recently published reviews and included articles were also screened.

Inclusion: i) Aged 5-18 years; ii) Experimental or quasi-experimental design; iii) Quantitatively assessed changes in psychosocial mechanisms; iv) Quantitatively assessed changes in cognitive function, psychological ill-being or mental well-being.

Exclusion: i) Learning and/or motor developmental disorders, ii) Interventions <1 week duration.

Analysis: Data extraction and risk of bias assessment was conducted independently by two researchers. Meta-analyses of the effect of physical activity on potential mechanisms and mental health outcomes was completed if there were sufficient data.

RESULTS: From 11,356 titles, 97 full texts were reviewed and 15 studies were included in the analyses. We found evidence that indicates the impact of physical activity on some mental health outcomes is mediated by changes in several psychosocial factors. Specifically, participation in physical activity appears to improve social interaction, perceived physical competence and body image. These factors have subsequent mental health implications. There is also evidence that participation in physical activity can promote positive mood states and a connection with nature that may influence various mental health outcomes that are context specific.

CONCLUSIONS: This is the first systematic review to examine potential psychosocial mechanisms responsible for the effects of physical activity on mental health in young people. It appears that the impact of physical activity on self-perception and interaction with people and nature may mediate subsequent mental health outcomes. These results may enable more targeted intervention development, but should not be considered in isolation from other neurobiological and behavioral mechanisms.
Behavioral Mechanisms Responsible for the Effects of Physical Activity and Fitness on Mental Health in Young People

Paul Kelly
University of Edinburgh, Edinburgh, UK

SIG: Children and families

Awards:

PURPOSE:
The purpose of this paper is to assess if the effect of physical activity on mental health outcomes is mediated by changes in other relevant behaviors in young people. There has been no previous collation or critical review of the evidence for potential behavioural mechanisms in the causal pathways between childhood physical activity and mental health.

METHODS:

Design: Systematic review and meta-analysis

Search strategy: Registered with PROSPERO (CRD42015024116) and reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Six electronic databases (Psychinfo, SCOPUS, Ovid Medline, SportDiscus, Embase) were searched up to July 2015. The reference lists of recently published reviews and included articles were also screened.

Inclusion: i) Aged 5-18 years; ii) Experimental or quasi-experimental design; iii) Quantitatively assessed changes in behavioral mechanisms; iv) Quantitatively assessed changes in cognitive function, psychological ill-being or mental well-being.

Exclusion: i) Learning and/or motor developmental disorders, ii) Interventions <1 week duration.

Analysis: Data extraction and risk of bias assessment was conducted independently by two researchers. Meta-analyses of the effect of physical activity on potential mechanisms and mental health outcomes was completed if there were sufficient data.

RESULTS:

From 11,356 titles, 97 full texts were reviewed and 3 studies were included in the analyses. We found evidence that indicates the impact of physical activity on some mental health outcomes is mediated by changes in several associated behaviors. Specifically, participation in physical activity appears to improve sleep duration, efficiency and onset latency. These factors have subsequent mental health implications. There is also evidence that participation in physical activity facilitates the development of self-regulation and coping skills that may influence mental health. Mind-body practices that promote relaxation, mindfulness and meditation appear critical to this process.

CONCLUSIONS:

This is the first systematic review to examine potential behavioral mechanisms responsible for the effects of physical activity on mental health in young people. It appears that the impact of physical activity on sleep quality and behavioral coping strategies may mediate subsequent mental health outcomes. These results may enable more targeted intervention development, but should not be considered in isolation from other neurobiological and psychosocial mechanisms.
Physical activity focussed research in children and adolescents with intellectual disabilities.

Convenor:
Samantha Downs, Edge Hill University, Ormskirk, Lancashire, UK

Discussant:
Josie Booth, The University of Edinburgh, Edinburgh, UK

Description:
Purpose: To introduce physical activity (PA) research involving children and adolescents with intellectual disabilities (ID). Collectively, the presentations will provide an overview of issues pertinent to researchers when designing PA research studies involving youth with ID.

Rationale: PA research involving youth with ID is limited. Due to the increased risk of various health complaints that are associated with some conditions, the benefits of leading an active lifestyle may be of even greater importance for individuals with ID in comparison to those without. However, recent research has reported that youth with ID tend to engage in lower levels of PA compared to their typically developing peers. Also, methodological inconsistencies are apparent making comparisons between studies difficult. Therefore the rationale for this symposium is to present evidence from different continents related to PA in youth with ID, highlighting key issues and challenges when working with this population. Additionally, the session will facilitate discussion of the most appropriate methodologies and procedures to be adopted in the future.

Objectives: This symposium aims to; 1. address some of the methodological issues associated with PA research involving youth with ID. 2. Examine time spent in moderate-vigorous PA amongst children with different disabilities during school time. 3. Investigate levels of PA and behavioural sleep problems in children with Autistic Spectrum Disorder (ASD).

Summary: Presentations all focus on PA research in youth with ID. Initially Downs and colleagues will address the challenges and issues encountered when working with this population and discuss methodologies used to accurately assess PA behaviours, which is crucial to generate high quality studies. Further, in order to address the low PA levels reported amongst youth with ID it is important to understand how and when children engage in PA to inform intervention design. Therefore, Sit and colleagues will explore PA levels at specific segments during school time. Different ID can be associated with a variety of problems; engagement in PA has been highlighted as an adaptable behaviour to improve such issues. An example of this is behavioural sleep problems, which are common amongst individuals with ASD and can cause disruption to everyday life. Thus, Thomas and colleagues will discuss the relationships between MVPA, sedentary time and sleep.

Format: The symposium will involve an introduction by the chairperson, followed by three individual presentations, including studies based in the UK, China and Australia. The symposium will finish with a general discussion between presenters and attendees.
Reflection on methodological issues and challenges for physical activity research with children and adolescents with intellectual disabilities.

Samantha Downs¹, Sarah Taylor², Zoe Knowles², Stuart Fairclough¹, Lynne Boddy²

¹Department of Sport and Physical Activity, Edge Hill University, Ormskirk, Lancashire, UK, ²School of Sport and Exercise Sciences, The Physical Activity Exchange, Liverpool, UK, ³Department of Physical Education and Science, University of Limerick, Limerick, Ireland

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Limited research exists investigating physical activity (PA) in youth with intellectual disabilities (ID), and methodological inconsistencies are apparent between studies. This study aimed to highlight some of the methodological issues associated with research in this area.

Methods: The research team reflected upon the challenges that arose during a four-year research programme involving children and adolescents with ID aged 5-16 years. The research involved two cross-sectional studies and one pilot school-based intervention. The studies assessed PA levels, sedentary and play behaviours during school time, outside of school and habitual PA levels. Qualitative methods included; focus groups, interviews and write and draw techniques. Quantitative methods included; accelerometry and direct observation (SOCARP, SOFIT).

Results:

Accelerometry assessed PA provided detail around the tempo and volume of PA levels and sedentary behaviour. Accelerometer wear compliance though was a significant issue which influenced the findings. Direct observation proved successful when focussing on specific segments of the school day e.g. recess. Adaptations made to the SOCARP protocol enabled population specific exploration of participants' play behaviours. Challenges arose when using some tools and methodologies. For example conducting standard anthropometric measures, fitting accelerometers and engagement with write and draw techniques. Difficulties with recruitment meant that sample sizes were a recurring issue and explanations for this were varied. Sample size was also an issue when attempting to publish studies, particularly when targeting PA specific journals which had, to date, little affinity with studies with this population. Additional issues identified included variance with terminologies and definitions, different classifications of ID and participant sub groups, and the importance of participant-researcher relationship.

Conclusions: Across the programme a mixed method approach worked well to capture PA data of youth with individual characteristics and additional needs. Accelerometry offers opportunity for a rigorous and reliable assessment of PA levels and sedentary behaviours but compliance to wear time protocols is a key issue. Qualitative methodologies provide insight to the context and reasoning informing behaviours/choices and the types of activity engaged in. Participant recruitment was a major issue; future studies should consider allocating an extended recruitment phase and accessing potential participants from various organisations.
School Time-Physical Activity among Children with Disabilities in Hong Kong

Cindy Sit\(^1\), Ester Cerin\(^2\), Jane Yu\(^1\), Wendy Huang\(^3\), Thomas McKenzie\(^4\), Bik Chow\(^3\)
\(^1\)Department of Sports Science and Physical Education, The Chinese University of Hong Kong, Hong Kong, China,\(^2\)School of Exercise and Nutrition Sciences, Deakin University, Burwood, Australia,\(^3\)Department of Physical Education, Hong Kong Baptist University, Hong Kong, China,\(^4\)School of Exercise and Nutritional Sciences, San Diego State University, San Diego, USA

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Physical inactivity is a serious public health problem. Schools are important settings where children can accrue health promoting PA. No studies have examined objectively assessed PA levels in children with disabilities in Hong Kong. This study aimed to examine time spent in moderate-to-vigorous physical activity (MVPA) among children with different types of disabilities during school time and between free play periods (i.e., recess and lunch time).

Methods: A total of 112 children (grades 1-12) were recruited from special schools, including 21 children with visual impairment (VI), 42 children with physical disabilities (PD), and 37 children with intellectual disabilities (ID). They were instructed to wear an accelerometer during school time for 3 days to determine MVPA minutes. A two-way (type of disability by gender) ANCOVA was used to determine type- and gender-specific differences in MVPA after controlling for grade level.

Results: Children with PD (11 minutes, 2.3%) spent less time in MVPA than children with VI (19 minutes, 4.3%) and children with ID (21 minutes, 4.9%) during school time (all p<.01). Similar patterns were found for MVPA during recess and lunch time, but lunch time in general better facilitated MVPA than recess. Girls with ID spent less time in MVPA than boys with ID during recess (p<.05).

Conclusions: Children with disabilities, particularly those with PD have low levels of PA during school time. Future PA intervention should target this group of children.
Correlations between physical activity and behavioural sleep problems in children with Autism Spectrum Disorder

Simone Thomas, Lisa Barnett, Trina Hinkley, Jo Salmon, Tamara May, Nicole Papadopoulos, Jenny McGinley, Nicole Rinehart

1Deakin Child Study Centre, School of Psychology, Deakin University, Burwood, Victoria, Australia, 2Health and Social Development, Faculty of Health, Deakin University, Burwood, Victoria, Australia, 3Centre for Physical Activity and Nutrition Research, Deakin University, Burwood, Victoria, Australia, 4Department of Paediatrics, the University of Melbourne, Parkville, Victoria, Australia, 5Department of Physiotherapy, the University of Melbourne, Parkville, Victoria, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Low levels of physical activity and sleep problems are common in children with Autism Spectrum Disorder (ASD). To date, only one study has examined the relationship between physical activity and behavioural sleep problems in children with ASD, reporting higher physical activity levels were associated with improved sleep onset. The current study aimed to investigate levels of physical activity and behavioural sleep problems in children with ASD.

Methods: Participants aged 4-6 years (n=22, 80% male, 92% without Intellectual Disability) with a current ASD diagnosis were recruited from a larger study. MVPA was measured using a hip-worn Actigraph accelerometer worn for one week. Age-appropriate cut-points were used to determine average daily sedentary time (≤25 counts.15s⁻¹) and MVPA (≥420 counts.15s⁻¹). Behavioural sleep problems were measured using the Children's Sleep Habits Questionnaire. Correlations investigated associations between sedentary time, MVPA and children's sleep habits.

Results: There was a moderate positive correlation between sleep onset delay and sedentary time (r = 0.47, p < 0.05) and a negative moderate correlation between sleep onset delay and MVPA (r = -0.46, p < 0.05). There was a moderate positive correlation between sleep disordered breathing and sedentary time breathing (r = 0.44, p < 0.05) and a negative moderate correlation between sleep disordered breathing and MVPA (r = -0.49, p < 0.05). There was a moderate positive correlation between the total score of the Child Sleep Habits Questionnaire and sedentary time (r = 0.48, p < 0.05) and a negative moderate correlation between sleep onset delay and MVPA was nearing significance (r = -0.44, p = 0.058). There were no further associations between the subscales of the Child Sleep Habits Questionnaire and sedentary time or MVPA.

Conclusions: The findings confirm the presence of a relationship between MVPA, sedentary time and sleep in children with ASD. Further research to investigate the directions of these relationships (i.e. to determine whether sleep onset delay influence children's sedentary time, or whether better sleep facilitates more time in MVPA) is required. Such research will set the scene for informing the development of novel interventions that seek to promote healthy outcomes in individuals with ASD.
Interacting obesity-related behaviours, contextual barriers and spatial patterns: The SPOTLIGHT project

Convenor:
Jeroen Lakerveld, EMGO Institute for Health and Care Research, Amsterdam, The Netherlands

Discussant:
Lawrence Frank, School of Community & Regional Planning, Vancouver, Canada

Description:
Purpose:
To present and discuss the findings of the SPOTLIGHT project, which examined individual and contextual correlates of obesity-related behaviours and obesity within Europe.

Rationale:
As informed by social-ecological theory, the social and physical environment encompasses a range of characteristics that are likely to influence obesity related behaviours (such as physical activity, sedentary behaviour and eating habits) – and thereby weight status. The SPOTLIGHT project has recently conducted a large five-country-European survey and street audit in urban neighbourhoods stratified by residential density and socio-economic status. This symposium describes innovative approaches and novel associations, including individual correlates, interactions with environmental barriers, and patterns of potentially obesogenic environments in European adults. The results are placed in the context of existing evidence in this field.

Objectives:
• To present the relation between several domains of sedentary behaviours with dietary habits
• To present the additive interactions of perceived barriers to and environmental opportunities for obesogetty-related behaviours
• To describe how built environmental characteristics are clustered in patterns that may be more (or less) obesogenic
• To discuss the implications of the results for further research and for future obesity prevention approaches.

Summary:
We start our symposium with a general background of the SPOTLIGHT survey and urban streets audit, conducted across five European countries. The presentations cover individual-level behavioural associations, interactions of individual- and environmental level characteristics, and environmental-level patterns potentially related to obesity-related behaviours and obesity. The presentations and debate will highlight the opportunities for prevention approaches and will contribute to setting directions for methodology and practical application for the research community.

Format:
00-10 min: Introduction by chair (J. Lakerveld, The Netherlands)
10-25 min: The association between domain-specific sedentary behaviours and dietary habits in European adults (S. Compernolle, Belgium)
25-40 min: Interactions of individual perceived barriers and presence of destinations in the neighbourhood and associations with obesity-related behaviours in Europe. (J.D. Mackenbach, the Netherlands)
40-55 min: Neighbourhood patterns based on virtual audit of environmental obesogenic characteristics (J-M. Oppert, France)
55-75 min: Discussion (L. Frank, Canada (to be confirmed))
The association between domain-specific sedentary behaviours and dietary habits in European adults (the SPOTLIGHT project)

Sofie Compernolle

Department of Movement and Sport Sciences, Faculty of Medicine and Health Sciences, Ghent University, Ghent, Belgium

SIG: No, this does not fit in any of the above mentioned special interest groups

Purpose: Sedentary behaviour has been associated with obesity and related chronic diseases. Disentangling the nature of this association is complicated due to interactions with other lifestyle factors, such as dietary habits, yet limited research has investigated the relation between domain-specific sedentary behaviours and dietary habits in adults. The aim of this paper was to examine the association between domain-specific sedentary behaviours and dietary habits in adults and to test the moderating effect of age and gender on this association.

Methods: A total of 6,037 participants from five urban regions in Europe completed a cross-sectional survey, assessing socio-demographic characteristics, domain-specific sedentary behaviour (transport-related sitting time, television time, computer time, other leisure sitting time and work-related sitting time) and dietary habits (fruit intake, vegetables intake, sugar-sweetened beverages consumption, alcohol consumption, sweets intake, and fast food intake). Of these, 6,001 were included in the analyses. Multilevel mixed-effects logistic regression analyses were used to examine main associations and interaction effects.

Results: All domain-specific sedentary behaviours, except transport-related sitting time, were related to dietary habits. In general, having a higher sitting time was related to having less healthy dietary habits, especially for television viewing. Gender did not moderate any of the relations, and age was only a significant moderator in the relation between other leisure sitting time and alcohol consumption.

Conclusion: These results emphasize the importance of developing and implementing interventions targeting multiple behaviours. The fact that almost none of the associations were moderated by age or gender suggests that these associations, and possibly also the effects of interventions targeting both behaviours, may hold across age and gender groups.
Interactions of individual perceived barriers and presence of destinations in the neighbourhood and associations with obesity-related behaviours in Europe (The SPOTLIGHT project)

Joreintje Mackenbach
Department of Epidemiology and Biostatistics, EMGO Institute for Health and Care Research, VU University Medical Center, Amsterdam, The Netherlands

SIG: Policies and environments

Awards:

Purpose: Perceived barriers towards physical activity and healthy eating as well as local availability of opportunities (destinations in the neighbourhood) are important determinants of obesity-related behaviours. However, still little is understood how they interact in relation to such behaviours. The aim of this study was to investigate interactions between the presence of destinations in the residential environment and individual perceived barriers to physical activity and healthy eating in relation to obesity-related behaviours.

Methods: Data were analysed from 5,205 participants of the SPOTLIGHT survey, conducted in 60 neighbourhoods in urban regions of 5 different countries across Europe. A virtual audit was conducted to collect data on the presence of destinations in each neighbourhood. Direct associations of, and interactions between, the number of individual perceived barriers and presence of destinations with obesity-related behaviours (physical activity and dietary habits) were analysed using multilevel regression analyses, adjusted for key covariates.

Results: Perceiving more individual barriers was associated with lower odds of physical activity and healthy eating. The presence of destinations such as bicycle lanes, parks and supermarkets were associated with healthier obesity-related behaviours. Analyses of additive interaction terms suggested that the presence of destinations influenced obesity-related behaviours most among those perceiving more barriers. For example, individuals perceiving no barriers to healthy eating, but living in neighbourhoods with few supermarkets, had 40% lower odds of having high levels of vegetable consumption that individuals living in a neighbourhood with many supermarkets. However, individuals in neighbourhoods with few supermarkets and perceiving many barriers had a 81% lower odds of having high levels of vegetable consumption.

Conclusion: This cross-European study demonstrated that individual perceived barriers, as well as the presence of objectively measured destinations in the residential neighbourhood, are significant correlates of physical activity and dietary habits. Moreover, we found that individual barriers moderated the associations between neighbourhood destinations and obesity-related behaviours. These explorative findings emphasize the interest and importance of combining objective (e.g. virtual neighbourhood audit) methods and subjective (e.g. individual perceived barriers collected in a survey) to better understand how the characteristics of the residential built environment can shape obesity-related behaviours depending on individual characteristics.
Neighbourhood patterns based on virtual audit of environmental obesogenic characteristics (the SPOTLIGHT project)

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\textbf{SIG:} Policies and environments

\textbf{Awards:}

\textbf{Purpose:} Virtual audit tools (e.g. using Google Street View) can be used to assess physical environmental characteristics associated with chronic diseases such as obesity. Derived data can then serve as a basis for building neighbourhood patterns that would capture and synthetize the complexity and multidimensional aspects of such information. The objective of the study were: (i) to describe the virtual audit data on the food and physical activity environment across different European countries; ii) to build a typology of neighbourhoods based on these obesogenic environmental characteristics.

\textbf{Methods:} Data were collected using a Google Street View-based virtual audit tool developed within the Spotlight project. Data on environmental obesity-related features were obtained using the same standardized audit protocol in 4,486 street segments from 60 neighbourhoods across five European urban regions (in Belgium, France, Hungary, the Netherlands and the UK). Multiple factor and hierarchical clustering analyses were used to identify neighbourhood patterns.

\textbf{Results:} Four neighbourhood clusters that differed in food environment, recreational facilities and active mobility features were observed. These clusters were unequally distributed across urban regions. Neighbourhoods from London and Paris regions differed strongly in terms of obesity-related features, whereas those from the Randstad (the Netherlands), Ghent and Budapest seemed to share more similarities. Neighbourhoods in the London region were mostly characterized by a high level of outdoor recreational facilities, whereas Paris neighbourhoods were characterized by high urban density and large amounts of food outlets. The Randstad, Ghent and Budapest neighbourhoods appeared to be more similar, characterized by relatively lower residential densities and greener areas, together with a very low percentage of streets with food and recreational facility items compared to London and Paris neighbourhoods.

\textbf{Conclusions:} The approach used in this study provided multidimensional constructs of obesogenic characteristics that may help target at-risk neighbourhoods for obesity prevention studies.
Youth and adult physical activity, sedentary and dietary behaviour surveillance systems and population levels across Europe: a DEDIPAC symposium

Purpose:
Physical activity, sedentary and dietary behaviours are well-known and well-studied health related behaviours. Monitoring population levels of these behaviours is needed to track changes over time, identify and target populations at risk and evaluate strategies. One of the aims of the DEDIPAC (Determinants of Diet and Physical Activity) Knowledge Hub is to enable standardised and continuous cross-European surveillance of physical activity, sedentary and dietary behaviours levels across the life course. Working towards this aim, this symposium will present an inventory of European surveillance systems for physical activity, sedentary and dietary behaviours and discuss the variation in population levels of physical activity and sedentary time in youth and adults across Europe.

Rationale:
The International Society for Behavioural Nutrition and Physical Activity is known for its expertise and interest in physical activity, sedentary and dietary behaviours, and its focus on research as well as policy. Since this symposium is combining these interests, it will be interesting to a broad range of researchers and policy-makers attending the ISBNPA meeting.

Objectives:
• To present an inventory of state-of-the-art surveillance systems for physical activity, sedentary and dietary behaviours and their key determinants in Europe.
• To describe the variation in population levels of physical activity and sedentary time in youth and adults according to cross-European surveys and studies.
• To discuss the impact of the measurement methods on these population levels and to identify research gaps and needs for future research.

Summary:
The symposium will start with a general introduction of physical activity and sedentary behaviour surveillance in Europe. The first speaker will present an inventory of surveillance systems for physical activity, sedentary and dietary behaviours in Europe. Subsequently, the results of four systematic literature reviews on physical activity in youth, sedentary time in youth, physical activity in adults and sedentary time in adults will be discussed. Finally, there will be a discussion with the attendants.
Inventory of surveillance systems assessing dietary, physical activity and sedentary behaviours in Europe

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: To compile an inventory of surveillance systems in Europe assessing dietary intake, dietary behaviour, physical activity (PA) and/or sedentary behaviour (SB) in order to identify gaps and needs and to contribute to the roadmap for a pan-European surveillance system.

Methods: We followed a two-step-process. To be eligible, surveillance systems had to meet specific inclusion criteria like having a well-defined population basis and regular reiterations. Firstly, the representatives of eleven DEDIPAC countries were approached to provide basic information about existing national surveillance systems (e.g. target population, behaviours assessed). Secondly, more detailed information was retrieved about the eligible surveillance systems (e.g. sample size, methods and instruments used). Furthermore, experts were asked about international surveillance systems in Europe.

Results: The inventory contains six international and forty-four national surveillance systems. In general, dietary intake and PA are most often assessed and adults are the predominant target population. All of the international systems collect information on PA and four cover SB. Thirty-eight and twenty-seven national systems assess PA and SB, respectively. While PA and SB are most often self-reported, few surveys have also used accelerometers. Sedentary behaviours most frequently assessed are screen time, watching TV and playing computer games.

Conclusions: The majority of initiatives exist at the national level. Dietary behaviours and SB are not covered as often as dietary intake and PA. Overall, there is a lack of surveillance systems including children. Subjective PA and SB assessment methods prevail and the assessment of SB is often limited to screen time.

Reference: Bel-Serrat S et al. Inventory of state-of-the-art surveillance systems assessing diet, physical activity and sedentary behaviors in Europe: a DEDIPAC study (submitted to Bull World Health Organ)
Variation in population levels of physical activity in European children and adolescents: a systematic review within DEDIPAC

Linde Van Hecke¹,², Anne Loyen³, Maité Verloigne⁴, Hidde P. van der Ploeg⁵,⁶, Jeroen Lakerveld³, Johannes Brug³, Ilse De Bourdeaudhuij⁴, Benedicte Deforche¹,²

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose:
Regular physical activity is associated with physical, social and mental health benefits, whilst insufficient physical activity is associated with overweight and obesity. Population monitoring of physical activity is important to gain insight into the prevalence of compliance to physical activity recommendations, groups at risk and changes in physical activity patterns. This review aims to provide an overview of existing surveys and studies that measure physical activity in youth, in two or more European countries, to describe the variation in population levels of physical activity and to describe and define challenges regarding assessment methods that are used.

Methods:
This systematic review is part of a set of four reviews conducted in the DEDIPAC Knowledge Hub. The search, article selection, data extraction and quality assessment were conducted simultaneously. A systematic search was performed on six databases in June 2014. Journal articles or reports that reported levels of physical activity in youth in more than one European country were included. Data were reviewed, extracted and assessed by two researchers, with disagreements being resolved by a third researcher.

Results:
The search resulted in 11,521 records of which 22 articles were included in the current review. This review revealed large differences in prevalence of compliance to physical activity recommendations, measurement methods and reported outcome variables. Different accelerometer cut-off points used to define moderate to vigorous physical activity (MVPA) resulted in substantial differences in MVPA between studies conducted in the same countries. When comparing self-reported data on physical activity in children from different studies in the same countries, considerable differences were found in the proportion of children meeting the guidelines as well as differences in the rank order of countries for compliance to recommendations.

Conclusions:
The reported levels of physical activity and prevalence of compliance to physical activity recommendations in youth showed large variation across European countries. This may reflect true variation in physical activity as well as variation in assessment methods and reported outcome variables. Standardization across Europe of methods to assess physical activity in youth and reported outcome variables is warranted, preferably moving towards a pan-European surveillance system combining objective and self-report methods.
Variation in population levels of sedentary time in European children and adolescents: a systematic review within DEDIPAC.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Sedentary time has been recognized as an independent health risk factor in adults. For children and adolescents, monitoring sedentary time is currently necessary to get insight into the prevalence rate and possible ill health effects. This systematic literature review aims to provide an overview of existing cross-European studies on sedentary time in children (0-12y) and adolescents (13-18y), describe the variation in population levels of sedentary time, and discuss the impact of assessment methods.

Methods: This review is part of a set of four reviews conducted in the DEDIPAC Knowledge Hub. The search, article selection, data extraction and quality assessment were conducted together for all four reviews. Included articles were observational studies reporting on levels of sedentary time in children and/or adolescents in at least two European countries. Population levels were reported separately for children and adolescents.

Results: Thirty-one eligible articles were identified, most were cross-sectional. The number of included European countries per article ranged from 2 to 35. There was a large variation in assessment methods and levels of sedentary time were higher in East-European countries compared to the rest of Europe. Most articles used a child-specific questionnaire (61%). Other methods included accelerometers, parental questionnaires or interviews, ecological momentary assessment, and the people meter method. Television time was reported as outcome variable in 61% of included articles, total sedentary time in 23%.

Conclusions: A substantial number of published studies report on levels of sedentary time in children and adolescents across European countries, but the large variation in assessment methods hampers comparison of outcomes. Questionnaires (child specific) were used most often, as this is more feasible in large cross-European studies. However, they mostly measured specific screen-based activities and did not assess total sedentary time. There is a need for harmonisation and standardisation of methods to assess sedentary time in children and adolescents to enable comparison across countries.
Variation in population levels of physical activity and sedentary time in European adults: a systematic review within DEDIPAC

Anne Loyen¹, Linde van Hecke², Maïté Verloigne², Jeroen Lakerveld¹, Benedicte Deforche², Ilse de Bourdeaudhuij², Johannes Brug¹, Hidde van der Ploeg¹,4

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective:
Physical inactivity and sedentary behaviour are public health risks that should be monitored at the population level. This systematic literature review aims to provide an overview of all existing cross-European surveys and studies that assess physical activity and sedentary time in European adults, describe the variation in population levels according to these studies, and discuss the impact of the assessment methods on cross-country comparisons.

Methods:
This systematic literature review is part of a set of four reviews conducted in the DEDIPAC Knowledge Hub. The search, article selection, data extraction and quality assessment were conducted conjointly. Six literature databases were searched, supplemented with backward- and forward tracking and searching authors' and experts' literature databases. Articles were included if they reported on observational studies measuring total physical activity, physical activity in leisure time, and/or any form of sedentary time in two or more European countries. Each record was reviewed, extracted and assessed by two independent researchers.

Results:
For physical activity, sixteen articles were included, reporting on ten different studies. The majority of studies used the IPAQ-short questionnaire and reported the percentage of participants who either were or were not meeting the physical activity recommendations. The percentage of participants meeting these recommendations ranged from 7% to 96% across studies and countries. With regard to sedentary time, eight articles were included, reporting on seven unique studies. The majority of studies used questionnaire to assess sedentary time. Total sedentary time per day was reported most frequently and varied from 150 to 483 minutes per day across studies and countries.

Conclusions:
The included studies showed substantial variation in the assessment methods, reported outcome variables and, consequently, the presented levels of physical activity and sedentary time. Because of this, population levels of physical activity and sedentary time in European adults are currently unknown. Objective data in representative samples of adults across Europe is currently lacking. Approximately one third of the European countries were not included in any of the studies. These findings highlight the need for standardisation of the measurement methods, as well as pan-European monitoring of population levels of physical activity and sedentary behaviour.
Oral Sessions, Thursday, June 9 (16:30)

Environmental determinants of diet
An unhealthy food environment near school weakens the positive association between self-efficacy and teen fruit and vegetable intake

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Objective: Social Cognitive Theory emphasizes the interaction between individuals and environments, yet little research has examined whether the built environment moderates the association between individual psychosocial factors and youth dietary intake. This study examines: 1) the association between self-efficacy, perceived barriers and teen fruit and vegetable (FV) intake, and 2) whether the perceived food environment near school moderates these associations.

Methods: Data were collected in 2014 among a cross-sectional sample of U.S. teens aged 12-17 for the NCI Family, Life, Activity, Sun, Health and Eating Study (n=1527). A 27-item dietary screener assessed the frequency of consumption of key foods from which a fruit and vegetable (fruit, green salad, other non-fried vegetables) daily intake (FVDI) frequency score was derived. Behavioral correlates of FV intake included self-efficacy (1 item) and perceived barriers (mean of 5 items). Environmental correlates included perceived availability of convenience stores, fast food restaurants and fruit/vegetable/farmer’s markets near the teen’s school. We first examined the independent association of behavioral correlates FVDI frequency (log transformed), controlling for home FV availability, gender, age, race/ethnicity, weight status, and parent education. Next, we examined moderation by including interaction terms between the perceived food environment and behavioral correlates.

Results: Teens reported consuming FV almost twice daily (average FVDI frequency = 1.8 (SD 1.5)). In the model containing behavioral correlates and covariates, greater self-efficacy was positively associated (B=0.30, p<0.001) and more perceived barriers were inversely associated (B=-0.17, p<0.0001) with FVDI frequency. We found a significant interaction between perceived convenience store availability near school and self-efficacy, such that the positive association between self-efficacy and FVDI frequency was weaker for teens who reported a convenience store near their school (B=-0.09, p=0.02).

Conclusion: Our findings suggest that an unhealthy food environment near school may weaken the positive association between self-efficacy and fruit and vegetable intake frequency among teens in the U.S. Research is needed to explore whether this could be due to decreased neighborhood availability of fruits and vegetables and/or increased availability of unhealthy foods/beverages which are then substituted in the diet.
Accessibility and affordability of supermarkets: does it matter for adherence to the Dietary Approaches to Stop Hypertension (DASH) diet?

Joreintje Mackenbach¹, Thomas Burgoine², Jeroen Lakerveld¹, Pablo Monsivais²

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SIG: Policies and environments

Awards: Yes, for the Student Competition *

Background The consumption of a healthy diet is a priority for reducing obesity and its associated chronic diseases. The DASH (Dietary Approaches to Stop Hypertension) diet which is rich in fruits, vegetables, whole grains and low fat dairy products has been shown to lower blood pressure and improve blood lipids. Both economic and environmental factors have been proposed as barriers to the adoption and long-term adherence to DASH. We sought to assess the importance of economic and geographic accessibility of supermarkets for the adherence to the DASH diet in British adults.

Methods Individual participants' sociodemographic characteristics, diet quality, dietary costs and home location were assessed in the population based Fenland study (N=11887). Diet quality and dietary costs (GBP/day) were derived from a semi-quantitative Food Frequency Questionnaire. Geographic Information Systems-defined distance to the nearest supermarket from home represented geographic access. Economic accessibility of supermarkets was based on the combination of individual dietary costs grouped in three strata (low- medium- or high-cost diets) and the cost tier of supermarkets, which was determined on the basis of a 101-item market basket.

Results Having the lowest-cost diet was associated with 58% lower odds of consuming a diet that met DASH recommendations. After adjustment for key demographics and exposure to other food outlets, individuals living farthest away from their nearest supermarket had 15% lower odds of reporting consuming a diet that met DASH recommendations. However, economic accessibility was more strongly related to the odds of consuming a diet that met DASH recommendations than geographic accessibility, with those living farthest away from the nearest economically matched supermarket having a 41% lower odds of consuming a diet that met DASH recommendations.

Conclusions Given the beneficial associations between adherence to the DASH diet and cardiovascular disease, understanding barriers in adherence to this dietary pattern is of public health importance. In this population-based UK study, we found that the likelihood of reporting consuming a diet that met DASH recommendations was dependent on both economic and geographic factors. These results suggest that improving adherence to a DASH diet may require structural approaches that take into account both affordability and accessibility.
**O.01.3**

**Longitudinal associations between fast-food access and change in body mass index among women residing in disadvantaged neighbourhoods in Victoria, Australia**

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Deakin University, Melbourne, Australia

**SIG:** Socio-economic inequalities  
**Awards:** No

**Purpose**
Aspects of the local built environment have the potential to influence weight by affecting diet and physical activity. Many studies have examined associations between the local food environment and obesity. Some have shown associations between access to fast-food outlets and body mass index (BMI). However, most are hampered by a reliance on cross-sectional data which does not allow the assessment of temporal relationships. The aim of this longitudinal study of Australian women was to examine associations between the objective residential neighbourhood fast-food environment at baseline and changes in BMI over time.

**Methods**
The Resilience in Eating and Activity Despite Inequalities (READI) three wave (Wave I: 2007/08, Wave II: 2010/11, Wave III: 2013/14) cohort study was used. This study was designed to examine pathways through which socio-economic disadvantage influences lifestyle choices associated with obesity risk among women residing in disadvantaged areas of Victoria, Australia. At Wave I, chain outlet fast-food addresses were sourced from websites, geocoded and mapped. The number of fast-food outlets within a 3km network distance of each participant’s home address was calculated. Women self-reported BMI at each wave. Multilevel linear regression with random intercept and slope was used to examine confounder-adjusted associations between fast-food availability and change in BMI.

**Results**
In total, 1296 women were included. On average, participants were aged 37 years (SD=7) at baseline and had a BMI of 26.0kg/m\(^2\) (SD=5.9), increasing to 26.5kg/m\(^2\) (SD=6.2) and 26.8kg/m\(^2\) (SD=6.3) at Waves II and III, respectively. The average number of chain fast-food outlets within 3km of women’s homes was 3 (SD=6), ranging from 0-55. There was evidence that BMI increased with increasing age (coefficient=0.11; 95% CI: 0.07, 0.14; p<0.001). However, there was no evidence that fast-food availability was associated with either baseline BMI (coefficient=0.11; 95% CI: -0.32, 0.09; p=0.28) or the rate of change in BMI (coefficient=0.002; 95% CI: -0.003, 0.006; p=0.50).

**Conclusions**
We found no evidence to support the hypothesis that access to chain fast-food outlets within 3km of women’s residences at baseline was associated with change in BMI among women living in disadvantaged areas in Victoria. Future research will examine associations between changes to the fast-food environment and BMI.
Independent and additive effects of Behavioral Economic strategies on school lunch selection and plate waste.

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SIG: Policies and environments

Awards: No

Purpose: More than 30 million students in the United States (US) receive school meals daily, and many rely on school meals for up to half of their daily energy intake. Plate waste (PW) is the amount of food served but not consumed. School lunch PW is a persistent challenge because it is substantial in magnitude and contributes to inadequate key nutrient intakes (fiber, potassium, calcium) among children. Research indicates Behavioral Economics (BE) interventions are effective at decreasing PW. However, studies lack proper design to determine which intervention strategies are most effective. The study aim was to evaluate the independent and additive effects of 2 BE strategies on school lunch selection and PW.

Methods: An intervention trial was conducted in 2 elementary schools (A and B) with identical menus and each school as its own control. Researchers collected 4 weeks of baseline data. Then, school A offered an additional fruit choice and school B posted descriptive labels for all foods for 4 weeks. Schools implemented both strategies for the final 4 weeks. Daily sales records were used to measure how interventions altered food selection. PW was measured using the validated Quarter-Waste method on 40 randomly selected trays 3 days a week. Hierarchical linear regression was used to compare selection and PW of lunch items (entrée, fruit, vegetable, milk).

Results: High levels of lunch item waste were documented, with fruits and vegetables most wasted. When descriptive labels were posted, entrée selection increased by 16.4% (p<0.001), accompanied by a 37.1% increase in the chance that students wasted all of their fruit (p<0.01). Offering an additional fruit choice was associated with decreased selection when the strategy was by itself (p<0.01) and combined (p<0.001). However, the chance the students ate the entire fruit increased by 26.1% (p<0.05) when strategies were combined.

Conclusions: Informative names may have generated greater interest in the entrée than the fruit, suggesting practitioners should label only what they wish to promote. Informed choice (fruit option plus label) may be necessary to increase fruit consumption. Study findings can be used to inform waste-minimization practices to increase intake of US student school lunches.
**O.01.5**

*Calorie labelling in a hospital café - does it affect customer purchasing behaviour and influence sales?*

Catherine Hankey, Stefanie Heinrich, Lisa Hutchison, Wilma Leslie  
*University of Glasgow, Glasgow, UK*

**SIG:** Policies and environments

**Awards:** No

**Purpose:** Consumption of foods and beverages outside the home has become more prevalent. Calorie labelling offers a simple approach to alert consumers to the energy content of items bought, influence purchasing behaviour and promote healthier eating patterns.

**Methods:** Calorie labelling of soups, snacks, cakes and drinks for sale in a café located in the foyer of a Glasgow hospital. Sandwiches were labelled and categorised into high, medium and low calorie options. Other foods and drinks were labelled only with calorie content. Labels were introduced for a two week period. Sales data for the labelling period were examined and compared to the two weeks prior to and following labelling. Customers were invited to complete a 13-item questionnaire following their purchase to elicit their views on calorie labelling.

**Results:** Sales of crisps, biscuits, snacks, cold drinks and total sandwich sales did not differ between the three study periods. Total sales decreased (-2.2%) during calorie labelling with a further decrease in the 2-week post labelling period (-2.5%). There was a shift in sales from higher to lower calorie items, particularly to changes in sandwiches sales (low/medium/high calorie section: +7%; -12%; -21%). Fruit sales increased (+7%), while cake sales fell (-15%). Total hot drink sales rose slightly, with the lower calorie sales rising (+8%). Of the 142 customers who completed the questionnaire, approximately half noticed the calorie labels (51%) and 44% of them said the labelling had influenced their purchase, with 78% choosing a lower calorie option. Over half of these individuals believed that they were a "normal" weight but wanted to avoid weight gain (68%). The main reasons given for ignoring calorie information included a lack of interest in calorie content (26%) and habitual ordering (49%).

**Conclusion:** Calorie labelling was easy to implement in a hospital retail environment and influenced consumer choice. The negative impact on sales could be ameliorated if stock ordering could be altered weekly. Labelling has promise as an ef
New technologies and methods for Physical Activity and Nutrition
Adolescents' Photo Food Presentation in Social Media

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SIG: Policies and environments

Awards: Yes, for the Student Competition *

Objective: Adolescents today use social media applications extensively and research demonstrates that peers in social media can influence adolescents regarding their food intake. These newly emerged channels also offer unique possibilities to observe adolescents' dietary communication. This study aimed to explore how adolescents communicate food images in a widely used social media image-sharing application, Instagram.

Methods: To find adolescent Instagram users we searched for images appended with the hashtag #14år (Swedish for "14 years"). The hashtag had been applied to 3479 images as of March 2014. However, as users change their privacy settings, delete their accounts, or change their user names, 1358 images were not retrievable. Users sometimes also applied the hashtag to several images, and we excluded accounts that we judged did not belong to adolescents (based on written and visual profile information); 1001 unique Instagram users’ photo streams were thus eligible for analysis. Content analysis was used to identify food items and categorize these based on types of food and how the food items were presented.

Results: Most of the adolescent users (85 %) shared images containing food items. A majority of the images (67.7%) depicted foods high in calories but low in nutrients. Almost half of these images were arranged as a still life with food brand names clearly exposed. Many of these images were influenced by major food marketing campaigns. Fruits and vegetables occurred in 21.8% of all images. This food group was frequently portrayed zoomed in with focus solely on the food, with a hashtag or caption expressing palatability. These images were often presented in the style of a cook book.

Conclusions: Food was presented in varied ways. Adolescents themselves produced images copying food advertisements. This has clear health promotion implications since it becomes more challenging to monitor and tackle exposure to marketing of unhealthy foods to young people in these popular online networks because images are part of a lifestyle that the young people want to promote. Shared images contain personal recommendations, which mean that they may have a more powerful effect than commercial advertising.
A mobile phone based method to assess energy and food intake in young children: a validation study against the doubly labelled water method and 24hr dietary recalls

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SIG: Children and families

Awards: No

Purpose: Mobile phones have become important instruments for assessing diet and energy intake. We developed the Tool for Energy Balance in Children (TECH), which uses a mobile phone to assess energy and food intake in pre-school children. The aims of this study were: (a) to compare energy intake (EI) using TECH to total energy expenditure (TEE) measured via doubly labelled water (DLW), and (b) to compare intakes of fruits, vegetables, fruit juice, sweetened beverages, candy, ice cream, and bakery products measured using TECH, to intakes acquired by 24hr dietary recalls in preschoolers.

Methods: Thirty-nine healthy, Swedish children (5.5±0.5 years) within the ongoing MINISTOP obesity prevention trial participated in this validation study. Energy and food intakes were assessed during four days using TECH and 24hr telephone dietary recalls. Using TECH the parents took pictures of foods and beverages consumed by their child through their mobile phones. TEE was measured using the DLW method for fourteen days. The Bland and Altman procedure was used to assess agreement between methods while Wilcoxon signed rank test were used to assess differences between mean intakes. Spearman correlations were also applied.

Results: Mean EI assessed with TECH was not statistically different (P=0.064) from TEE (DLW) (5820±820kJ/24hr and 6040±680kJ/24hr, respectively). No significant differences in average intakes for the investigated foods (fruits, vegetables, fruit juice, sweetened beverages, candy, ice cream, and bakery products) using TECH and 24hr dietary recalls were found. No trends in the Bland and Altman plots were found. All food intakes were correlated between TECH and the 24hr dietary recalls (ρ= 0.665-0.896, P<0.001).

Conclusion: In conclusion, TECH was able to accurately estimate average EI as well as the mean intakes of fruits, vegetables, fruit juice, candy, ice cream, and bakery products of preschool children in our particular setting. TECH has the potential to be a useful tool for studies investigating dietary intake, for example in obesity prevention trials, in young children.
Objective

Wearable technology, facilitating physiological data collection for health and wellness purposes experiences increasing adoption rates. Research indicates however, that 50% of new users of wearables, and 74% of new users of mobile health apps abandon them fairly quickly. Preventing wearable drop-out can be important in promoting physical activity adherence. Therefore, identifying those factors that keep people interested in their physical activity data, whether or not generated through wearables, is crucial. This study addressed the issue by focusing on people’s persistent use of Online Fitness Communities (OFC). These online platforms process data generated through wearables and present their users with functionalities centered around self-monitoring, social affordances and enjoyment. We attempted to assess to what extent these elements play a role in keeping people actively collecting and analyzing their data.

Methods

A quantitative online survey was conducted among Strava users (N=394). We tested a multi-sample structural equation model, measuring the influence of self-monitoring, social affordances and enjoyment on perceived usefulness of OFCs and habitual OFC use, and of perceived usefulness on habitual OFC use. We compared the model for novice and experienced users, respectively using Strava for more than or less than one year, using multi-group moderation analysis.

Results

Results indicate that self-monitoring and social affordances are crucial for all users, both novice and experienced, to the formation of habitual OFC use, both directly and indirectly through their impact on perceived usefulness. Moderation analysis revealed that, for novice users, self-monitoring motives are the prime drivers of habitual OFC use, while in later stages, social motives and enjoyment become increasingly important.

Conclusions

OFC users, collecting their personal data through wearables and mobile apps, are initially driven by self-monitoring needs. We assume that once a user’s knowledge increases, the interest in these data subsides, no longer requiring data collection through wearables and as such, abandonment or drop-out. Our research suggests that what keeps users active on OFCs is social interaction and enjoyment (e.g. through gamification) around their data. When designing interventions using (wearable) data collection, we believe it should be considered if inclusion of these elements would benefit retention.
Evaluation of a smartphone food diary application using objectively measured energy expenditure

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objective: Common dietary assessment methods are limited in their ability to adequately measure food intake and eating behaviours, such as snacking and meal skipping. A novel method of dietary assessment was developed to capture both food intake and the contextual factors surrounding eating occasions. The ability of this smartphone application ("FoodNow") to measure food intake in young adults was examined by comparing estimated energy intake (EEI) collected by the application with measured energy expenditure (MEE) collected with a valid physical activity monitor (SenseWear Armband).

Methods: Participants aged 18-30 years used FoodNow over four non-consecutive days recording all food and beverages consumed through a combination of written text, voice recorded messages and images. At each eating or drinking occasion, a series of contextual questions were completed. These questions included the time, place, social company, activities during consumption, a description of the eating occasion, and information surrounding the purchasing and preparation of the foods. The SenseWear Armband (BodyMedia Inc, USA) was worn on the left triceps during the same seven day period, and has been previously validated to collect free-living MEE in this population. Participants were identified as low-energy-reporters (LER), adequate-energy-reporters (AER) and high-energy-reporters (HER) using the Huang method. Intra-class correlation coefficients (ICC) estimated the reliability of FoodNow to measure EEI compared to MEE.

Results: Fifty-five participants (41 females, 14 males; mean age = 25 ± 3.14 years) provided 210 days of dietary data. All participants wore the SenseWear Armband for a minimum of 11 hours on at least 5 days (average daily wear time = 22 hours). Fourteen participants were identified as LER while the remaining 41 were AER. A high degree of reliability was found between EI and MEE (ICC, 95% CI: 0.82, 0.69-0.90).

Conclusions: The FoodNow smartphone application is a suitable method for capturing EEI data from a young adult population. This new dietary assessment method will offer an alternative method of dietary assessment which is capable of collecting both EEI and contextual factors surrounding eating occasions. Information collected from this novel method may be used to inform future public health messages or research interventions.
Location Matters: Pilot Testing of the Location Initiated Individualized Texts for African American Adolescent Health (LIITAH) Mobile Application

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SIG: E- & m-health

Awards: No

Objective: To develop a tailored mobile application to help African American (AA) adolescents make healthier food choices at the point of sale (e.g., a restaurant or school cafeteria).

Methods: The prototype application was explored in this ongoing project with AA adolescents (n=16) at schools in Metro Detroit. This consisted of two components. 1) Focus groups and semi-structured interviews were conducted with participants to inform the cultural tailoring of messages and to elicit participants’ perceptions of the application, using grounded theory to identify common themes, and 2) Pilot testing was performed with students (for 4 weeks) to explore the functioning of the application which was designed to: 1) Enable each student to register eating venues during a ‘training period’ and record the latitude, longitude, and an initial radius for the locations. 2) Recognize when participants arrive at a registered location and inquire whether they are there with the “intent to eat.” 3) Deliver tailored messages prompting the selection of specific healthy menu options. 4) Allow participants to rate the suggestion, take a picture of their meal, annotate it, and rate their meal.

Results: Technology - The application’s accuracy detecting locations was enhanced by categorizing participants’ proximity to the nearest venue as cold, warm, or hot, which set the next polling interval. This was battery conserving and improved proximity verification. Participants found the technology easy to use but wanted it to be more customizable. Tailoring - Efforts to tailor the messages to students’ preferences were generally successful as they indicated that the messages seemed relevant to them. However, while there were some common preferences (e.g., wanting images that remind them of themselves and messages that include foods they normally eat) participants seemed to indicate that individual tailoring rather than cultural tailoring might be needed.

Conclusions: The mobile application successfully identified when adolescents entered an eating venue and delivered actionable and appropriate food recommendations on most occasions. This offers the potential to provide tailored content to adolescents based on their location. Further work is required to refine the technology and tailoring and to determine whether the application positively impacts food choices and ultimately weight status.

Community intervention nutrition
O.03.1

Final results of Live Well-Viva Bien - a multilevel intervention in low income housing sites to increase fruit and vegetable consumption

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SIG: Socio-economic inequalities

Awards: No

Purpose: Eating more fruits and vegetables (F&V) is associated with lower risk for many chronic diseases. However, most Americans, especially low-income, racial/ethnic minorities, do not eat recommended amounts. The purpose of ‘Live Well, Viva Bien’ (LWVB) is to evaluate whether Fresh to You (FTY), an innovative public-private partnership that brings year-round, discount, mobile, fresh F&V markets to subsidized low income housing complexes in conjunction with nutrition education programming, is effective at increasing F&V intake among housing residents.

Methods: Fifteen housing complexes (6 family and 9 elderly/disabled housing) were recruited. Project staff, with the help of resident assistants, recruited residents to participate in the evaluation cohort. After baseline surveys were completed, housing sites were randomized to intervention or comparison conditions. Interventions lasted for 12 months. Intervention sites received the FTY F&V markets twice per month as well as two F&V campaigns, monthly newsletters, a DVD and chef demonstrations. Comparison sites received physical activity and stress programming. F&V intake was measured using the NCI F&V screener at baseline and 12 months. Process evaluation was conducted to measure market sales and participation as well as participation in/use of nutrition education programs/materials.

Results: Participants (n=1598) were 73% female, 54% Hispanic; 17% black; 50% born outside the US; 5% employed fulltime; 68% had household income < $12K per year. F&V prices averaged 20% below supermarket prices. Most popular items included bananas, mangoes, grapes, tomatoes, broccoli, asparagus and tomatoes. F&V intake increased from baseline to 12 months in the intervention group by 0.44 cups while comparison group F&V intake decreased by 0.08 servings, p=0.015. Changes were much more pronounced for the elderly/disabled housing sites (Intervention 0.65 cups vs. comparison -0.07 cups, p<0.011). There was also a dose response effect, with participants who shopped at more markets and participants who watched the DVD having significantly higher changes in FV intake.

Conclusions: LWVB was successful in increasing F&V intake of low income participants, particularly for the elderly and disabled. We will also present data on changes in theoretical mediators and discuss implementation challenges, lessons learned, and plans for the future.
A novel approach to evaluate South Africa's salt reduction legislation

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SIG: Policies and environments

Purpose: Attempts to curb the rising epidemic of hypertension include population-level salt reduction strategies. South Africa was the first country globally to adopt legislation (implemented June 2016) regarding maximum salt levels in a range of processed foods. This paper outlines an innovative approach to evaluate the effectiveness of this food policy.

Methods: A nested cohort design will be used to evaluate pre and post-policy salt intakes, using the gold standard method of 24-hr urinary sodium excretion. Participants will be recruited from the World Health Organization Study on global AGEing and adult health (WHO SAGE), a multi-national longitudinal study of the health and well-being of adults and the ageing process (18+ years, with an emphasis on adults 50+ years). The SAGE-South Africa Wave 2 cohort will include a substudy (n = 1200) of the larger sample (n = 4223 households) in which a salt behaviour questionnaire will be administered, blood pressure and anthropometry measured and spot and 24-hour urine samples collected for analysis of sodium, potassium and iodine concentrations. This will be repeated during SAGE Wave 3 (2017), post salt legislation, in order to assess change in population-level sodium intake. Ghana will be used as a comparative control African country with no formal salt policy and a subsample of n = 1200 will be recruited from the larger (n = 6000) SAGE-Ghana Wave 2 cohort.

Results: The design utilises a population sample from an ongoing, high quality longitudinal study in order to apply the RE-AIM framework model (Reach, Efficacy, Adoption, Implementation, and Maintenance) for evaluation of health policy. The urine samples provide nationally representative for adults 50+ years in both countries. Challenges associated with large scale urine collections in two African countries will be outlined.

Conclusion: This natural experiment will inform public health policy regarding the impact of legislative approaches to changing the food supply in an upper-middle income country (South Africa) compared to a lower-middle income country (Ghana) without legislation. Successful reduction of population level sodium intake through public health policy has not yet been demonstrated. This study makes an important contribution to methods for evaluation of complex public health interventions.
O.03.3

A Mobile Produce Market Increases Fruit and Vegetable Intake and Access among Adults in Disadvantaged Communities in the USA

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SIG: Policies and environments

Awards: No

Purpose: A randomized controlled trial (RCT) tested the effectiveness of the Veggie Van (VV) program to increase access and intake of fruits and vegetables (F&V) in disadvantaged communities. VV, a mobile produce market, sells local F&V on a sliding scale and offers nutrition and cooking demonstrations to customers.

Methods: We recruited community sites interested in hosting VV. Adults at each site completed a phone survey about perceived food access and dietary intake. Sites were then randomized in pairs to receive the VV or a delayed intervention control. Intervention participants received one $10 VV voucher towards their first purchase and newsletters including VV market times, produce tips, recipes and nutrition information. Control participants received monthly non-nutrition related newsletters. Follow-up surveys were completed 6 months post-baseline. Perceived access to F&V was assessed using a validated 3-item (5-point likert scale) measure of availability, quality, and variety of F&Vs near participants' home and two additional measures assessing access near the community site and in general. F&V intake was measured using the validated 10-item National Cancer Institute F&V screener; cups/day was calculated by multiplying frequency by portion size. We used multiple linear regression to calculate adjusted differences in the outcome variables while controlling for baseline values, income, education and clustering within sites.

Results: Among participants at 8 sites (N=166), 114 completed the follow-up survey (68.7% retention). Most participants were female (95.6%) with an average age of 45.9 and BMI of 32.0; 62.3% reported receiving government assistance. Average baseline income and education was higher for control vs. intervention participants (p<0.05). F&V intake at baseline was 3.34 cups/day for control and 3.51 for intervention. At follow-up, adjusted change in F&V consumption was 1.32 cups/day greater for intervention vs. control participants (p<0.001). Intervention participants reported greater increases in perceived access to fresh F&V around the community site (p=0.02).

Conclusions: Mobile markets are increasingly popular in disadvantaged communities, but this is one of the first studies to evaluate them using a RCT. Our results indicate that mobile markets are a very promising strategy for increasing both access to and intake of F&V among residents of disadvantaged communities.
**Changes in Adult Menu Orders Following the Implementation of a Healthier Children’s Restaurant Menu**

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**SIG:** Policies and environments

**Awards:** Yes, for the Student Competition *

**Objective:** Restaurant meals contribute to excess calorie intake and poor diet quality in children and adults. Research has illustrated positive overall shifts in the nutritional quality of kids’ meal orders following healthy menu modifications to children’s menus. Healthy changes to children’s menus also have the potential to influence adults’ ordering patterns either directly (via priming) or through interactions between parents and their children.

**Methods:** A healthier children’s menu was introduced at the Silver Diner, a regional full-service restaurant chain, in April 2012. This menu featured an increased number of kids’ meals meeting the National Restaurant Association’s Kids LiveWell standards, healthy side dishes bundled with all meals by default, and the removal of French fries and soda (which could be substituted for free). Aggregate orders of adult menu items were abstracted from before (PRE; n=2,078,343) and after (POST; n=2,063,334) the implementation of the healthier children’s menu. Adult entrées and appetizers were identified as healthier if they were listed under the “Healthier Selections” section of the menu. McNemar tests of paired proportions were used to compare the percentage of entrees and appetizers ordered from adult menus that were healthy, the percentage of beverages that were soda, and the ratio of dessert orders to entrée orders at PRE versus POST.

**Results:** The proportion of healthy entrées and appetizers ordered from adult menu increased from PRE to POST (8.8% to 10.2% and 25.5% to 27.5%, respectively), and the proportion of soda and orders of desserts decreased (23.7% to 22.8% and 24.9% to 24.1%, respectively). All shifts were statistically significant (p<0.0001).

**Conclusions:** These preliminary data highlight significant shifts in healthy adult-menu orders from PRE to POST. It is unclear whether the observed changes are driven by the healthy children’s menu change, changes to the adult menu during that same time, differences in adult ordering patterns when dining out with children, shifts in the patron population, and/or shifts in preferences. Future analyses will explore adult menu orders placed in conjunction with and in the absence of kids’ meal orders to further assess the potential impact of the children’s menu on adult menu orders.
The impact of the Guiding Stars on-shelf nutrition labelling system on the nutritional quality of food purchases in supermarkets in Canada.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: Unhealthy diet is now a leading risk factor for chronic diseases in Canada. “Guiding Stars” is an on-shelf nutrition rating system that provides simple standardized nutrition labels on all products in a supermarket. This study examined the impact of the Guiding Stars system on the nutritional quality of store-level food purchases in the largest supermarket retailer in Canada.

Methods: Using a pre-post quasi-experimental research design, this study compared supermarkets with (N=44) and without (N=53) the Guiding Stars system in Ontario, Canada. The supermarket retailer provided aggregate store-level transaction data for all supermarkets in Ontario from June 1, 2012 to February 1, 2013, representing millions of transactions before and after the Guiding Stars system was implemented. A database with nutrition information and star ratings for each product were also provided and merged with the transaction data. A difference-in-differences approach was used to assess the changes in the store-level food purchases that qualify for 0, 1, 2, and 3 star ratings. This model used a single indicator for exposure to the Guiding Stars system and included supermarket-level fixed effects to control for unobservable factors, and time dummy variables to control for macro shocks that affect all consumers the same across supermarkets such as seasonal trends (e.g., Thanksgiving).

Results: Overall, the Guiding Stars system has a small but significant and positive effect on the share of food purchases with stars in intervention compared to control supermarkets in Ontario. The increase in starred purchases in intervention supermarkets can be attributed to: an increase in the number of items per transaction, an increase in the share of 1- and 3-star products purchased, and a decrease in the share of 0- and 2-star products purchased. From a nutrient perspective, these changes in food purchasing patterns translate into significantly less trans fat, sodium, and sugar, and more fibre and omega-3 purchased.

Conclusion: This is the first study in Canada to examine a large-scale nutrition rating system in supermarkets. Results indicate the Guiding Stars nutrition rating system significantly increased the share of food purchases that qualify for stars in intervention compared to control supermarkets in Ontario.
Physical Activity and Health across the lifespan
Physical activity and depressive symptoms trajectories: Associations over time among breast cancer survivors

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SIG: Cancer prevention and management

Awards: Yes, for the Early Career Award**

Purpose: Lack of physical activity and depressive disorders represent major burdens for breast cancer survivors. Whereas physical activity and depressive disorders have been linked in previous research, the directionality of effects (and in particular, whether the effect is bidirectional) has not been elucidated. Understanding whether low levels of physical activity predict a greater presence of depressive symptoms over time, or vice versa, is important especially in the early post-treatment period when breast cancer survivors may (re)establish physical activity behaviors and are at increased risk of reporting depressive symptoms. Five waves of data (covering a 15 month period) from the Life After Cancer: Moving on study of 201 women treated for breast cancer were analyzed to examine physical activity and depressive symptoms trajectories and the covariance between them over time.

Methods: Self-reported data on depressive symptoms and accelerometer-derived data on moderate-to-vigorous physical activity (MVPA) were analyzed using latent growth curve modeling by (1) allowing the growth trajectory of MVPA to depend on initial levels of depressive symptoms, and (2) allowing change in depressive symptoms to be affected by initial levels of MVPA.

Results: Levels of MVPA generally decreased over time (b = -3.05, p = .001) with some variation in change (b = .69, p = .001), whereas the presence of depressive symptoms remained stable (b = -.20, p = .65) with some evidence of variation in change over time (b = .99, p < .001). Higher initial levels of MVPA were associated with higher initial levels of depressive symptoms (r = -.25, p = .04). Also, initial levels of depressive symptoms were associated with change in MVPA over time (b = .55, p = .002); however, initial levels of MVPA were not associated with change in depressive symptoms over time (b = -.06, p = .80).

Conclusions: Based on these results, initial levels of depressive symptoms affect breast cancer survivors’ participation in MVPA, but participation in MVPA does not appear to affect the presence of depressive symptoms in the early post-treatment period. Thus, successfully treating depressive symptoms might help increase or maintain levels of MVPA in this population.
**O.04.2**

**Associations of fat mass and fat-free mass with physical fitness in 4-year-old children: the MINISTOP trial**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Early Career Award**

**Purpose:** Physical fitness is a powerful marker of health already in childhood and is influenced by physical activity and body composition. Studies in adolescents and adults suggest that higher fat mass is related to worse physical fitness. However, there is limited knowledge whether fat mass as well as fat-free mass is associated with physical fitness already in preschoolers. We examined associations of fat mass and fat-free mass with physical fitness in healthy Swedish 4-year-olds.

**Methods:** Baseline data from the population-based MINISTOP trial collected in 2014 was utilized for this cross-sectional analysis (n=303). Body composition was assessed using air-displacement plethysmography. Fat mass index [fat mass (kg)/height^{2} (m)] and fat-free mass index [fat-free mass (kg)/height^{2} (m)] were used to provide height-adjusted measures of body composition. Physical fitness was measured using the PREFIT battery, which includes cardiorespiratory fitness (20 m shuttle run), upper body muscular strength (handgrip strength), lower body muscular strength (standing long jump) and motor fitness (4 x 10 m shuttle run). Physical activity was measured using ActiGraph wGT3x-BT triaxial accelerometer on the non-dominant wrist for 24 hours a day during at least 3 days.

**Results/Findings:** A higher fat mass index was associated with a lower cardiorespiratory fitness (standardized β= -0.16, P= 0.006), lower body muscular strength (β= -0.16, P= 0.005) and motor fitness (β= -0.19, P= 0.001). Conversely, a higher fat-free mass index was associated with higher cardiorespiratory fitness (β= 0.16, P= 0.006), upper body muscular strength (β= 0.44, P< 0.001), lower body muscular strength (β= 0.21, P< 0.001) and motor fitness (β= 0.14, P= 0.015). Adjusting these crude estimates for age, sex and time spent in moderate-to-vigorous or vigorous physical activity had little influence on the results.

**Conclusions:** These results demonstrate that a higher fat mass already in preschoolers is associated to lower physical fitness in weight-bearing tests. The findings also clearly show that a higher fat-free mass is related to higher levels of all physical fitness components. Thus, fat mass and fat-free mass appears to have joint but opposite associations with physical fitness, an important marker for later health.
**O.04.3**

**Associations of body composition and muscle strength with lower extremity physical function in older overweight women before and after weight loss**

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**SIG:** Ageing

**Awards:** No

Obesity negatively impacts lower extremity physical function (LEPF) whereas exercise enhances muscle mass and strength, and LEPF in older adults. The contribution of body composition and muscle strength to LEPF in overweight women after weight loss, with or without exercise, is not well established.

**Purpose:** The aim of this study was to determine the relative effects of change in body composition and leg strength on changes in LEPF in overweight sedentary postmenopausal women undergoing weight loss from diet alone (D) or diet plus exercise (D+EX).

**Methods:** After randomization, women (BMI=31.1±5.1 kg/m², 69.2±3.6 y) completed 6-month D (n=20) or D+EX (n=39) interventions. The supervised EX intervention (75 min/session; 3 sessions/week) included cardiovascular, strength and flexibility/balance modes. A dietitian prescribed diets that reduced energy intake by ~500 kcal/day. Body composition was measured via dual-energy X-ray absorptiometry; thigh muscle strength via maximal isokinetic knee torque with isokinetic dynamometry at 60 deg/s; LEPF via 6-minute walk (WALK) and up and go (UPGO) tests. Independent t-tests on change scores were used to determine group effects. Linear regression analyses determined independent predictors of change in LEPF. **Results:** At baseline, BMI and adiposity were negatively, and leg lean mass and strength were positively related to WALK and UPGO performance (r range = 0.26 to 0.61, all P<0.05). Groups had similar changes in weight (-7.5±4.1 kg or -9.2±4.8%) and fat mass (both P>0.05). Compared to D+EX, D lost greater leg lean mass (-0.63±0.76 kg vs. -0.22±0.57 kg; P<0.05) and strength (-6.4% vs. +6.2%; P<0.05). D+EX had a ~5-fold and ~2.5-fold improvement in WALK and UPGO, respectively, compared to D (both P<0.01). Change in muscle strength was the only independent predictor of changes in WALK (standardized β=0.45, P=0.002) and UPGO (standardized β=-0.39, P=0.01) explaining 24% and 18% of the variance, respectively; changes in leg lean mass and weight were not predictors (both P>0.05). **Conclusions:** Although adiposity, leg lean mass and strength influence LEPF in overweight postmenopausal women, preservation of muscle strength, through exercise training, is critical for improvements in LEPF during weight loss. More research regarding exercise/physical activity and LEPF in older adults undergoing weight loss is needed.
Lifelong physical activity and cognitive performance in midlife: The Cardiovascular Risk in Young Finns Study

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SIG: Ageing

Awards: No

Purpose: Physical activity may protect against old-age cognitive decline. Additionally, a positive association has been found between physical activity and childhood cognitive performance/academic achievement. However, studies on longitudinal associations between lifelong physical activity and midlife cognitive performance are lacking. We investigated the associations between physical activity trajectories from childhood to adulthood and midlife cognitive performance in a longitudinal population-based cohort.

Methods: This study is a part of the ongoing Cardiovascular Risk in Young Finns Study. Altogether 3,596 randomly selected children/adolescents (aged 3-18 years) participated at baseline. The cohort has been followed-up for 31 years (1980-2011) in 3-9 year intervals. Physical activity indexes were formed based on self-reported data on frequency, duration and intensity of physical activity and sports club participation. Trajectory modeling was used to identify physical activity trajectory groups among subjects having at least two physical activity measurements (n=2836): 1) persistently active (7.3%), 2) decreasingly active (13.9%), 3) increasingly active (14.6%), 4) persistently low active (49.6%), 5) persistently inactive (14.6%). In 2011, several cognitive domains were assessed using a computer-based cognitive testing (n=1798).

Results: Compared to the persistently active subjects, subjects in all other trajectory groups had worse reaction time after adjusting for age, sex and socioeconomic status: decreasingly active -0.38SD, increasingly active -0.41SD, persistently low active -0.52SD and persistently inactive -0.69SD (for all associations p<0.001). Additionally, the persistently inactive subjects had -0.37SD (p<0.001) worse visual processing and sustained attention and -0.22SD (p=0.04) worse episodic memory and visuospatial learning than the persistently active subjects. Compared to the persistently active subjects, borderline significant associations were observed for the decreasingly active subjects in visual processing and sustained attention (-0.19SD, p=0.07) and episodic memory and visuospatial learning (-0.20SD, p=0.07), as well as for persistently low active subjects in visual processing and sustained attention (-0.17SD, p=0.07).

Conclusions: Longitudinal association was observed between persistent physical activity from childhood to adulthood and better midlife cognitive performance. Most robust associations were seen for reaction time, visual processing, sustained attention, episodic memory and visuospatial learning. These results encourage to lifelong engagement in physical activity in order to promote midlife cognitive health.
Real-time remotely monitored exercise-based cardiac rehabilitation could augment traditional centre-based programmes: results from a pilot non-inferiority randomised controlled trial.

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SIG: E- & m-health

Awards: Yes, for the Student Competition*

Purpose

Exercise-based cardiac rehabilitation (exCR) improves mortality, functional capacity and cardiovascular risk factors among coronary heart disease (CHD) patients. Traditional centre-based programmes are underutilised; common participation barriers relate to accessibility. Home-based exCR enhances accessibility but sacrifices clinical exercise specialist supervision and individualised coaching. We developed a custom mobile health (mHealth) exCR platform that remotely connects exercise specialists with patients in real-time, in almost any location, and compared 12 week mHealth and centre-based exCR programmes. We hypothesised mHealth exCR would be at least as effective as centre-based exCR.

Methods

An mHealth exCR platform, comprising custom smartphone and web-based applications (apps), middleware, and wireless sensors was developed to deliver real-time remote exercise monitoring and coaching, behaviour change education, and social support. Exercise prescription and behaviour change content were informed by exCR guidelines and behaviour change theories. A pilot trial nested within a larger non-inferiority RCT compared 12 weeks of mHealth and centre-based exCR among CHD patients. Outcomes included change from baseline maximal aerobic exercise capacity ($\dot{V}O_2\text{max}$), cardiovascular risk factors, self-efficacy, and adherence. The non-inferiority margin for the primary outcome, $\dot{V}O_2\text{max}$, was -1.75 ml·kg$^{-1}$·min$^{-1}$.

Results

$\dot{V}O_2\text{max}$ change scores were comparable between groups (difference=0.16 ml·kg$^{-1}$·min$^{-1}$, $P=.87$) but was just beyond the non-inferiority criterion (95%CI= -1.79 to 2.12 ml·kg$^{-1}$·min$^{-1}$). As expected, no between-group differences were observed for changes in self-reported physical activity energy expenditure, blood pressure, blood lipid or glucose concentrations, exercise adherence, or anthropometry ($P=.07$ to 1.00) except waist-to-hip ratio, which favoured centre-based exCR (difference=0.02, $P=.03$). Both groups improved $\dot{V}O_2\text{max}$ (mHealth=+2.92 ml·kg$^{-1}$·min$^{-1}$; centre-based=+2.76 ml·kg$^{-1}$·min$^{-1}$), physical activity energy expenditure (mHealth=+2786.11 MET·min$^{-1}$·week$^{-1}$; centre-based=+3148.75 MET·min$^{-1}$·week$^{-1}$) and exercise self-efficacy (mHealth=+12.87%, centre-based=+12.86%).

Conclusions

12 weeks of mHealth and centre-based exCR was associated with similar improvements in $\dot{V}O_2\text{max}$, physical activity level, and exercise self-efficacy. These promising results indicate real-time remotely monitored exCR could provide a suitable alternative for CHD patients unable or unwilling to attend centre-based exCR. The mHealth platform and theory-based intervention content may have utility among other populations for promoting exercise training and physical activity.
Physical Activity and Sedentary Behaviour in Children
O.05.1

Intra-dyadic Relations of Daily Stress with Physical Activity and Sedentary Behavior among Mothers and Children: An Ecological Momentary Assessment Study

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SIG: E- & m-health

Awards: No

Objective: Psychosocial stress may influence physical activity (PA) and sedentary behavior (SB) dynamically among mothers and children. However, research is lacking on the extent to which these interpersonal processes may unfold on a day to day basis. The current study used Ecological Momentary Assessment (EMA) in mother-child dyads to examine the relations of each member’s daily stress on their own PA and SB, and on the other dyad member’s PA and SB. Methods: The sample included mothers (ages 26-57 years, 54% Hispanic) and their 8-12 year-old children (52% female) (N = 167 dyads). A smartphone app prompted EMA surveys among mothers and children at random times during non-school hours across 7 days, with up to 8 prompts per weekend day and 4 prompts per weekday. Dyads reported perceived stress (2 items), and whether recreational PA (e.g., sports, exercise) or screen-related SB (e.g. TV, videos, video games) were performed in the past 2 hours. Data were analyzed using multilevel linear regression modeling, with days (level 1) nested within subjects (level 2). Models examined within-dyad (WD) effects of mothers’ and children’s perceived stress on their own PA and SB, and also on the other dyad member’s PA and SB, controlling for between-dyad (BD) variation in perceived stress, day of the week, and income. Results: Neither children’s nor mothers’ perceived stress were associated with their own PA at the day level. On days when children reported higher perceived stress than usual, their mothers engaged in less PA (WD coef. = -0.074, p = .042), but mothers’ stress was unrelated to children’s PA at the day level. On days when mothers reported higher perceived stress than usual, their children engaged in more SB (WD coef. = 0.088, p = .022), yet mothers’ own SB was lower on those days (WD coef. = -0.116, p < .001). Conclusions: On any given day, psychosocial stress experienced by mothers is associated with higher SB performed by their children, and children’s stress may reduce mothers’ PA on that day. Future research is needed to uncover parenting mechanisms underlying these associations and intervention strategies to buffer these effects.
Bone mass at age 20 is predicted by trajectories of television watching across childhood and adolescence in the Raine Study

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: The purpose of this study was to assess the relationship between television (TV) watching during key developmental stages and bone mass at age 20.

Methods: Longitudinal assessments (at ages 5, 8, 10, 14, 17 and 20) of hours (h) spent watching TV per week were made in 1274 members (48% female) of a pregnancy cohort (the Raine Study). Using latent class analysis, three trajectories of TV watching were developed. Participants were classified into either a ‘low’ (<14 h/week; 19·4%), ‘high’ (≥14 h/week; 44·7%) or ‘increasing’ (from <14 to ≥14 h/week during adolescence; 35·9 %) TV watching trajectory. Whole body bone mineral content (BMC) at age 20 was assessed by dual-energy X-ray absorptiometry (DXA). The association between BMC and TV watching trajectory was tested using general linear models.

Results: Males and females in the ‘low’ TV watching trajectory had significantly greater BMC at the whole body, legs and arms compared to ‘high’ TV watchers after adjustment for body size, physical activity, calcium intake, serum 25-hydroxyvitamin D levels, alcohol and smoking habits. Males in the ‘increasing’ TV watching trajectory had significantly lower arm BMC compared to those in the ‘low’ TV watching trajectory (215.0 ±3.3g vs 231.9 ±5.4g), whereas females in the ‘increasing’ trajectory had significantly greater whole body (2736.5 ±24.1 vs 2635.5 ±24.1g), leg (474.6 ±5.0g vs 454.2 ±4.6g) and arm (159.5 ±2.1g vs 151.2 ±2.0g) BMC compared to females in the ‘high’ TV watching trajectory.

Conclusion: In this community-based cohort, reduced peak bone mass at age 20 was independently predicted by consistently high TV watching habits during childhood and adolescence for both males and females. The results also suggest that an increase in TV watching over the adolescent period may be detrimentally associated with bone mass in males. Attaining optimal peak bone mass is important for protecting against osteoporosis in later life; therefore reducing sedentary time in the pre pubertal years for females and throughout growing years for males may have long term skeletal benefits.
Not all screens are equal: Tracking screen use activities from Year 5 to Year 12

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SIG: Children and families

Awards: No

Purpose: The purpose of this research was to track children's screen use from Year 5 to Year 12. Children's screen use has typically been grouped together as one activity. However, screen based activities can be differentiated into several categories, such as console gaming, social media, web browsing and passive media consumption (TV). Patterns of children's screen use, over time and between gender, is important to help understand related health impacts.

Methods: Data were collected from 1948 Western Australian children in Year 5, 7 and 9 each for a three-year period. Total screen time and amount of time engaged in different screen activities were collected via online survey administered in schools biannually (winter and summer). Conditional latent growth curve analyses evaluated the change in screen use over the duration of the study. A random intercept, random slopes model was tested for each of five measures of screen use, with age entered as a covariate of both intercept and slope and gender differences evaluated by employing a multi-group approach.

Results/Findings: Total screen use typically exceeded the two-hour recommendation from an early age, and girls reported an extra hour per day of total screen time (4.2hrs vs 3.2hrs). Total Screen time increased over time for boys, but decreased over time for girls. Console gaming was more common amongst boys than girls, and decreased over time. For social media use, a different pattern emerged: girls reported spending more time on social media than boys. In addition, there was an overall increase in time spent on social media over time. Patterns of web use did not change over time, and revealed no gender differences. Boys reported more passive media consumption, but among both boys and girls there was a reduction in time spent in passive media consumption over time.

Conclusions: This study shows that while total screen time is high from a young age for both boys and girls, the types of screen based activities do not track consistently across age and gender. The health related impacts of different screen use require greater understanding, as exposure changes during childhood and between gender.
An investigation into physical activity and classroom behaviours in children with intellectual disabilities.

Sarah Taylor, Zoe Knowles, Stuart Fairclough, Samantha Downs, Lynne Boddy

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: In typically developing children, physical activity (PA) has positive influences on health and classroom behaviour. Children with intellectual disabilities (ID) appear to be less active and also exhibit challenging behaviour in the classroom environment. The purpose of this study was to describe habitual and segmented PA levels, and investigate the associations between PA and teacher-rated classroom behaviour in children with ID within the Special Educational Needs (SEN) school setting.

Methods: Habitual PA was assessed using accelerometers in 21 5- to 11- year-old children with severe ID (N = 16 boys, mean age = 7.1). In 17 of these participants teacher ratings of behaviour were completed pre- and post- lunch recess. Analyses of covariance (ANCOVA) examined the differences in PA and behaviour pre- and post- recess controlling for recess length. Associations between PA in the different segments of the day/week (school day, before and after school, weekends), recess PA, and classroom behaviour were examined using partial correlations and linear regression.

Results: A large proportion of children (73%) achieved ≥60 minutes of moderate to vigorous PA (MVPA) per day. Percentage time spent sedentary and in MVPA were not significantly different between week and weekend days (Sedentary p = 0.79. MVPA p = 0.89). Percentage time spent sedentary was significantly higher before and after school in comparison to during the school day (School day 65.6%, before 73.4%, p = 0.036, after 70.5%, p = 0.043). Habitual PA did not predict recess PA (r = 0.05, p = 0.54) and recess MVPA was low (mean = 6.4 minutes). Teacher rated classroom behaviour improved significantly pre- to post- recess (Pre 7.15, post 8.26, p = 0.006). Total PA and MVPA during recess were positively correlated with disruptive behaviour post- recess (Total PA r = 0.56, p = 0.032. MVPA r = 0.52, p = 0.048).

Conclusions: Reduced sedentary behaviour was observed during classroom time in comparison to other periods of the day. This suggests that children are provided opportunities to move more within the SEN school setting. PA was not associated with higher ratings of behaviour and was associated with disruptive behaviour post- recess.
Physical Activity and Sedentary Behaviour Guideline Adherence and Demographic Relationships in Toddlers

Nicholas Kuzik, Valerie Carson
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SIG: Early care and education

Awards: Yes, for the Student Competition*

Purpose: Limited evidence exists worldwide on physical activity and sedentary behaviour in toddlers, including guideline adherence and demographic relationships. The purpose of this study was to examine: (1) adherence to Canadian Physical Activity and Sedentary Behaviour Guidelines, and (2) the associations between demographic characteristics, physical activity, and sedentary behaviour in a sample of toddlers.

Methods: Findings are based on 144 parents and their children (18.9±2.0 months), recruited from four immunization clinics in Edmonton, Canada as part of the ongoing PREPS study. Children's demographic characteristics (i.e., age, sex, race/ethnicity, number of siblings, childcare type), parental demographic characteristics (i.e., age, education, household income, marital status, country of birth), and children's screen time were measured with a parental questionnaire. Children's sedentary time, light-intensity physical activity (LPA), moderate- to vigorous-intensity physical activity (MVPA), and total physical activity (TPA), were measured with a waist-worn accelerometer (Actigraph GT3x+) over 7 consecutive days. Meeting the sedentary behaviour guideline of no screen time was determined by parental questionnaire. Meeting the physical activity guideline of 180 minutes/day of TPA, and progressing to 60 minutes/day of MVPA was determined using Betabinomial distributions calculated from accelerometer data. Simple and multiple regression models examined associations between demographic characteristics, sedentary behaviour, and physical activity.

Results: Eight-one percent met the TPA recommendation, 15% met the no screen time recommendation, and 14% met both. Furthermore, 74%, 60%, 42%, and 29% of children met the TPA recommendation while accumulating 20, 30, 45, and 60 minutes/day of MVPA. In multiple regression models, screen time was associated with sex (β=-29.97, 95%CI: -55.76, -5.18; reference=girls), household income (≤$50,000: β=30.96, 95%CI: 3.40, 58.53 and $50,001-$100,000: β=40.97, 95%CI: 4.77, 77.18; reference=>$100,000), and ethnicity (β=34.62, 95% CI: 6.19, 63.04, reference=Caucasian). Furthermore, MVPA was associated with sex (β=11.60, 95% CI: 4.36, 18.84; reference=girls). No associations were observed for sedentary time, LPA, and TPA.

Conclusions: Few toddlers met both the physical activity and sedentary behaviour guidelines, and some demographic correlates were found, especially for screen time. Interventions/initiatives considering these demographic groups in toddlers could have positive impacts. Future work will explore modifiable correlates of physical activity and sedentary behaviour in this sample.
Physical Activity and Environment in Adults
Street characteristics preferred for transportation walking among older adults: A choice-based conjoint analysis with manipulated photographs

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SIG: Ageing

Awards: No

Objective: Knowledge about the relationships between micro-scale environmental factors and older adults’ walking for transport is limited and inconsistent. This is probably due to methodological limitations, such as absence of an accurate neighborhood definition, lack of environmental heterogeneity, environmental co-variation, and recall bias. Furthermore, most previous studies are observational in nature. We aimed to address these limitations by investigating the effects of manipulating photographs of micro-scale environmental factors on the appeal of a street for older adults’ transportation walking. Secondly, we used latent class analysis to examine whether subgroups could be identified that have different environmental preferences for transportation walking. Thirdly, we investigated whether these subgroups differed in socio-demographic, functional and psychosocial characteristics, current level of walking and environmental perceptions of their own street.

Methods: Data were collected among 1131 Flemish older adults through an online (n= 940) or an interview version of the questionnaire (n= 191). This questionnaire included a choice-based conjoint exercise with manipulated photographs of a street. These manipulated photographs originated from one panoramic photograph of an existing street that was manipulated on nine environmental attributes. Participants chose which of two presented streets they would prefer to walk for transport.

Results: In the total sample, sidewalk evenness had by far the greatest appeal for transportation walking. The other environmental attributes were less important. Four subgroups that differed in their environmental preferences for transportation walking were identified. In the two largest subgroups (representing 86% of the sample) sidewalk evenness was the most important environmental attribute. In the two smaller subgroups (each comprising 7% of the sample), traffic volume and speed limit were the most important environmental attributes for one, and the presence of vegetation and a bench were the most important environmental attributes for the other. This latter subgroup included a higher percentage of service flat residents than the other subgroups.

Conclusions: Our results suggest that the provision of even sidewalks should be considered a priority when developing environmental interventions aiming to stimulate older adults’ transportation walking. Natural experiments are needed to confirm whether our findings can be translated to real environments and actual transportation walking behavior.
O.06.3

A methodology to leverage cross-sectional accelerometry to capture weather's influence on active living

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose

While active living interventions focus on modifying built and social environment, weather variation, a phenomenon that perennially interacts with these environmental factors, is consistently underexplored. The objective of this study is to develop a methodology to leverage existing cross-sectional accelerometry data in developing active living interventions that factor-in weather variation.

Methods

As part of an active living initiative in Saskatoon, Canada (www.smartcitieshealthykids.com), urban design, and built and social environment were measured. Actical accelerometers were used to collect physical activity data in 25 sequential one week cycles between April and June, 2010. Each accelerometry cycle was conducted on different cohorts within the total sample of 455 children. Each accelerometry cycle was matched with localized weather categories (e.g. Warm-Wet-Calm) simulated by factoring-in the interrelationship between temperature, precipitation and wind. Multilevel modeling using Hierarchical Linear and Non-linear Modeling software was conducted to depict the influence of environmental exposures (including weather variation) on physical activity.

Results

Utilizing the proposed methodology, weather variation's influence on physical activity was captured with cross-sectional accelerometry during a single seasonal transition (spring to summer). Overall, physical activity increased during warmer days and decreased during colder days, thus corroborating existing evidence that physical activity is positively associated with increasing temperature. However, after simulation of localized weather patterns by factoring-in the interrelationship between different weather variables, a more nuanced picture emerged. Wind was the detrimental factor which modified the influence of both temperature and precipitation on physical activity. Multilevel models, taking into account urban design, built and social environment at the neighbourhood level depicted that irrespective of weather patterns, children residing in denser neighbourhoods with high diversity of destinations were more likely to be active.

Conclusions

As weather is non-modifiable, the focus falls on understanding how diverse environmental exposures interact with varying weather patterns to influence physical activity. The proposed methodology could be utilized to leverage globally available existing cross-sectional accelerometry data to develop place-specific active living interventions across the world.
Perceived environmental attributes and change in walking and physical activity and incidence of type 2 diabetes in a large sample of middle-aged and older Australians

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¹James Cook University, Cairns, Queensland, Australia, ²University of Sydney, Sydney, New South Wales, Australia

SIG: Policies and environments

Awards: No

Objective: To analyse prospective relationships between environmental perceptions and changes in walking, physical activity and type 2 diabetes incidence.

Methods: We used three-year longitudinal data (2006/07-2009/10) of adults 45 and older living in metropolitan areas (n=24,341; 62.9±11.3 years) in New South Wales, Australia. Environmental attributes were measured using the validated Physical Activity Neighborhood Environment Survey and physical activity with the validated Active Australia Survey. General linear regression was used with each individual neighbourhood attribute as the exposure and change in walking and total activity as the outcome, adjusted for various covariates and baseline activity. Logistic regression was used for diabetes incidence.

Results: During the follow-up period (3.3±0.94 years), the average change in walking was +6.3 min/week (SD=1.4, 95%CI:3.4-9.1), and +6.0 min/week (SD=3.3, 95%CI:-0.34,12.40.34-12.42) for total physical activity (VPA weighted by 2), and there were 550 new cases of diabetes. There were significant differences in changes in walking, physical activity and diabetes incidence by perceptions of the environment. Participants who reported having shops (+14.59 min/week, 95%CI:11.46, 17.71, p<0.001), public transport stops (+7.60, 95%CI:5.14, 10.06, p<0.001) and recreation facilities (+7.97, 95%CI:5.41, 10.53, p=0.004) within walking distance, and those who perceived their neighbourhood as safe from crime during the day (+7.34, 95%CI:4.89, 9.79, p=0.017) increased their walking, compared to those with negative perceptions of these attributes who walked less over time. There were no differences in changes of walking by availability of sidewalks and safety at night. Participants who reported shops nearby (+17.6, 95%CI: 10.64, 24.65, p<0.001), and who perceived their neighbourhood as safe at night (+14.54, 95%CI: 8.15, 20.83, p<0.001) increased their overall physical activity, compared to those with negative perceptions of these attributes who decreased their activity levels. Having recreational facilities nearby (OR=0.79, 95%CI: 0.64-0.98), high perceived safety during the day (OR=0.74, 95%CI: 0.54-0.99) and at night (OR=0.81, 95%CI: 0.68-0.96) were associated with lower odds of developing diabetes.

Conclusions: Having access to shops, public transport stops, and recreation facilities, and safety from crime may help with maintenance of walking and physical activity and protection against type 2 diabetes in middle-aged and older adults.
Assessment of mismatch between perceived and objectively measured environmental obesogenic features in European neighbourhoods (The SPOTLIGHT project)

Célina Roda¹, Hélène Charreire¹,², Joreintje D. Mackenbach³, Helga Bardos⁴, Harry Rutter⁵, Ilse De Bourdeaudhuij⁶, Jeroen Lakerveld³, Jean-Michel Oppert⁷

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SIG: Policies and environments Awards: No

Objective. Association between the built environment and obesity-related behaviors remain equivocal. Potential explanations for the mixed results include the differences in approaches that have been used to characterize the built environment. This study aimed to investigate the agreement between perceived (self-reported) and objectively measured (using a virtual audit) obesogenic environmental features by 1/measuring agreement about environmental features at individual level, 2/quantifying any mismatch at neighborhood level, and 3/examining how the mismatch varied by European urban region, and neighborhood.

Methods. Cross-sectional data from the SPOTLIGHT project conducted in five European urban regions were used. A virtual audit (using Google Street View - GSV) was performed in 4,486 street segments of 59 neighborhoods to assess characteristics related to the food and physical activity environments. These data were aggregated at neighborhood level, and combined into neighborhood clusters related to the food environment, recreational facilities and active mobility features. Residents' perceptions of built environmental characteristics were collected by questionnaire (n=3,914). Perceived presence of each environmental feature was aggregated at neighborhood level using 2-level logistic models adjusted for age, gender, education level, length of residency, and percent of overlap between neighborhood definitions. Agreement between the virtual audit items and the survey was assessed by percent agreement and Kappa statistics. The mismatch was quantified at neighborhood level by a distance metric derived from a factor map. The extent to which the mismatch metric varied by region and neighborhood was examined using linear regression models.

Results. Agreement was moderate (agreement<82%, kappa<0.3) and varied by obesogenic environmental feature, region and neighborhood. Highest agreement was found for food outlets (61.6%-81.1%), outdoor recreational facilities (80.9%) and lowest agreement was obtained for aesthetics (41.5%). The mismatch was significantly lower in neighborhoods grouped into the clusters labelled ‘food and recreational facilities’ and ‘high residential and low aesthetics’ compared to neighborhoods labelled ‘green and low residential density’ as identified by cluster analysis.

Conclusions. Distinct mismatch patterns were identified at the individual, neighbourhood and region levels. Perceived and objectively measured built environment qualities should be combined to better understand the impact of the built environment on obesity-related behaviors, especially in low residential density neighborhoods.
Oral Sessions, Saturday, June 11 (10:00)

Dietary intake and health
O.07.1

A low-cost, home-based intervention incorporating motivational interviewing can effectively improve dietary and physical activity behaviours of disadvantaged rural adults with or at risk of metabolic syndrome.

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SIG: Theories of motivation

Awards: Yes, for the Student Competition*

Purpose: Overweight/obesity coupled with advancing age increases the risk of metabolic syndrome, a cluster of abnormalities that are well-documented risk factors for type 2 diabetes and cardiovascular disease. This randomised controlled trial (RCT) identified and recruited adults aged 50-69 with or at risk of metabolic syndrome, residing in rural Western Australia (WA), to participate in a home-based physical activity, dietary, and healthy weight intervention. It was hypothesised that by the end of the 6 month RCT, the intervention group compared to the control group, would show significant improvements in metabolic syndrome parameters, anthropometry, physical activity levels, fat and fibre intake, and fruit and vegetable consumption.

Methods: Participants (n=401) from the City of Albany and environs in WA were recruited into a 6 month RCT. They were screened for metabolic syndrome and randomly allocated to intervention (n=201) or control groups (n=200). Data were collected at baseline and post-test and consisted of a self-report questionnaire incorporating the Fat and Fibre Barometer and the International Physical Activity Questionnaire (short form). The program materials and resources were provided to the intervention group at baseline, and the control group was waitlisted to receive the program after post-test. Each participant was provided with a package designed to educate, motivate, and support improvement in diet and physical activity through goal setting, based on the principles of the Self-Determination Theory and Motivational Interviewing. Generalised estimating equation models assessed repeated outcome measures over time.

Results: A total of 151 (75.1%) intervention and 159 (79.5%) control group participants completed post-test and were included in the analysis. After controlling for confounders, the intervention group marginally increased their metabolic equivalent (MET) minutes of moderate intensity physical activity per week (p=0.049), and significantly improved fibre intake (p<0.001), fat intake (p=0.003), and vegetable serves per day (p=0.002) from baseline to post-test compared to the control group. Changes to anthropometry and metabolic syndrome parameters will be reported elsewhere.

Conclusions: A low-cost home-based intervention with motivational support can effectively improve the dietary and physical activity behaviours of adults aged 50 to 69 years with or at risk of metabolic syndrome residing in a disadvantaged rural area.

Laila Hopstock1, Kaare Harald Bønaa2,3, Anne Elise Eggen1, Sameline Grimsgaard1, Bjarne Koster Jacobsen4, Maj-Lisa Løchen1,4, Inger Njølstad1, Tom Wilsgaard4

1UIT The Arctic University of Norway, Tromsø, Norway, 2Norwegian University of Science and Technology, Trondheim, Norway, 3St. Olavs University Hospital, Trondheim, Norway, 4University Hospital of North Norway, Tromsø, Norway

SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose: Elevated blood cholesterol is a modifiable risk factor for cardiovascular disease. Cholesterol level surveillance is necessary to study population disease burden, consider priorities for prevention and intervention, and understand the effect of diet, lifestyle and medication use. Previous studies show a cholesterol decline in recent decades, but lack data to follow individuals born in different decades throughout life.

Methods: We investigated changes in age-specific total cholesterol levels by repeated measurements in 37,968 women and men born 1905-1977 (aged 20-89 years at screening) examined up to five times between 1979 and 2008 in the population-based Tromsø Study in Norway. Linear mixed models were used to test for time trends.

Results: Mean cholesterol decreased during 1979-2008 in both genders and all age groups. The decrease in cholesterol in age group 40-49 years was 1.2 mmol/L in women and 1.0 mmol/L in men. Both the 80th and the 20th percentile of the population cholesterol distribution decreased in both genders and all age groups, shifting the cholesterol distribution curve to the left. Use of lipid-lowering drugs was rare in 1994 and increased thereafter, but was low (<1.5% in women and <4% in men) among those younger than 50 years in all surveys. Among those born 1940-69 mean cholesterol increased with age up to 2001 and decreased thereafter. Among those born 1910-39 cholesterol decreased after 1994.

Conclusions: The findings indicate a population effect from lifestyle changes, partly explained by the treatment with lipid-lowering drugs. It is likely that the cholesterol decrease has contributed to the observed substantial decline in cardiovascular disease in this population.
The impact of meeting dietary guidelines on UK mortality: a comparative risk assessment modelling study

Anja Mizdrak, Peter Scarborough, Adam Briggs
University of Oxford, Oxford, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose:
National dietary guidelines can act as a benchmark for assessing the healthiness of diets. Assessing the potential health impacts of meeting dietary guidelines is important to inform health policy. The purpose of this study was to estimate the mortality impact of meeting UK dietary guidelines.

Methods:
We used a comparative risk assessment model, PRIME (Preventable Risk Integrated ModEl), to estimate the effect of meeting recommended intakes for fruit and vegetables, salt, fibre, and fat on UK mortality from non-communicable diseases in 2011. We used age and sex-specific population and mortality data from the Office of National Statistics. The baseline diet was derived from the National Diet and Nutrition Survey 2011. The counterfactual diet represented a scenario where we shifted the entire population distribution towards daily recommendations: five portions (400g) of fruits and vegetables, 6g salt, 18g fibre, 31.5% total energy from fat, 11% from saturated fats (with a SD 10% for all risk factor distributions). The PRIME model estimates population attributable fractions for diet-related cardiovascular diseases and cancers and applies them to annual mortality from these conditions to estimate avoidable mortality in the counterfactual scenarios.

Results/findings:
We estimate that in 2011, 23,000 (95%CI 18,700-27,200) deaths would have been delayed or averted (DDA) if dietary guidelines were met. Meeting the 5-a-day fruit and vegetable recommendation would have the greatest impact (12,800DDA (95%CI 9,500-16,300)). Continued reductions in salt intake would have the smallest impact (300DDA, 95%CI 100-600).

Conclusions:
There would be substantial reductions in diet-related mortality if UK guidelines were achieved. Our results illustrate the continued importance of encouraging healthier diets in the UK, particularly with respect to increasing fruit and vegetable intake. There are further health benefits of achieving more ambitious, minimum risk, dietary scenarios. Assessing the impact of specific interventions on meeting current national recommendations, and incorporating possible impacts on obesity are important avenues for future research.


**Interactions between genetic variants in vitamin D metabolism-related genes and environmental factors on blood vitamin D concentrations**

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**SIG:** E- & m-health

**Awards:** Yes, for the Early Career Award**

**Purpose:** Polymorphisms in vitamin D metabolism genes are associated with altered concentrations of circulating 25-hydroxyvitamin D but little is known about potential diet-gene interactions. This study aimed to determine predictors of 25-hydroxyvitamin D3 (25-OH D3) concentrations, to investigate relationships with vitamin D genotypes and to determine whether these relationships are affected by dietary and environmental factors within a Personalised Nutrition (PN) intervention study.

**Methods:** Participants (n=1011) were included from a 6-month PN randomized controlled trial (Food4Me) conducted in 7 European countries. Participants were genotyped for vitamin D receptor (VRD rs1544410 and rs2228570) and vitamin D binding protein (GC rs2282679, rs4588 and rs7041), and risk scores (RS) calculated. Blood samples were assayed for 25-OH D3 concentrations and dietary (food frequency questionnaire) and demographic information collected.

**Results:** 25-OH D3 concentrations were positively associated with age (P=0.001), vitamin D3 intake from food and supplements (P<0.001) and from food only (P=0.001), physical activity level (PAL; P<0.001) and time spent in moderate to vigorous activity (P=0.003). 25-OH D3 concentrations were higher in men than in women (P<0.001), in Mediterranean countries compared with non-Mediterranean countries (P<0.001), in spring, summer and autumn compared with winter (P<0.001) and vitamin D supplement users compared with non-users (P<0.001). Individuals with a higher GC RS had lower 25-OH D3 concentrations compared with those with lower RS (50.8 mmol/L, CI: 55.2-62.5 v 58.7 mmol/L, CI: 56.2-61.4; P-trend<0.001). Among individuals with the highest GC RS, 25-OH D3 concentrations were lower in females than males (44.2 mmol/L, 40.8-47.9 v 61.4 mmol/L, 55.8-67.5; P-interaction=0.005). Following addition of a VDR rs2228570 and PAL interaction term, VDR rs2228570 was positively associated with 25-OH D3 concentrations (P=0.012) and an interaction determined between VDR rs2228570 and PAL (P-interaction=0.019).

**Conclusion:** Serum 25-OH D3 concentrations are associated with a wide variety of dietary and environmental predictors in a pan-European population. Moreover, carriage of GC risk alleles is associated with lower serum 25-OH D3 concentrations and this relationship differs by sex, while a positive relationship between VDR rs2228570 and 25-OH D3 concentrations may be mediated by PAL.
O.07.5

Distribution of sodium and potassium intake in adults in a Black Caribbean population with a high burden of cardiovascular disease

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CDRC, The University of the West Indies, St Michael, Barbados

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objectives

High levels of sodium and low levels of potassium intake are risk factors for hypertension. Barbados has an adult prevalence of hypertension of 40%. The aim of this study was to estimate sodium and potassium intake in adults, identify sources of sodium in the diet, and determine if these differed by age, sex or educational level.

Methods

This was a sub-study of randomly selected adults (25-64 years) from the core sample of a national cross-sectional survey (N=1204). A single, timed 24 hr urine collection and two non-consecutive 24 hr dietary recalls were completed. A culturally adapted questionnaire captured participants’ knowledge, attitudes and practices towards salt. Completeness of urine collection was assessed through volume, adherence to protocol and urinary creatinine. Dietary recall data were analysed using Nutribase Pro v 9 and statistical analyses completed in Stata v12.

Results

Eighty-four percent (n=373) of those contacted participated. Mean sodium excretion was 2.7 g/d (95% CI: 2.5-2.8), equivalent to 6.75 g salt/d; higher in men (2.9 g/d; 2.7-3.1) than women (2.5 g/d; 2.2-2.7). More than 1.5g/d of sodium (recommended upper limit for Black populations) was consumed by 79% (72-85) women and 89% (83-93) men. Mean potassium excretion was 1.5 g/d (1.4-1.5); all participants were below the adult recommended 4.7 g/d. Mean sodium-to-potassium ratio was 2.0 (1.9-2.1).

There were no significant differences in sodium or potassium excretion by age or educational level (tertiary vs below tertiary). There was also no difference by hypertension treatment status. The vast majority (94%) of respondents stated preference of a ‘non-salty’ taste. Eighty percent thought that they were consuming the right amount, or too little, salt, but of these >80% exceeded 1.5g/d. Five food items contributed almost one-quarter of total sodium intake.

Conclusions

In this population at high risk of hypertension, sodium intake was high and potassium intake very low, irrespective of age, sex, educational level and hypertension treatment status. Awareness of consuming too much salt was low. These findings provide a basis for designing and evaluating interventions to reduce the risk of hypertension in this and similar populations.
Epidemiology of excessive weight
Perinatal and birth-related risk factors of adult adiposity: results from the trans-generational Framingham Heart Study (1971-2008).

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: Prenatal and perinatal factors including maternal obesity and weight gain are hypothesized to influence development of obesity and non-communicable diseases in adulthood. We uniquely investigate associations between pregnancy and birth-related factors and adulthood body fatness in trans-generational (mother-child) analyses.

Methods: Secondary analyses were conducted using prospective data from two familial generations of the Framingham Heart Study's Offspring (representing parents) and Generation 3 (representing biologic offspring) cohorts, spanning approximately 4 decades of follow-up from 1971-2008. Clinical exams were conducted every 4y to collect medical, lifestyle and anthropometric data. The current analyses dataset consists of 303 women with complete self-reported birth history information including hypertension, weight gain and smoking during pregnancy, and gestational age, relating to their participating biological offspring (n=721). There were 319 (44%) normal, 254 (35%) overweight and 148 (21%) obese offspring. The outcome variable, BMI, was divided into three categories: normal weight=BMI<25, overweight=BMI 25-30 and obese=BMI >30. Dietary data, assessed by food frequency questionnaires, anthropometric measures, socio-demographic and lifestyle information were used in the analysis. Multinomial regression models were used to calculate odds ratios (OR) and 95% confidence intervals (CI) for being overweight and obese versus normal BMI, among persons with exposure to the specified prenatal and birth-related factors in adult offspring (20y+) of the respondent mothers. Analyses were performed using SASv.9.4.

Results: After adjusting for offspring’s education, smoking, alcohol and calorie consumption, the study noted that offspring's birth weight was associated with an increased risk of being obese (OR(95%CI): 1.30(1.06-1.60)) but not overweight (OR(95%CI): 1.02(0.87-1.19)), versus normal BMI among adult offspring. Furthermore, maternal factors including hypertension during pregnancy (OR(95%CI): 2.09(0.52-8.83)), smoking during pregnancy (OR(95%CI): 1.74(1.08-2.82)) and being overweight or obese before pregnancy (OR(95%CI): 2.36(1.12-4.94)) were all associated with risk of obesity in adult offspring, but not with risk of being overweight after adjusting for covariates (data not shown). There were no observed associations with excessive maternal pregnancy weight gain or gestational age (full-term/pre-term/post-term) and risk of being overweight or obese among adult offspring (data not shown).

Conclusions: This study explicitly recognizes the importance of pregnancy-related and early life exposures in adult obesity, supporting the theory of developmental origins of excess adiposity.
O.08.2

Accelerometer-measured physical activity is not associated with 2 year weight change in African-origin adults from 5 diverse populations.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: Increasing population-levels of physical activity (PA) is a controversial strategy for managing the obesity epidemic, given the conflicting evidence for weight loss from PA alone per se. We measured PA and weight change in a 3 year prospective cohort study in young adults from 5 countries (Ghana, South Africa, Jamaica, Seychelles and USA).

Methods: 1,944 men and women had baseline data, and at least 1 follow-up examination including measures of anthropometry (weight/BMI), and objective PA (accelerometer, 7-day) following the 3 year study period. PA was explored as 1-minute bouts of moderate and vigorous PA (MVPA) as well as daily sedentary time.

Results: At baseline; Ghanaian and South African men had the lowest body weights (63.4±9.5, 64.9±11.8 kg, respectively) and men and women from the USA the highest (93.6±25.9, 91.7±23.4 kg, respectively). Prevalence of normal weight ranged from 85% in Ghanaian men to 29% in USA men and 52% in Ghanaian women to 15% in USA women. Over the 2 year follow-up period, USA men and Jamaican women experienced the smallest yearly weight change rate (0.1±3.3 kg/yr; -0.03±3.0 kg/yr, respectively), compared to South African men and Ghanaian women greatest yearly change (0.6±3.0 kg/yr; 1.22±2.6 kg/yr, respectively). Mean yearly weight gain tended to be larger among normal weight participants at baseline than overweight/obese at baseline. Baseline MVPA nor sedentary time were associated with weight gain. Using multiple linear regression, only baseline weight, age and gender were significant associated with weight gain.

Conclusion: From our study it is not evident that higher volumes of PA alone are protective against future weight gain, and, by deduction our data suggest that other environmental factors, such as the food environment may have a more critical role.
O.08.3

Dual trajectory modeling in physical activity and behavioral nutrition research

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose: Health behaviors often co-occur or cluster. Furthermore, even though health behaviors co-occur, there is also considerable heterogeneity in their course over time. This is especially true for individuals transitioning from adolescence into adulthood. In this setting, a life course epidemiological approach contributes to the understanding of how a variety of complex processes influences individual's health behaviors over time. Research questions in this field, however, need to be answered by application of complex statistical techniques relatively unknown in the field of physical activity and behavioral nutrition research. This abstract provides an overview of latent class dual trajectory modelling to provide a summary of heterogeneity in the developmental linkages between related, but distinct outcomes of interest. We will demonstrate these models using health behavior data from an ongoing life course cohort.

Methods: Data of the Amsterdam Growth and Health Longitudinal Study (www.aggo.nl) will be used. This is an ongoing, longitudinal, population-based cohort study for which data collection started when the participants were 13 years old. Thereafter, 10 follow-up measurements were conducted. Participants are currently in their fifties. 336 Participants were included in the analyses. Dual trajectory models will be conducted according to Example 6.13 in the Mplus User’s Guide taking into account the different transitional stages in the life course.

Results/findings: Analyses revealed three distinct developmental trajectories for both BMI and physical activity. A ‘normative’ (85.9%), chronic overweight (5.5%) and a stabilizing trajectory (8.6%) for BMI and a stable low (55.8%), a slowly decreasing (32.7%) as well as a steeply decreasing trajectory (11.5%) for physical activity. ‘Unfavorable’ BMI trajectories did not necessarily co-occur with ‘unfavorable’ physical activity trajectories, although some overlap was visible. More favorable health behaviors tended to co-occur over time, especially for males (94% overlap) compared to females (83% overlap).

Conclusions: Dual trajectory models provide a unique perspective on the changing relationship between health behaviors throughout the life course, but should be applied with caution. At the conference, we will present opportunities and challenges of these models in order to bring valuable insights to physical activity and behavioral nutrition research.
Weight status and self-rated health: associations with lifestyle profiles in European adults (The SPOTLIGHT project)

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SIG: Policies and environments

Awards: No

Objective. Few studies have considered the combined effects of lifestyle factors on weight and health outcomes. This study aimed to identify profiles of lifestyle behaviors (physical activity, sedentary behaviors, dietary habits, sleep duration, alcohol consumption and smoking) and their associations with BMI and self-rated health in adults.

Methods. A total of 6,037 adults were enrolled in SPOTLIGHT, a cross-sectional study conducted across 60 urban neighborhoods in 5 European regions (in Belgium, France, Hungary, the Netherlands, and United Kingdom) during February and September 2014. Data on socio-demographics, sleep duration, smoking, alcohol consumption, dietary habits (fruit, vegetable, sweets, fast-food, and sugar-sweetened beverages consumption), sitting time (while travelling, watching television, using a computer and doing other leisure time activities) were collected by questionnaire. Transport-related and leisure time physical activity were also documented. In addition, participants assessed their general health through a visual analogue scale (from 0 ‘very unhealthy’ to 100 ‘very healthy’), and reported their height and weight. Recursive partitioning trees were performed to identify subgroups of participants that varied in terms of lifestyle behaviors related to their BMI and self-rated health.

Results. About 44% of the participants were men. Mean (SD) age was 51.8 (16.4) years. Mean BMI was 25.2 (4.5) kg/m², and 12.8% of adults were obese. Participants self-rated their general health at 69.6 (19.7)% on average. Among all candidate lifestyle variables, sitting while watching television, sitting while using a computer, leisure time physical activity, vegetable intake, sleep duration, and smoking status appeared to be key factors for splitting the data into homogeneous groups regarding to BMI and self-rated health levels. A distinct lifestyle profile was found for participants who had the highest BMI. They were more sedentary while watching television and using a computer, slept short and ate few vegetables. Poor self-rated health was observed in participants who had low levels of leisure-time physical activity and who slept for a short duration.

Conclusions. Using the recursive partitioning tree approach, specific lifestyle groups associated with weight status and self-rated health were identified. A better understanding of clustering of lifestyle factors may assist in targeting public health strategies aimed at tackling obesity.
Factors associated with obesity related health risk among Bangladeshi migrants in UK

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Durham University, Durham, UK

SIG: Socio-economic inequalities

Awards: Yes, for the Early Career Award**

Factors associated with obesity related health risk among Bangladeshi migrants in UK

NASIMA AKHTER1, PAPREEN NAHAR2, KHURSHIDA BEGUM2, GILL COOPER2, ADETAYO KASIM1 and GILLIAN R. BENTLEY1,2.

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Objectives: South Asians face greater challenges of obesity with increased risks for diabetes and cardiovascular diseases (CVD). Migrant communities with financial and acculturation pressures are at higher risk of developing obesity and non-communicable diseases. Although health risk of obesity varies among ethnic groups, its assessment is not straightforward. Estimation of obesity related health risk and identifying factors associated with it among migrant Bangladeshi in the United Kingdom (UK) could facilitate health policies and targeted interventions.

Methods: We analysed data from 538 Bangladeshis living in the UK as part of a larger study on acculturation and health. The UK National Institute for Health and Clinical Excellence (NICE) suggested using both body mass index (BMI) and waist circumference (WC) to identify those who are at increased health risk. Internationally, BMI of >25kg/m2 and >=30kg/m2 is considered overweight and obese, respectively. For WC, >94 cm in male and >80cm in female are considered high. We estimated NICE indicator for BMI & WC combined prevalence of health risk and used a logistic regression model to identify factors significantly associated with this risk. We hypothesized that female Bangladeshis; those with financial difficulties, less acculturated and inactive groups will be at increased health risk.

Results: About 55% of Bangladeshis were overweight or obese (BMI >25kg/m2), whereas 64% had raised waist circumference. Combining both indicators, about 46% had increased health risk. Health risk was significantly high among females, those with financial struggle and those with higher educational status (P<01), but did not vary by diet or acculturation index. Walking 20 minutes on a regular basis and involvement in regular physical activity/ sport was negatively associated with obesity related health risk in this population (P<0.05).

O.09.1

**Family Conflict and Chaos: Impacts on Weight-Related Behaviors**

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**SIG:** Children and families

**Awards:** Yes, for the Early Career Award**

Objective: This study examined how weight-related behaviors (diet, physical activity, and sleep) differed in mothers and their preschool children by levels of family conflict and household chaos and disorganization.

Methods: A nationally representative sample of mothers of preschoolers completed an online survey assessing weight-related behaviors of themselves and their children. Maternal diet was assessed via Block Fruit/Vegetable/Fiber and Fat screeners, child beverage intake via a modified food frequency questionnaire, mother and child physical activity via a shortened International Physical Activity Questionnaire (IPAQ), and mother and child sleep via the Pittsburgh Sleep Quality Index. Family conflict (FC) among family members was rated with the 5 item, 5-point Family Conflict and Cohesion subscale (Family Environment Survey) and household chaos (HC) with a 3 item, 5-point scale adapted from the Confusion, Hubbub, and Order Scale (CHAOS). Mothers were assigned to these groups based on their FC and HC score tertiles: Low-FC/Low-HC (bottom tertile for both measures, n=68); Low-FC/Moderate-High HC (bottom FC and middle and top HC tertiles, n=75); Moderate-FC/Any-HC (middle FC and all HC tertiles, n=173); High-FC/Low-Moderate HC, (top FC and middle and bottom HC tertiles n=85); and High-FC/High HC (top tertile for both, n=149). One-way ANOVA assessed differences among FC/HC groups and mother and child behaviors.

Results: Participants (n=550) were 72% white and 37% had a baccalaureate degree or higher. High-FC/High-HC mothers tended to have more food insecurity, lower affluence levels, poorer health, and children with poorer health (p<0.001). Mothers with High-FC/High-HC also had significantly more body dissatisfaction and fewer family meals compared to Low-FC/Low-HC. High-FC/High-HC mothers consumed significantly fewer fruits/vegetables, fiber, magnesium, and potassium than Moderate-FC/Any-HC or High-FC/Low-Moderate HC mothers (p<0.001). No differences occurred among FC/HC groups and maternal BMI, fat intake, maternal IPAQ scores, or sleep duration. Both maternal and child sleep quality was higher in families with High-FC/High-HC. Analysis of child BMI percentile, sugar-sweetened beverage intake, IPAQ, and sleep duration showed few differences across FC/HC groups.

Conclusion: Family conflict and household chaos is associated with weight-related behaviors linked to excess weight gain. This frequently overlooked component of family interaction may affect intervention outcomes and objectives of educational initiatives.
The influence of parental modelling on children’s physical activity and screen time: Does it differ by gender?

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: To investigate associations between parent and child physical activity and screen time behaviours, including differences by parent and child gender.

Methods: The sample comprised 3471 schoolchildren and their parents recruited through the UP4FUN project (child mean age: 11.2±0.8 years, 52% boys, 83% mothers). Data was collected in September 2011 in five European countries: Belgium, Greece, Hungary, Germany and Norway. Child and parent surveys were used to assess physical activity (participation in sports, outdoor activities, walking and cycling for transport) and screen time (TV/DVD viewing, computer/games use) in children and their parents. Multilevel multivariate regression was applied to assess associations between parent and child physical activity and screen time.

Results: Parents’ participation in sport, outdoor activities, walking/cycling for transport, TV/DVD viewing and computer/games use were positively associated with children’s corresponding behaviours (p < 0.001). Analyses by parent gender however showed that maternal, but not paternal, participation in sport, outdoor activities and walking for transport were positively associated with children’s corresponding behaviours (p < 0.001). In contrast, both maternal and paternal TV/DVD viewing and computer/games use were positively related to children’s engagement in these screen-based activities (p < 0.01). Further analyses by child gender revealed that mothers’ role modelling of outdoor activities significantly predicted outdoor activities in girls (p < 0.001), but not in boys. In contrast, fathers’ role modelling of TV/DVD viewing and computer/games use significantly predicted these screen-based behaviours in boys (p < 0.001), but not in girls.

Conclusions: Parental modelling of physical activity and screen time may influence children’s engagement in these behaviours. Maternal modelling of sport, outdoor activities and active transport may positively influence children’s participation these physical activities. Both maternal and paternal modelling of TV/DVD viewing and computer/games use may lead to higher screen use in children. The influence of parental modelling appears to be stronger in parent-child pairs of the same gender. Hence, family-based interventions to improve physical activity and screen time in children may be more effective when both mothers and fathers model recommended levels of physical activity and screen time.
Overt and Covert Food-Related Parenting Practices: Associations between an expanded conceptualization of food-related parenting practices and child dietary intake and weight outcomes.

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: Parents are advised by healthcare professionals to avoid controlling food-related parenting practices (pressure to eat, food restriction) to promote healthy dietary intake and weight among children; however, the evidence is inconclusive on the effectiveness of this recommendation. Inconsistent results may stem from an oversimplification of the concept of food-related parenting practices. The present study explores associations between child dietary intake and weight and an expanded conceptualization of food-related parenting practices, specifically markers of overt control (detectable by the child) and markers of covert control (not detectable by the child).

Method: Based on Social Cognitive Theory/ ecological framework, the randomized controlled trial, Healthy Home Offerings via the Mealtime Environment (HOME Plus), promoted healthy eating behaviors with parents and their 8-12 year old children (n=160). Baseline HOME Plus data were used to test associations between markers of overt control (pressure-to-eat, food restriction) and covert control (parent modeling of healthful eating, home food availability) and health outcomes (fruit and vegetable intake, healthy eating index dietary quality, child body mass index) using multiple linear regression, with and without adjustment for parental education. Overall variance explained by covert and overt constructs was calculated.

Results/findings: Overt control: In models adjusted for parental education, both food restriction and pressure-to-eat were significantly associated with child BMIz (β=-0.05; SE=0.02; p<0.01 and β=0.02, SE =0.01; p=0.01, respectively), but not with dietary outcomes. Covert control: In models adjusted for parental education, an obesogenic home food environment was significantly and inversely associated with BMI z-scores (β=-0.02, SE=0.01; p=0.04). The covert marker of parent modeling of healthful eating was not significantly associated with dietary or weight outcomes. Total Variance: Greater total variance in child BMI-z was explained by overt control practices, whereas covert control practices contributed to greater total variance for both dietary outcomes.

Conclusions: Including a construct of food-related parenting practices with separate markers for overt and covert control should be considered for future research. These concepts address different forms of parental control and, in the present study, yielded unique associations with child dietary and weight outcomes. Additionally, the role of parent education in observed associations should be explored further.
Measuring family co-participation in physical activity: a narrative review

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Purpose
The family environment is a key influence on children's physical activity (PA). Parents, for example, may support their child's PA through modelling, encouragement, or co-participation. Little is known about the prevalence or correlates of family co-participation in PA, or its contribution to family members' PA. To first establish how best to measure family co-participation in PA, the current review aims to provide an overview of the existing measures of co-participation, evaluate their psychometric properties and identify current gaps in the measurement literature.

Methods
A dual search strategy was performed including 1) a formal literature search in four electronic databases, and 2) an informal, snowball approach of contacting relevant research groups and cross-referencing relevant reviews. Measures were included if they assessed family co-participation in PA which was defined as joint physical activities including at least 1 child and 1 other family member, e.g., parent/guardians, siblings, cousins. Titles and abstract were screened in duplicate. Key data regarding type of measure, study population and psychometric properties of the measures was extracted.

Results
Seven different types of measures assessing co-participation were identified among 94 studies. Questionnaires using multiple (≥2) items were most frequently used (N=47), followed by 1-item questionnaires (N=39). Variation among questions was limited and they predominantly assessed frequency of co-participation. When assessed, reliability and internal consistency of the questionnaires was generally high. Less commonly applied methods were diaries (N=1), event history calendars (N=1), Ecological Momentary Assessment (EMA) (N=3), accelerometry (N=1) and combined accelerometry and Global Positioning Systems (N=2). In addition to frequency, these measures typically captured duration and intensity of co-participation. Measures were used across all ages, but most focused on assessing co-participation among primary school aged children.

Conclusion
This review demonstrates that whilst a large number of studies attempt to measure family co-participation in PA, only few do so using comprehensive assessments. Future work should focus on developing comprehensive and consistent measurements of co-participation, which will help improve our understanding of family-based PA, its contribution to all family members' activity levels, its determinants, and enable rigorous evaluation of family-based PA interventions.
Acquiring cooking skills at different life stages: association with diet quality, cooking skills, general health interest and creativity

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: The number of interventions to improve cooking skills (CS) with people of all ages has increased in recent years. However, it is unknown at what life stage these interventions are best delivered. The purpose of this study is to assess the diet quality, CS, general health interest (GHI) and food creativity of adults and their relationship to when people learn most of their CS.

Methods: A survey was completed by a nationally representative sample of 1049 adults aged 20-60 years living on the Island of Ireland. Participants were asked “At what stage of your life would you say you learned most of your CS?” in order to classify them as child learners (CL), teenage learners (TL) or adult learners (AL). They then completed measures in relation to their [1] diet quality (saturated fat and fibre intakes by the Dietary Instrument for Nutrition Education (DINE) questionnaire, eating choices index (ECI), frequency of take-away consumption and level of food preparation used in cooking), [2] CS (self-reported use of 18 cooking practices and confidence in using their mentioned practices), [3] GHI, and [4] creativity with food. Differences between CL, TL, and AL were compared by Chi-squared/ANOVA tests.

Results: [1] CL had a higher ECI score than TL (p<0.05). AL consumed a higher level of fibre than TL (p<0.001). There was no differences in saturated fat intake between groups (p=0.42). Compared to AL, CL and TL consumed take-away food less often (p<0.05) and were less likely to use pre-prepared ingredients when cooking (p<0.01). [2] TL had greater CS confidence than AL (p<0.001). CL and TL used more cooking practices than AL (p<0.01). [3] In addition, CL had a higher GHI than TL (p<0.05). [4] Further CL and TL were more creative (p<0.001) than AL.

Conclusions: Learning CS at a younger age had a significantly positive impact on some aspects of diet quality (frequency of takeaway consumption, level of food preparation), current CS and creativity. This highlights the importance of teaching CS at an early age, which could be implemented through the educational system.
Improving the diets of picky eaters: unexpected findings from an intervention study

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Purpose. Children who are picky eaters typically demonstrate poorer diet quality and resistance to dietary change. As such, they may be less likely to benefit from behavioral nutrition interventions; however, this has not previously been examined. This analysis tested the moderating effect of pickiness on the efficacy of a behavioral nutrition intervention among youth with type 1 diabetes.

Methods. Parent-youth dyads (N=136; youth age 12.4±2.5y, diabetes duration 8.9±3.1y, A1c 8.1±1.0, 31.6% pump) participated in an 18-month trial of a behavioral nutrition intervention integrating motivational interviewing, active learning, and applied problem-solving to increase intake of whole plant foods. Diet quality indicated by Whole Plant Food Density (WPFD, cup/oz equivalents per 1000 kcal of target food groups) and Healthy Eating Index-2005 (HEI2005, measures conformance to US dietary guidelines, ranges 0-100) were calculated from three-day youth food records completed by families every 3 months. Parents reported youth dietary pickiness every 6 months; youth in the top 50%ile at baseline were classified as "picky eaters". Mean WPFD and HEI2005 were estimated using population ratio method; standard errors were computed using jackknife variance estimation.

Results. Baseline diet quality was lower in picky (mean±SD WPFD=1.62±0.17 and 1.48±0.17, HEI2005=52.87±2.39 and 50.02±3.14 for intervention and control, respectively) than non-picky (WPFD=2.09±0.19 vs. 2.13±0.17, HEI2005=60.54±2.54, 60.79±2.36) eaters. There was no intervention effect on pickiness. Stratified analyses demonstrated an intervention effect across the study duration on WPFD (p=.003) and HEI2005 (p=.04) in picky eaters only. Among picky eaters, diet quality at 18-month follow-up in the treatment group improved (WPFD=2.08±0.16, HEI2005=61.92±3.43), while diet quality in the control group remained low (WPFD=1.26±0.16, HEI2005=53.34±2.45). In contrast, diet quality of non-picky eaters in both the intervention (WPFD=2.24±0.26, HEI2005=65.67±3.02) and control (WPFD=1.98±0.15, HEI2005=60.23±2.32) groups changed minimally. Testing for interaction of intervention group by pickiness on WPFD and HEI2005 did not reach statistical significance, possibly due to sample size being relatively small.

Conclusions. Contrary to our hypothesis, diet quality improved in picky eaters participating in this behavioral nutrition intervention trial, whereas there was no treatment effect in non-picky eaters. Findings suggest that the diet quality of picky eaters can be substantially improved without changing their underlying pickiness.
O.10.2

Engagement and retention of schools, children and their families in a cluster RCT of a novel obesity prevention intervention: The Healthy Lifestyles Programme (HeLP)

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SIG: Children and families

Awards: No

Purpose: Enhancing retention and engagement in a cluster RCT of a novel obesity prevention programme through meaningful stakeholder involvement in its design and delivery.

Background: Retention of participants is crucial for statistical power and internal and external validity and engagement is essential for behaviour change. However, most school-based interventions focus on programme content and employ specific standalone strategies (such as incentives) to improve retention rather than embedding the building of supportive relationships with all participants within the intervention to foster engagement and retention. This has resulted in poor retention rates and low levels of engagement.

Methods: The Healthy Lifestyles Programme was developed using intervention mapping and involved extensive stakeholder involvement in both the design of the trial and the intervention to ensure that (i) delivery methods were suitably engaging, (ii) deliverers had the necessary skills and qualities to build relationships and (iii) the intervention dovetailed with the National Curriculum. HeLP is a year-long intervention consisting of 4 multi-component phases (including creating a receptive environment, drama activities, goal setting and reinforcement activities) using a range of delivery methods. We recruited 1324 children from 32 schools from the South West of England to a cluster randomised controlled trial to determine the effectiveness of HeLP in preventing obesity. The primary outcome is change in body mass index standard deviation score (BMI SDS) at 24 months post-randomisation. Secondary outcomes include additional anthropometric and behavioural (physical activity and diet) measures at 18 and 24 months.

Results: Anthropometric and behavioural measures were taken on 100%, 96% and 94% of children at baseline, 18 and 24 months respectively, with no differential follow up between the control and intervention groups at each time point. All children participated in the programme and 92% of children and 77% parents across the socio-economic spectrum engaged with HeLP.

Conclusions: We attribute our excellent retention and engagement results to the high level of stakeholder involvement in the design of the trial and the intervention and a focus on relationship building using appropriate personnel and innovative and creative delivery methods that are accessible to children and their families across the social spectrum.
**O.10.3**

**Translating a multi-disciplinary family-focused childhood weight management programme to real-world settings: Barriers and facilitators for success**

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**SIG:** Children and families

**Awards:** Yes, for the Student Competition*

**Purpose**

Research suggests that community-based family-focused weight management programmes that incorporate physical activity, diet and behavioural components can be effective in treating paediatric obesity. However, the majority of these programmes are small, feasibility trials whose findings have yet to be replicated in the real-world context. This study explores the barriers and facilitators experienced by those implementing a government-funded, multi-component childhood weight management programme in the community.

**Methods**

Semi-structured interviews were conducted with a purposive sample of 28 stakeholders responsible for referring to or implementing the programme including professionals from dietetics, clinical psychology, public health nursing, physiotherapy, and health promotion. Interviews were audiotaped, with participants' informed consent and transcribed verbatim. Framework analysis was used to identify barriers and facilitators which were then mapped onto six levels of influential factors outlined by Grol and Wensing: the innovation, the individual professional, the patient, the social context, the organisational context, and the external environment. This framework describes how barriers and facilitators can be identified, categorised, and used for the development of tailored-based implementation strategies to facilitate desired change.

**Findings**

Most perceived barriers occurred at the level of the social and organisational context while the majority of facilitators were at the level of the individual professional. For all participants, barriers arose due to the multi-disciplinary nature of the programme, including the lack of role clarity, lack of understanding of other disciplines as well as the added complexities of working in different locations. Participants' recognition of the need for a programme and their own personal interest in the area were the main drivers behind implementation while the provision of incentives and presence of supportive colleagues were further enabling factors.

**Conclusion**

This study highlights the complexities associated with implementing multi-disciplinary childhood weight management programmes in the community setting from a wide range of stakeholder perspectives. Our results suggest that the assignment of clear roles and responsibilities, the provision of sufficient training and resources as well as organisational support play pivotal roles in overcoming barriers to change. This evidence should be used when developing implementation plans to support the translation of efficacious interventions into real world settings.
O.10.4

The “Healthy Habits, Healthy Girls – Brazil” randomized controlled trial: did the girls improve weight status and health behaviors after 6-month follow-up?

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose: to evaluate the 6-month impact of a school-based obesity prevention program among adolescent girls from São Paulo, Brazil. Methods: The “Healthy Habits, Healthy Girls – Brazil” was a school-based randomized controlled trial with 253 (mean age 16.05; standard error 0.05 years) adolescent girls attending 10 governmental schools in São Paulo, Brazil. It was based on the Social Cognitive Theory. Details of the study design, protocol and baseline results are published elsewhere. Moreover, the study are registered in the clinicaltrials.gov platform and reported according to the CONSORT checklist. The primary outcome was Body Mass Index (BMI) and secondary outcomes were BMI z-score, waist circumference, and self-report dietary intake, physical activity and recreational screen-time. Data were collected in 2014-2015 and analyzed in 2015. Data were checked for normality and those that were not normally distributed were log or square root transformed. Linear mixed model adjusted for the nature of the data (i.e., school) was used to evaluate the intervention impact. Analyses followed the intention-to-treat principles and were conduct in SPSS (version 21.0 Mac OS) with significant levels set at p≤0.05. Results: After 6 months, there was no intervention effect for the primary outcome (BMI) (adjusted mean difference -0.24kg/m² standard error, 0.17, p=0.288). However, there were intervention effects on weight (-0.97kg, 0.41, p=0.033) and waist circumference (-2.75cm, 0.76, p=0.000). Also, significant changes were found on the milk, cheese and yogurt (0.33 serving/day, 0.33, p=0.04) and the sweets and sugar groups (-1.25 serving/day, 0.49, p=0.008). Proportional differences favoring the intervention girls were found at follow-up for light (p=0.029), moderate (p=0.002) and vigorous (p=0.004) physical activity. There were no changes for recreational screen-time activities. Conclusion: The Healthy Habits, Healthy Girls – Brazil intervention did not result in significant effects on the primary outcomes. However, changes favoring the intervention girls were found for dietary and physical activity behaviors. Further studies with adolescent girls from Brazil and other low and middle-income countries should focus on more intensive strategies of nutrition, physical activity and recreational screen-time behaviors to prevent unhealthy weight gain.
Development and pilot testing of iChoose: A community-based participatory adaptation and implementation of an evidence-based childhood obesity intervention.

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SIG: Children and families

Awards: No

Objectives: The efficacy and maintenance effects of childhood obesity treatment interventions are promising, but little evidence exists that suggest these approaches are being implemented in typical practice settings. Even less is understood about the translation of such programs into low resource community settings that bear a disproportionate burden of obesity. The goal of this study was to describe a community-based participatory (CBPR) adaptation and testing of an evidence-based childhood obesity treatment program in a medically underserved area.

Methods: A quasi-experiment with a focus on the feasibility of an adapted evidence-based childhood obesity intervention (biweekly family sessions, telephone support calls, and newsletters; exercise sessions 2x/week) for local implementation by a community-academic partnership. Eligible children were 8-12 years old, BMI z-score >85%. The local health department and regional pediatric providers identified potential participants using existing medical records. The RE-AIM planning and evaluation framework was used to guide the study and we included individual level assessments of reach (proportion and representativeness of potential participants), effectiveness (program completion BMI z-score changes), and short-term maintenance (BMI z-score changes 3 months post program completion) as well as staff level implementation quality (proportion of objectives achieved across intervention sessions). Physical activity (PA), fruit and vegetable intake (FV) and sugar sweetened beverage (SSB) intake were also assessed.

Results: 557 eligible children were identified and 101 children were enrolled (18% participation rate). Overall, children who enrolled in the program were not significantly different from those that did not enroll for age, gender, ethnicity, and race. BMI z-scores (1.89±0.48 to 1.87±0.49, p=0.04) were reduced post program, but were not maintained (1.92±0.51 to 1.87±0.49). PA, FV and SSB followed a similar pattern. Implementation fidelity averaged 97%, 98%, and 84% across family sessions, telephone support, and exercise sessions respectively. Implementation fidelity did not differ between community or research delivery agents.

Conclusions: The resultant program was successful in initiating changes in child BMI z-scores, could be implemented in a low resource community with fidelity, but was insufficient to lead to sustained child BMI z-scores. In response to these data, maintenance of program effects and delivery are the current focus of the CBPR team.
Longitudinal Physical Activity Studies
A longitudinal investigation of a multidimensional model of social support and physical activity over the first year of university

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objective: Declines in physical activity participation occur during the transition from high school to university. Lack of social support is a reported barrier to physical activity within this transitional period. However, research is lacking adopting a multidimensional examination of the type of social support that is important for this target population. The purpose of this study is examine the associations between multiple social support dimensions (structural, functional and perceptual) and moderate-to-vigorous aerobic physical activity (MVPA) and strength training during three time points across the first year of university.

Methods: A prospective cohort of undergraduate students at a Canadian university (64% female) completed a self-report survey at three time points: at the beginning (N = 819) and near the end (N = 265) of their first year in university, and at the beginning of their second year (N = 190). Structural (number of family and friends), functional (support received), and perceptual (perceived support) dimensions of social support, and MVPA and strength training were assessed using valid and reliable measures (Craig et al., 2003; Cutrona & Russell, 1987; Rees et al., Hardy et al., 2007; Sabiston & Crocker, 2008; Sallis et al., 1987). Linear mixed modeling was used to assess the association between social support dimensions and physical activity behaviours across the first year of university, controlling for mother’s education, ethnicity, gender, living situation, relationship status and body mass index.

Results: Both the structural (support networks of family and friends), and the functional (support received from friends and satisfaction with tangible support received) social support dimensions at each time point were significantly positively associated with both MVPA and frequency of strength training (p = 0.00 to 0.003).

Conclusions: Social support from both family and friends may be important for first year university students’ physical activity participation. Based on these findings, university active living initiatives should be developed to foster multiple dimensions (structural and functional) of social support for increased MVPA and strength training participation.
‘Physical activity location and intensity across the school year: a mixed methods study.’

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SIG: Children and families

Awards: Yes, for the Student Competition *

Objective: Global Positioning Systems (GPS) monitoring shows promise as a method to improve understanding of how the built environment influences physical activity behaviours. This mixed methods study aims to measure PA location and intensity across the school year, as well as establishing why and how young people use these locations and the built environment for PA.

Methods: Participants were 112 9-13 year olds attending a West Midlands (UK) school. Participants wore GPS and heart rate (HR) monitors to identify the location and intensity of PA each school term. A sub-sample of students took part in focus groups to establish reasons for and barriers to PA. HR data was analysed according to sedentary behaviour, and moderate to vigorous physical activity (MVPA) over four days. GPS data was analysed by identifying PA location. Location zones were categorised as: home, on foot, motorised transport, school, outdoors and indoors. A thematic approach was used to analyse focus group data.

Results/Findings: HR data indicated that mean time spent in MVPA was 309 (±583) minutes for term 1 (Autumn), 255 (±611) minutes for term 2 (Winter) and 256 (±670) minutes for term 3 (late Spring/Summer). Mean sedentary time was 1046 minutes (±1149) for term 1, 648 (±817) minutes for term 2 and 762 (±996) minutes for term 3. Emergent themes from focus groups were facilities, location, enjoyment, family/friends influence and seasonal differences. ‘If it’s in the winter, some people don’t have motivation because it’s quite cold and dark’; ‘I used to go to the astro-turf because it was good weather but now it’s kind of cold so I just kind of stay in the car park where it’s near my house.’

Conclusions: Children were found to spend more time in both MVPA and sedentary behaviour during summer and autumn months and differed in their use of the environment at different times of year. In practice, this informs the need for interventions to target winter months to increase levels of MVPA in children, and target summer/autumn months to reduce sedentary behaviour. Future research could combine environmental factors and seasonal differences to promote PA.
Longitudinal changes and gender differences in objectively measured physical activity and sedentary time during puberty among Finnish children

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: This study determined the changes and gender differences in objectively measured physical activity and sedentary time during puberty. Methods: The study population consisted of children from 9 schools throughout Finland who participated in a 2-year follow-up study. At baseline, children were in grades 4-7 (ages 10-13). Five times during the follow-up period, participants' physical activity was monitored objectively for 7 consecutive days using hip-worn accelerometers (ActiGraph GT3+). The main outcomes were the daily time spent in moderate to vigorous physical activity (MVPA) (> 2295 cpm) and sedentary time (< 100 cpm). Preliminary results were analysed for 288 children, 121 boys and 167 girls, who had valid ActiGraph data at baseline and the 5th follow-up in spring 2013 and 2015, respectively. Results: During the 2-year follow-up period, MVPA decreased an average of 3.7 min/day, from 51.2 to 47.5 min/day (p< 0.001), with a greater decline in boys than girls (8.1 vs. 0.5 min/day; p< 0.001). Sedentary time increased on average 0.6 h/day, from 9.0 to 9.6 h/day, with no significant gender differences. At baseline, boys had 4.6 min/day more of MVPA (p<0.001) and 0.4 h/day less of sedentary time (p=0.024) than girls, but 2 years later, no significant gender differences were observed. Conclusions: Boys' advantage in childhood physical activity levels seems to vanish during puberty because of greater unfavourable behaviour changes than among girls.
Life-long physical activity trajectories and their determinants

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SIG: Policies and environments

Awards: No

Purpose: Modeling longitudinal trajectories of physical activity and identifying the determinants affecting the trajectories is crucial for effective and customized physical activity promotion. We identified physical activity trajectories from childhood to adulthood and their determinants in a large longitudinal population-based cohort.

Methods: This study is a part of the ongoing Cardiovascular Risk in Young Finns Study. Altogether 3,596 randomly selected children and adolescents (aged 3-18 years) participated at baseline. The cohort has been followed-up for 31 years (1980-2011) in 3-9 year intervals. Physical activity indexes were formed at baseline and all follow-up studies based on self-reported data on frequency, duration and intensity of physical activity as well as on sports club participation. Group-based trajectory modeling approach was used to model the physical activity trajectories from childhood to adulthood among subjects having at least one physical activity measurement from childhood/adolescence and one from adulthood (n=2836). Socioeconomic and demographic factors were queried and analyzed to characterize the childhood (at age 12 years), early adulthood (at age 24 years) and early midlife (at age 37 years) determinants associated with each trajectory group.

Results: Based on the data-driven analyses, we identified five physical activity trajectories: 1) persistently active (7.3%), 2) decreasingly active (13.9%), 3) increasingly active (14.6%), 4) persistently low active (49.6%), 5) persistently inactive (14.6%). Success at school, high educational level and healthy lifestyle choices (i.e. non-smoking and at most moderate alcohol drinking) associated with persistently active and increasingly active groups. Simultaneously, low educational level, smoking and living in rural surroundings associated with persistently inactive, low active and decreasingly active groups.

Conclusions: Our study introduces physical activity trajectories describing the longitudinal physical activity paths from childhood into adulthood. Information on the natural course of physical activity trajectories and the determinants of these trajectories is essential to the development of effective strategies to promote physically active lifestyle among those persons who are inactive or low active in childhood/youth. Additionally, the results may be exploited to maintain the active lifestyle into adulthood among those already active in childhood/youth.
Does physical self-concept mediate the relationship between motor abilities and physical activity in adolescents and young adults?

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**SIG:** Theories of motivation

**Awards:** Yes, for the Early Career Award**

**Purpose:** The purpose of this study is to examine the reciprocal relationship between motor abilities and physical activity and the mediation effects of motor ability self-concept in this relationship using longitudinal data. We expect that the effects of motor abilities on physical activity are rather indirect via motor ability self-concept and that the effects of physical activity on motor abilities are rather direct without involvement of the motor ability self-concept.

**Methods:** Data were obtained from the Motorik-Modul (MoMo) Longitudinal Study in which 335 boys and 363 girls aged 11-17 years at Baseline were twice examined in a period of six years. Physical activity was assessed by the MoMo Physical Activity Questionnaire for adolescents, motor ability self-concept by Physical Self-Description Questionnaire and motor abilities by MoMo Motor Test. Hierarchical multiple regression analyses were used to analyse the mediation effects.

**Results:** The results of the hierarchical multiple regression analyses show that the effects of motor abilities on physical activity were fully mediated for the dimensions strength, coordination, and flexibility. For the dimension endurance, neither direct nor indirect effects were significant. In the opposite direction, the effects of motor abilities on physical activity were partially mediated by self-concept in the dimensions strength and coordination. For the dimensions endurance and flexibility, only indirect effects were significant.

**Discussion:** The results of this study largely support the assumption that the effects of motor abilities on physical activity are not direct but rather mediated by self-concept. Self-concept seems to be an important determinant of adolescents’ physical activity.
O.12.1

The effect of complex workplace dietary interventions on employees’ dietary intakes, nutrition knowledge and health status: a cluster controlled trial

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Objective: Although the workplace is a potentially important setting to influence dietary intakes, evidence on effective interventions is limited. This study assessed the comparative effectiveness of a workplace environmental dietary modification and an educational intervention of high intensity both alone and in combination versus a control workplace on employees’ dietary intakes, nutrition knowledge and health status.

Methods: In the Food Choice at Work cluster controlled trial, four large, purposively selected manufacturing workplaces were allocated to control (N=111), nutrition education alone (Education)(N=226), environmental dietary modification alone (Environment)(N=113) and nutrition education and environmental dietary modification (Combined intervention) (N=400). Nutrition education included: group presentations, individual consultations and detailed nutrition information (traffic light menu-labelling, posters, leaflets and emails). Environmental dietary modification included: menu modification (restriction of fat, saturated fat, sugar and salt), increase in the availability of fruit and vegetables, price discounts for fruit, strategic positioning of healthier alternatives and portion size control. Data on dietary intakes (24-hour dietary recalls), nutrition knowledge (validated questionnaire tool), body mass index (BMI), waist circumference and blood pressure were obtained at baseline, follow-up at 3-4 months and 7-9 months. Analysis of covariance was used to compare changes between baseline and follow-up across the four groups with adjustment for age, gender, educational status and other baseline characteristics.

Results: Follow-up data at 7-9 months were obtained for 541 employees (64% of 850 recruited) aged 18-64 years as follows: Control: 70(63%), Education: 113(50%), Environment: 74(65%) and the Combined intervention: 284(71%). There were significant positive changes in intakes of saturated fat (p=0.013), salt (p=0.010) and nutrition knowledge (p=0.034) between baseline and follow-up in the combined intervention versus the control workplace in the fully adjusted multivariate analysis. Small but significant changes in BMI (-1.2kg/m²(95%CI -2.385, -0.018, p=0.047) were also observed in the combined intervention. No significant changes in dietary fibre intake, waist circumference and blood pressure were observed. Effects in the education alone and environment alone workplaces were smaller and generally non-significant.

Conclusion: The combination of nutrition education and environmental dietary modification of high intensity may be an effective approach to the promotion of a healthy diet and weight loss in workplace settings.
O.12.2

Weight control attempts in adults: a systematic review and meta-analysis

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: To summarise the available epidemiological data on the prevalence of weight loss and weight maintenance attempts among adults worldwide, and to provide a comprehensive description of the strategies used and the reasons behind these attempts.

Methods: Scientific articles were identified through electronic databases searches (e.g., PubMed) and reference scanning. Epidemiological/observational studies were eligible for inclusion if they reported current weight control attempts in samples of adults (≥18 years). The Joanna Briggs Institute data extraction form for prevalence and incidence studies was used to extract relevant information. Study methodological quality was assessed using a short version of The Joanna Briggs Institute critical appraisal checklist for studies reporting prevalence data.

Results: Fifty-three studies met eligibility criteria. Pooled estimates for the prevalence of weight loss and weight maintenance attempts were, respectively, 40.4% (Q=31320, p<0.001; I²=99.8%) and 26.9% (Q=5709, p<0.001; I²=99.8%). Analysis of only the last 15 years shows a prevalence of weight loss attempts of 46.9% (Q=11681, p<0.001; I²=99.8%). Excluding studies with methodological limitations led to negligible changes in the overall prevalence estimates. There were significant differences between geographic regions (Q=11005, p=0.012), with the highest overall prevalence found in North America (43%) and the lowest in Europe (31.4%). Increases in the prevalence of weight loss attempts were associated with (1) the year of the survey (from 1975 to 2012; b=0.04, SE=0.005; z=7.964, p<0.001), (2) higher prevalence of overweight and obesity (b=0.01, SE=0.002; z=7.249, p<0.001), and (3) higher percentage of women in the samples (b=0.01, SE=0.003; z=2.266, p=0.02). Across studies, the most frequently used strategy for trying to control weight was “adopting a healthier diet”. “To improve wellbeing” and “to improve general health” were the main reported reasons for trying to lose and maintain weight, respectively.

Conclusions: To our knowledge, this is the first systematic review to investigate weight control attempts worldwide. Key strategies and reasons associated with weight control were identified, suggesting that these can be taken into account in future public health initiatives aiming to promote and support healthy weight control. In order to better capture prevalence shifts, surveillance systems with standardized instruments should be scheduled, to facilitate comparability of results.
Engaging Families in Weight Management

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SIG: Children and families

Awards: Yes, for the Student Competition*

PURPOSE: Approximately 50% of families who initiate a weight management programme (WMP) will not complete. It is fundamental to understand why participants initiate and complete a programme, and to ensure that programmes are effectively designed and delivered. This study examined the reasoning for family (young person and parent) engagement in three different and diverse WMPs.

METHODS: A multiple instrumental case study approach was employed. Three community-based WMPs participated: MoreLife, SHINE, and Weigh to Go. Clear design and implementation differences existed between WMPs. Multiple WMPs were recruited to examine the generalisability of research findings, and extract key features associated with participant engagement. Thirty families took part (~10 per programme). Data were collected early in the programme (0-2 weeks) and immediately after completion or dropout (within two weeks). Young people took part in a Participatory Action Research (PAR) session (interactive activities to generate meaningful information), and parents completed semi-structured interviews. A deductive line of inquiry was used; questions were based upon participant characteristics, environmental interactions, psychological processes and programme interactions. Interview data was transcribed verbatim and analysed alongside the PAR data using content and thematic analysis (themes presented in italics).

RESULTS: Preliminary findings indicate that families often engage in a WMP for non-weight related reasons. Such reasons include: management of mental health, to improve self-esteem, and to create friendships. Families remain in a WMP when: the programme suits their needs, they fit in amongst other participants, strong relationships are fostered with staff, and have strong support networks. Numerous families completing programmes prioritised WMP attendance above other leisure activities, and had plans in place to ensure they could attend each session. Low engagement was due to situational factors (e.g. logistic barriers [transport, timing...]) rather than programme dissatisfaction.

CONCLUSIONS: Families attend community-based WMPs for reasons beyond weight management. Additionally, the families identified unique WMP features (e.g. maintenance programmes and non-clinical staff) which encourage programme attendance. Such features can be replicated in multiple, diverse settings. Understanding participant engagement is critical to designing and implementing efficacious WMPs.
O.12.4

Life after FFIT: do men in a weight management programme delivered through elite football clubs sustain change long term?

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: Male obesity is rising but few men take part in existing weight management programmes, and evidence on long-term weight loss in men is limited. The Football Fans in Training (FFIT) is a group-based, 12 week, gender-sensitised weight management and healthy lifestyle programme delivered to men aged 35-65 years with BMI at least 28 kg/m² at professional football clubs by trained club community coaches. It works with prevailing cultures of masculinity to teach men evidence-based behaviour change techniques in an attractive, supportive and valued environment.

We conducted a two arm, stratified, individually Randomised Controlled Trial (RCT) of FFIT in 2011-12. At 12 months, mean intervention group weight loss was 4.96% (95%CI: 4.20–5.71) in the intervention group (N=374) and 0.52% (0.03–1.00) in the comparison group (N=373) (p <0.0001). The comparison group were able to undertake the FFIT programme under non-research conditions in 2012 after completing 12-month measurements. The aim of the current study was to investigate long-term weight loss trajectories in both groups.

Methods: A longitudinal cohort follow-up of RCT participants 3.5 years (intervention group) or 2.5 years (comparison group) after participation in FFIT. The study population was 665 (of 747) men in the RCT who consented to post-RCT follow up. The primary outcome was objectively-measured weight. Secondary outcomes included self-reported physical activity, diet, self-esteem, affect and health-related quality of life.

Results: We followed up 488 (intervention group, N=233; comparison group, N=255) men (65.3% of 747 in RCT population; 73.4% of 665 who agreed to follow up after the 12 month RCT measures). Those followed-up were more likely to be older, in paid work and with lower baseline BMI. Both groups of FFIT participants demonstrated significant reductions in weight from baseline. Mean weight loss was 2.52% (1.60-3.45) in the intervention group and 2.36% (1.41-3.31) in the comparison group (p =0.7266). Significant long-term improvements in secondary outcome measures were also observed.

Conclusions: We have demonstrated that FFIT helps men achieve significant long-term weight loss, both those who undertook FFIT under research conditions (the intervention group) and in routine deliveries (the comparison group) a year later.
Evaluation of the uptake of voluntary calorie posting on menus in Ireland

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Objective: International literature suggests that menu calorie posting has the potential to reduce the prevalence of obesity by encouraging people to make healthier food choices through informed consumer decisions. The aim of this evaluation was to investigate the uptake of voluntary calorie posting in Ireland to inform any further action that might be undertaken by policy makers in this regard.

Methods: A national telephone survey was conducted with a representative sample of Irish food service businesses (N=604) (N=2,308 when the number of outlets within each business was considered). Data obtained was verified through structured observation visits (N=80). Data on the (a) structure of the food outlet (type of food outlet, service provided, customer point of order etc.) and (b) delivery/non delivery of the calorie content (reasons for display/non display, location of display, methods used to calculate calories etc.) were obtained during the telephone survey and the structured visits were conducted to observe the visual application of menu calorie posting. Data was analysed using the Statistical Package for the Social Sciences (SPSS) software, version 21 and was assessed according to business category and display/non display of calorie information.

Results: A total of 7% of food businesses reported displaying calories on their menus (this percentage was primarily reliant on chain businesses and poorly reflected in single outlet owner establishments). Of those displaying calories, 50% calculated them internally with the most popular method used being electronic sources (52.4%). The majority of establishments displayed calories per portion (45.2%), followed by per meal (33.3%) and most businesses displayed information on menu boards (33.3%) or printed menus (31%). However, of the businesses who claimed to display calories during the telephone survey a small percent were not doing so, as verified during the observation visits. The main reasons cited by food service businesses for not displaying calories included time and cost constraints (58%) and that it was unnecessary/not mandatory (41.1%).

Conclusions: Mandatory menu calorie posting is an important element of the overall national strategy to combat obesity in Ireland. Time and cost constraints must be addressed by policy makers to increase the current uptake of menu calorie posting.
Physical Activity and Nutrition Interventions in Children and Adolescents
Environmental contexts interact with self-determined motivation to influence moderate-to-vigorous physical activity during a youth sports camp

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

PURPOSE: To determine the impact of environmental contexts (i.e., activity-promoting practice, standard practice, game, free time) and individual differences in self-determined motivation (SDM) on percent time in moderate-to-vigorous physical activity (%MVPA) during a youth sport camp.

METHODS: Seventy-six girls, aged 9-12y (mean ± SD, 10.5y ± 1.0) participated in a 5-day basketball camp where they were exposed to 2 games, 2 practices, and 3 free-time sessions each day. On the first day, players completed the Situational Motivation Scale and were included in the analysis (n=50) if they were high SDM (top tertile) or low SDM (bottom tertile). On the second day of practices, players were randomly assigned to either a coach trained to implement activity-promoting strategies (INT), or to a control coach who had not received such training (CON). Players wore an ActiGraph monitor for the duration of each program day and Evenson cut-points were used to determine physical activity intensity. The primary outcome was %MVPA during each session (n=21 sessions) after the intervention (days 3-5). Data were analyzed using mixed random effects models.

RESULTS: Across environmental contexts, players with high SDM had greater (p<0.001) %MVPA than players with low SDM (mean ± SE; 23.8% ± 1.1 vs. 21.3% ± 1.2), although there was a significant 3-way SDM-by-environmental context-by-condition interaction (p=0.03). During games, high SDM players had greater (p<0.001) %MVPA compared to low SDM players (25.4% ± 1.3 vs. 19.7% ± 1.4), but there was no difference during free time (14.5% ± 2.0 vs. 14.2% ± 2.0; p>0.05). During practices delivered by untrained coaches, high SDM players had greater (p<0.001) %MVPA compared to low SDM players (CON: 24.3% ± 1.8 vs. 21.8% ± 1.9). In contrast, during practices delivered by trained coaches, there was no significant difference (p>0.05) in %MVPA between players with high and low SDM (INT: 39.5% ± 1.9 vs. 37.7% ± 2.1).

CONCLUSION: Compared to individual differences in SDM, environmental context was a greater influence on MVPA during this youth sport camp. The impact of individual differences in SDM on MVPA during practices was attenuated when coaches were trained to implement activity-promoting strategies.
O.13.2

The Physical Activity 4 Everyone cluster randomised trial. 2-year outcomes of a school physical activity intervention among adolescents.

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Objective
The aim of this abstract is to report the 24 month effectiveness of a multi-component school-based intervention (Physical Activity 4 Everyone (PA4E1)) in reducing the decline in moderate-to-vigorous physical activity (MVPA) among secondary school students in disadvantaged areas of New South Wales (NSW), Australia.

Methods
A cluster randomized controlled trial was conducted in five intervention and five control schools with follow-up measures taken at 24-months post randomization.

Intervention schools received a multi-component school-based intervention based on the Health Promoting Schools Framework. The intervention consisted of seven physical activity promotion strategies that targeted: the curriculum (teaching strategies to increase physical activity in physical education lessons, student physical activity plans and modification of school sport program); school environment (recess/lunchtime activities, school physical activity policy); parents and community (parent newsletters and community physical activity provider promotion). Six additional strategies supported school implementation of the physical activity intervention strategies. The main outcome measure was minutes per day spent in moderate to vigorous physical activity (MVPA), objectively measured by accelerometer.

Results: Participants (n = 1150, 49% male) were a cohort of students aged 12 years (Grade 7) at baseline and 14 years (Grade 9) at follow-up. At 24-month follow-up there were significant effects in favour of the intervention group for daily minutes of MVPA. The adjusted mean difference in change in daily MVPA between groups was 7.02 minutes (95% confidence interval [CI]: 2.7, 11.4, p < 0.002). Sensitivity analyses based on multiple imputation were consistent with the main analysis (6.0 minutes, 95% CI: 0.6, 11.3, p < 0.031).

Conclusion: The PA4E1 intervention was effective in increasing adolescents’ minutes of MVPA, suggesting that implementation of the intervention by disadvantaged schools has the potential to slow the decline in physical activity.
Findings from an Internet-supported Physical Activity Intervention Delivered in Secondary Schools located in Low Socio-economic Status Communities: The Activity and Motivation in Physical Education (AMPED) Cluster Randomized Controlled Trial

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SIG: Theories of motivation

Awards: No

Objective: Many physical education (PE) lessons do not engage students in sufficient moderate-to-vigorous physical activity (MVPA) to achieve health benefits. Previous interventions have employed face-to-face workshops designed to help teachers learn strategies that provide greater opportunities for MVPA during lessons. In this trial we tested the efficacy of a teacher professional development intervention, delivered partially via the Internet, on secondary school students' MVPA during lessons. Strategies were designed to maximize opportunities for students to be physically active during lessons enhance students’ autonomous motivation towards PE and leisure-time physical activity.

Methods: A two-arm cluster randomized controlled trial with allocation at the school level (intervention vs. usual care control). Government-funded secondary schools in low socio-economic areas of the Western Sydney region of Australia were eligible to participate. During the main portion of the intervention (six months), teachers participated in two workshops and completed two online implementation tasks and two group mentoring sessions at their school. Implementation tasks involved video-based self-reflection via the project’s Web 2.0 platform and an individualized feedback meeting with a project mentor. Data collection included baseline, post-intervention (7-8 months after baseline) and maintenance phase (14-15 months after baseline) assessments. The primary outcome was the proportion of PE lesson time that students spent in MVPA, as measured by accelerometry (ActiGraph). Secondary outcomes included motivation towards PE and physical activity outside school hours.

Results: Year 8 students (N = 1,558) from 14 schools completed baseline assessments and were included in linear mixed model analyses. A significant group x time interaction indicated that the intervention had a significant positive effect on students’ MVPA during lessons. Compared with controls, students in the intervention schools were 29.2% more active during post-intervention lessons (p < .001) and 19.6% more active during maintenance phase lessons (p = .001). No significant effects were found on students’ motivation or physical activity outside school.

Conclusions: The efficacy of the AMPED intervention, delivered partially online, on MVPA compares favorably with previous interventions delivered exclusively face-to-face. The provision of an online training platform for teachers could help facilitate widespread dissemination of evidence-based interventions to increase MVPA during PE lessons.
The quantitative evaluation of the Health and Local Community Project. A 19-month multi-level, multi-component community-based intervention study

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SIG: Children and families

Awards: No

The purpose was to evaluate the effects of the Health and Local Community (HLC) project on overweight, dietary intake and physical activity among children. Furthermore, to evaluate the effects of the intervention on sales of fish, fruit, vegetables, whole grain, confectionery and sugary beverages in supermarkets located the three intervention communities.

Methods: The HLC was a community-based multi-level, multi-component intervention study to promote healthier eating and physical activity among children aged 3-8 years and their families living in three local communities on the island of Bornholm, Denmark. The design was a quasi-experimental design, including a matched intervention and control group. The intervention was developed using the supersetting approach. Main settings were day care centers, primary schools and supermarkets located in the three intervention communities, and the local media. The quantitative evaluation included measures of BMI and waist circumference among children, questionnaires for children and families, and sales data from both intervention supermarkets (n=7) and control supermarkets (n=8). At baseline the intervention group consisted a total of 443 children and the control group of 418 children. Data were analyzed using linear mixed model. The HLC project was completed in June 2015. All data have been collected and are processed but the final statistical analyses are currently in progress.

Results: Preliminary results show a significant increase in the sales of fish (P<0.0001), fruit (P<0.0001), vegetables (P=0.01) and wholegrain products (P<0.001) in the intervention supermarkets compared to the control area. No significant effects were found on sales of confectionery and sugary beverages. Results from the questionnaires showed a tendency of a decreased intake of candy (P=0.07), an increase in the time spend on outdoor activities (P=0.04) but also an increase in the time spend on a computer/tablet (P=0.03) among children in the intervention group compared to the control group. No significant effects however were found on the intake of vegetables, fruit and fish, or on BMI and waist circumference.

Conclusion: Preliminary results showed significant increases in the sales of healthy foods in the supermarkets located in the intervention communities compared with the control communities but no significant effect on measures of overweight among children.
Using photovoice to explore the reach of a school-based health promotion intervention into the home environment

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SIG: Children and families

Awards: Yes, for the Student Competition*

Objective: The prevalence of sedentary behaviours, physical inactivity, and poor diets is a major public health problem. The school and home environments play a significant role in influencing such behaviours. While school-based health promotion interventions have proven effective, it is unknown if the behaviours learned are adopted within the home environment. Research regarding the translation of behaviours from school to home is limited, and existing approaches typically rely on parental perceptions to identify such changes. The purpose of this research was to use student perspectives to examine if participation in a school-based health promotion intervention, the Alberta Project Promoting active Living and healthy Eating in Schools (APPLE Schools), impacts the home environment.

Methods: This research was guided by community-based participatory research, which is rooted in ethnography and involves the co-creation of knowledge between the researcher and participants. Photovoice was used as the data generating strategy. Grade 5 students attending an APPLE School were purposively sampled (n=30), and asked to take photos of what APPLE Schools looks like in their home environments. Consistent with photovoice protocols, subsequent one-on-one interviews were conducted with participants to gain a deeper understanding of student perceptions. Interviews were audio-recorded and transcribed verbatim. Data collection and latent content analysis occurred concurrently and is ongoing (n=20 interviews completed). Student participants will aid in the analytic process during a follow-up session to ensure accurate representation of the findings through member checking.

Results: Preliminary results indicate that students are not only translating behaviours to the home, but that they are the drivers of change regarding these behaviours. Students acted as advocates for their whole family and frequently reported changing household eating habits (influencing purchasing and consumption of healthier foods), increasing time spent being active, and the importance of getting enough sleep.

Conclusions: This research provides evidence that health behaviours learned in school are translated into the home environment. The results contribute to the overall evaluation of APPLE Schools and the evidence-base for school-based health promotion interventions. This research provides much needed insight into the views of students, and informs us about the reach of APPLE Schools beyond the school setting.
Physical Activity in Young Children
**O.14.1**

**Physical activity intensity, body composition and physical fitness in 4-year-old children: the MINISTOP trial**

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**SIG:** Children and families  

**Awards:** No

Purpose: Existing knowledge on associations between physical activity (PA) intensities and body composition and physical fitness in preschoolers is limited. We examined associations between PA intensities using vector magnitude (VM) during time-specific percentiles with body composition and physical fitness in healthy Swedish 4-year-old children.

Methods: For the cross-sectional study we utilized baseline data collected in 2014 for the population-based MINISTOP trial (n=307). PA was continuously assessed 24-h during 3-7 days using the wrist-worn ActiGraph (wGT3x-BT) accelerometer. For each child, the 25th, 50th (median), 75th, 90th and 95th percentiles of 10 second sum of VM during awake time that the monitor was worn, were calculated. These variables provide an estimate of the children's movement intensity in time-specific percentiles (e.g. 95%, 90%, 75%, 50% and 25% of their time). The advantage of these VM percentiles are that they avoid some limitations inherent in defining PA intensities using predefined cut-off levels. Body composition was measured using air-displacement plethysmography, and physical fitness (i.e. cardiovascular fitness, motor strength, lower and upper muscular strength) was measured using the PREFIT fitness battery. Multiple linear regression models, adjusted for relevant confounders, were applied.

Results/findings: A higher 95th and 90th percentile VM were positively associated with a higher fat-free mass index (FFMI) (adjusted coeff. 0.07 kg/m², p<0.001; 0.08 kg/m², p=0.003, respectively). In addition, a higher 90th percentile VM was negatively associated with lower %fat mass (adjusted coeff. -0.25, p=0.047). Furthermore, a higher 95th, 90th and 75th percentile VM were associated with better performance on all physical fitness tests, except the lower muscular strength test where positive associations were found only in children with a higher 95th and 90th percentile VM. No significant associations were observed between the 50th and 25th percentile VM and body composition measurements or physical fitness tests.

Conclusions: Percentiles (95th, 90th and 75th) of accelerometer VM were associated with FFMI and physical fitness. Children whose PA included the highest intensities had higher FFMI and better physical fitness. The results suggest that promoting high intensity PA may be essential in order to prevent childhood obesity and to improve physical fitness already in preschool age children.
Terms and conditions may apply: A longitudinal assessment of student physical activity and changes to the objectively measured school physical environment

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Purpose: Longitudinal evidence on associations between the school physical environment and physical activity is lacking. The purpose of this study was to examine how changes to the objectively measured school physical environment impact moderate to vigorous physical activity (MVPA) in a large sample of high school students over a 1 year period.

Methods: Quasi-experimental longitudinal data from 18,569 grade 9-12 students, and 85 schools participating in year 2 (2013-2014) and year 3 (2014-2015) of the COMPASS study (Ontario and Alberta, Canada) were used. Quantity and condition of facilities were objectively measured using the COMPASS School Environment Application. Student MVPA (min/day) was self-reported using the COMPASS Student Questionnaire. Multi-level modeling with three levels (time, students, schools) was used to examine change in student MVPA between schools that made environmental changes and schools that did not. Models adjusted for several student and school level confounders.

Results: Over the 1 year period, 38 schools made quantity or condition changes. In terms of quantity changes, student MVPA significantly increased in one school that added a fitness/weight room and two fields (β = 10.2, 95% CI: 1.1, 19.3), compared to schools that made no quantity changes. In terms of condition changes, student MVPA significantly increased in two schools that improved the condition of their outdoor basketball courts (β = 9.2, 95% CI: 1.3, 17.2) and significantly decreased in one school that improved the condition of their field (β = -9.8, 95% CI: -17.9, -1.5) compared to schools that made no condition changes. A decrease in student MVPA was also observed in two schools where the condition of the fitness/weight room declined (β = -7.5, 95% CI: -15.4, 0.5) but it was borderline none significant (p=0.06). No other quantity or condition changes significantly impacted student MVPA.

Conclusions: Changing the school physical environment can be costly. Results suggest specific improvements to quantity and condition of facilities can impact student MVPA. Given the specificity of these results, it is important for administrators to carefully consider the type of change (e.g. condition vs. quantity) and target facilities (e.g. outdoor basketball courts vs. field) when looking to increase student MVPA.
Outside play, which key components are associated with utilization and physical activity levels on public playgrounds among children?

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Objective:

Many studies focused on the association between playground features and physical activity (PA) of children. However, little research included both fixed and social playgrounds factors, such as supervision or organization of lessons and events. The purpose of this study was to objectively identify the key factors (both fixed and social factors) that are associated with both the utilization as well as PA levels of children on public playgrounds.

Methods:

Thirty public playgrounds in deprived neighborhoods in the Netherlands were included in this study. Fixed and social playground features, as well as playground usage and activity levels were measured using direct observation through SOPLAY (System for Observing Play and Leisure Activity in Youth). Trained observers collected data on each playground for 4 non-consecutive days for 2 hours each day. Multivariable forward prediction multilevel logistic regression models (adjusted for temperature and playground size) were used to identify key factors associated with usage and PA levels on public playgrounds.

Results:

Supervision (OR 1.36, 95% CI 1.15;1.61), organized events (OR 1.13, 95% CI 1.02;1.25), and loose lendable equipment (OR 1.41, 95% CI 1.18;1.69) are positively associated with higher utilization for boys. For girls, supervision (OR 1.43 95% CI 1.21;1.67), organized events (OR 1.20, 95% CI 1.09;1.32), and loose lendable equipment (OR 1.54, 95% CI 1.30;1.83) as well as the presence of fixed play equipment (slides, swings etc.) (OR 1.09, 95% CI 1.04;1.15) are positively associated with higher utilization. Fixed sport equipment was significantly associated with higher PA levels of girls (OR 1.18, 95% CI 1.05;1.33); the availability of loose lendable equipment was associated with lower PA levels of girls (OR 0.61, 0.49;0.76). The number of fixed play equipment was for both boys (OR 0.80 95% CI 0.71;0.91) and girls (OR 0.78 95% CI 0.68;0.89) associated with lower PA levels.

Conclusions:

The presence of supervision, organization of events and the availability of loose lendable equipment were positively associated with higher utilization of public playgrounds for both boys and girls. Introducing these social factors to existing public playgrounds can increase utilization.
Could a ball skill intervention eliminate sex differences in preschoolers?

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SIG: Early care and education

Awards: Yes, for the Student Competition*

Purpose

Ball skill competence (e.g. kicking and throwing) during childhood is an important predictor for physical activity during adolescence. However, girls are less proficient in these skills than boys. This study examined if girls are able to catch up to boys following a ball skill intervention and assessed the acute and long-term effects on changes in ball skill competence.

Methods

This randomized controlled trial took place in an accredited Head Start Center in the USA. Participants consisted of 54 girls and 63 boys (M = 47.87 months). They were randomly assigned to a motor skill intervention group (CHAMP; n = 77) or control group (free-play, n = 40). The motor skill intervention was implemented twice a week and consisted of a skill introductory activity, ball skill activity, and closure activity. Ball skill proficiency was assessed at pretest, posttest, and at 9-weeks follow-up using the object control subscale of the Test of Gross Motor Development - 2nd Edition. Repeated measures analysis of variance was used to analyze the data and significance were set at p < .05.

Results

In total, 117 participants completed all measurements. Results showed significant differences among the groups from pre- to post-test, $F(3, 117) = 59.322, \ p < .001$, pre-test to follow-up, $F(3, 113) = 46.479, \ p < .001$, and post-test to follow-up, $F(3, 113) = 117.477, \ p < .001$. At post-test and follow-up both CHAMP groups had significantly better ball skills compared with the control groups ($p<.001$) and CHAMP boys scored significantly better than all other groups ($p<.001$). Significant decreases from post-test to follow-up were revealed in the CHAMP groups ($p<.001$), but there was no significant differences in the rate of decline between boys and girls ($p = .103$).

Conclusions

This intervention improved ball skills in preschool-aged children and these improvements were maintained over a 9-weeks follow-up period. However, girls were not able to catch up to boys. Results suggest that girls may need additional ball skill instructional time in order to catch up to boys.
How do the family environment and perceived safety interact to influence children's physical activity over the transition to primary (elementary) school

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SIG: Children and families

Awards: No

Purpose: The family environment is an important determinant of young children’s physical activity. However, parents may adjust their parenting practices depending on conditions within the neighbourhoods they live in. Interaction between contextual influences is a key premise of socioecological models, but is rarely explored. This study examined whether perceived neighbourhood safety moderated associations between parent support for physical activity and weekend physical activity among children over the transition to primary school.

Methods: Longitudinal data were drawn from the Healthy Active Preschool Years Study. Children aged 3-5 years (n=1004) were recruited from preschools in metropolitan Melbourne and 548 were followed up three years later. At each timepoint, parents reported how frequently they and their partner participated in physical activity with their child and provided logistical and emotional support for physical activity (summed score), and whether they perceived their neighbourhood as safe for children. Participants wore an ActiGraph GT1M accelerometer for one week (Sirard et al. cutpoints) at both timepoints. Minutes/day of moderate-to-vigorous intensity physical activity (MVPA) on weekends was computed. A longitudinal model tested whether associations between baseline parent support and MVPA at follow-up were mediated by baseline MVPA and parent support at follow-up, and interaction terms were added to account for the moderating effect of perceived safety at baseline and follow-up. Analyses were adjusted for age, sex, maternal education and wear-time, and excluded those living in different neighbourhoods at follow-up. The analytical sample comprised 315 participants.

Results: On average, children increased their MVPA on weekends by 7.2 (SD=34.4) minutes/day. Parent support at baseline was positively associated with weekend MVPA at follow-up (b=0.4, 95%CI=0.1-0.8). Baseline MVPA and parent support at follow-up explained 38% of this association. In the full model, parent perception of neighbourhood safety at follow-up interacted with parent support at follow-up (p=0.013). In post-hoc analyses, parent support at follow-up was positively associated with MVPA among those who considered the neighbourhood as safe (b=0.9, 95%CI=0.4-1.3); there was no association among those whose parents considered the neighbourhood unsafe.

Conclusions: Parental influences on children’s physical activity are complex and may be moderated by parents' perceptions of the neighbourhood in which they live.
Reducing Sedentary Behaviour and promoting Physical Activity
Why older adults spend time sedentary and break their sedentary behaviour: a mixed methods approach.

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SIG: Ageing

Awards: Yes, for the Early Career Award**

Purpose
Older adults spend a large part of the day being sedentary, but several national and international health guidelines explicitly recommend that older adults should reduce their sedentary time and break prolonged periods of sitting to promote healthy ageing and well-being. In order to refine the guidelines and develop effective interventions, it is crucial to identify when, why and how older adults are most likely to be able to change their sitting habits. Therefore, the purpose of this study was to utilise life-logging equipment (objective activity monitor and time-lapse camera) to understand reasons for older people to remain sedentary and to break periods of prolonged sitting.

Methods
In this mixed-methods study, 30 older adults (mean (±SD) age 74.0±5.3 years) were asked to recollect their believed reasons for (breaking) sedentary behaviour. In addition, they were presented with a personal storyboard with objective records (1 day activity monitor and time-lapse camera images) of their daily behaviour and asked, during a semi-structured interview, to give their interpretation of their objectively measured sedentary behaviour and explain their actual reasons for (breaking) their sitting. The interview transcriptions were analysed using inductive thematic analysis.

Results
The most frequent reasons that people believed kept them sedentary were television/radio (48.3%), fatigue (34.5%) and health status (31.0%). The factors most often mentioned as actual reasons were eating/drinking (96.6%), television/radio (89.7%) and reading/crosswords (75.9%). Domestic chores (55.2%), walking (37.9%) and socialising (20.7%) were most often mentioned as reasons that people believed made them break their sedentary behaviour. The factors that were most often mentioned as actual reasons were domestic chores (86.2%), food/tea preparation (82.8%), and performing simple tasks (75.9%).

Conclusions
This study showed that there is a difference in what older adults believe are reasons for them to remain sedentary or break their sedentary time and what their actual reasons are. This knowledge can be used to develop effective interventions to reduce sedentary behaviour in older adults.
Effects of an intervention to reduce sitting at work on energy, fatigue, and mood among sedentary female employees

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SIG: No, this does not fit in any of the above mentioned special interest groups  
Awards: Yes, for the Early Career Award**

Objective: Recent research has shed light on the physiological benefits of breaking up prolonged sitting, but few studies have examined whether reducing sitting impacts mental health outcomes. The purpose of this study was to determine whether individuals who participated in an intervention to reduce sitting at work would report changes in energy, tension, fatigue, and mood.

Methods: Inactive females with full-time sedentary occupations (N=49) participated in an 8-week intervention. Participants were randomly assigned to take short, frequent breaks (1-2 minutes every half hour; SB) or longer, planned breaks (two 15-minute walks; LB) from sitting each workday. A variety of behavioral strategies (e.g., daily activity logs, action and coping planning) were used to promote adherence to the recommended protocols. At baseline and post-intervention, participants completed the Activation-Deactivation Checklist, Fatigue Symptom Inventory, and Positive and Negative Affect Scale. Sedentary behavior during the workday was measured using accelerometers. T-tests were used to examine within-group changes across the intervention.

Results: Sedentary time during the workday decreased significantly in the SB group (-35.6 min; d=-0.75; p=0.03), but did not change in the LB group (+4.5 min; d=0.12). Participants in the SB condition reported significant increases in energy (d=0.76; p=0.02) and positive affect (d=0.60; p=0.02), and significant decreases in tension (d=-0.81; p=0.001), fatigue severity (d=-0.52; p=0.04), fatigue duration (d=-0.82; p=0.005), fatigue interference with daily activities (d=-0.65; p=0.008), and negative affect (d=-0.61; p=0.04) from pre- to post-intervention. Participants in the LB group did not report any significant changes in the mental health outcomes assessed; effect sizes ranged from d=0.01 (negative affect) to d=-0.28 (fatigue interference).

Conclusions: A recommendation to take short, frequent breaks from sitting during the workday elicited reductions in sedentary behavior and significant improvements in a variety of mental health outcomes. These findings add to a growing body of literature documenting physical and mental health benefits of reducing sedentary behavior. Further, these findings will be of interest to employers and worksite wellness advocates who want to create a culture of wellness in the workplace. Short, frequent breaks are easy to implement and may lead to happier, more energetic, and less tired employees.
OBJECTIVE: Given the role that physical activity plays in reducing the risk of several noncommunicable diseases, approaches to promoting activity in a novel and engaging manner, and with broad reach, are required. Websites using Web 2.0 technologies (including social networking) have potential to engage participants for longer periods, and more frequently, in comparison to websites that do not contain these features. The primary aim of the Walk 2.0 trial was to investigate the effects of a Web 2.0 intervention on physical activity levels.

METHODS: Participants were 504 adults (176 male, 328 female) recruited from two sites in Australia (central Queensland and western Sydney) through a range of methods including the Australian electoral roll, local media advertising, and from former research participants who had registered their interest for future research. Participants were randomised into one of three groups: Walk 2.0 - a Web 2.0 interactive Internet intervention (including social networking); Walk 1.0 - the 10,000 Steps website; or a print-based logbook intervention (control). The primary outcome was accelerometer-measured minutes of moderate-to-vigorous intensity physical activity (MVPA) (>1952 cpm). Outcomes were assessed at baseline, 3, 12, and 18 months. Data were analysed using linear mixed models and were adjusted for age, gender, BMI, education, and accelerometer wear time.

RESULTS: At 3 months post-baseline, significant increases were found for both the Walk 2.0 (6.8 min/day, 95% CI: 3.4, 10.2) and logbook group (4.8 min/day, 95% CI: 1.3, 8.2) when compared to the Walk 1.0 group, which showed no change. At 12 and 18 months, changes in MVPA observed in the Walk 2.0 group were no longer statistically different from baseline, although post-baseline significant increases were found in both the Walk 1.0 and logbook groups (p<0.05). A significant group x time interaction (p=0.023) was found.

CONCLUSIONS: Despite the initial effectiveness of the Walk 2.0 intervention in increasing MVPA at 3 months, less interactive interventions facilitated greater changes in activity over the longer term.
Long-term effectiveness of a 12-week worksite physical activity counselling intervention based on Self-Determination Theory: Is it mediated by need satisfaction?

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SIG: Theories of motivation

Awards: No

Objective: This study examined the short- and long-term effects of a 12-week worksite physical activity (PA) counselling intervention among insufficiently active employees. As the intervention was guided by the principles of Self-Determination Theory, it was also examined whether the intervention effects were mediated by changes in employees' basic need satisfaction.

Methods: Insufficiently active employees (i.e., not meeting the health-enhancing PA guidelines) (N=300; mean age 41 years; 78% women) were recruited from a large pharmaceutical company in Flanders (Belgium). Participants were measured using a quasi-experimental design, with the intervention group (N=246) recruited separately from the reference group (N=54). Participants in the intervention group received a 12-week behavioural support intervention, which consisted of 1-hour face-to-face counselling at the start of the intervention, three short contacts by e-mail or telephone at weeks 3, 6 and 9, and 1-hour face-to-face counselling at the end of the intervention. The PA counselling sessions were delivered by qualified PA coaches (Masters in Kinesiology) and aimed to satisfy the employees' basic psychological needs for competence, autonomy, and relatedness. Outcome measures included objectively measured daily step count (SenseWear armband) and self-reported basic psychological need satisfaction for PA and were assessed at three moments: before the intervention (pre-test), immediately after the intervention (3-month post-test: short-term) and 9 months after pre-test (9-month follow-up test: long-term).

Results: Mixed model analyses showed significant time by group interaction effects in weekday daily step count, both in the short- and long-term. (ES=.65 and ES=.48 at short- and long-term, respectively). More specifically, the intervention group increased their daily steps at weekdays both in the short-term (+1280 steps per day) and long-term (+473 steps per day). By contrast, no changes occurred in the reference group. At weekend days, no interaction effects were found. Bootstrapping analyses indicated that changes in the total composite score of psychological need satisfaction mediated both the short- and long-term intervention effects on weekday daily step count.

Conclusion: This study provides support for the long-term effectiveness of a need-supportive PA counselling intervention at the workplace on weekday PA through changes in employees' psychological need satisfaction.
Experiences of using a novel self-monitoring device, the SitFIT, to help men sit less and walk more: Findings from a pilot trial

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose: Time spent sedentary is associated with poor health. Self-monitoring of walking, using pedometers for objectively measured real-time feedback, is highly effective at increasing physical activity. There is no similar device to self-monitor time spent sitting. The aim of this study was: a) to evaluate the acceptability and usability of a prototype of the novel pocket worn SitFIT™ as a self-monitoring device for reducing sedentary behaviour and increasing physical activity; b) to assess whether feedback on sitting time or standing time was likely to be most effective.

Methods: A convenience sample of forty sedentary men (30-65 years) was randomised into one of two intervention groups. Over a period of 4 weeks, one group received a SitFIT™ prototype providing feedback on steps and time spent sedentary (lying/sitting); the other group received a SitFIT™ prototype providing feedback on steps and time spent upright (standing/walking). Incremental goals for sedentary/upright time and steps were provided in conjunction with information how to achieve the goals. Change in physical activity and sedentary behaviour was assessed using activPAL™ monitors at baseline and 4 week follow up, at which point all participants returned their SitFIT™. Semi-structured interviews were conducted with participants after 4 and 8 weeks. The interviews were recorded digitally, transcribed and then analysed thematically.

Results: On average, participants in both groups reduced their sedentary time by 32±98 minutes/day (F=4.11, p=0.05) and increased their standing time by 23±60 minutes/day (F=5.87, p=0.02). Step count was increased by 260±2473 steps/day (non-significant). There were no between-group differences. Overall, the SitFIT™ was reported as acceptable and usable and seen as helpful to reduce time spent sitting. Participants provided suggestions for improving the SitFIT™ design, some of which were incorporated into the next version of the SitFIT™.

Conclusions: The SitFIT™ has potential to be used as a self-monitoring device in interventions aiming to reduce sedentary behaviour. The effectiveness of the SitFIT™ for changing sedentary behaviour remains to be determined in a fully powered trial.
Effectiveness of the self-regulation eHealth intervention 'MyPlan 1.0' on fruit and vegetable intake of adults who visit general practice: A Clustered Randomized Controlled Trial

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SIG: E- & m-health

Awards: Yes, for the Early Career Award**

Purpose: Most often eHealth interventions have small intervention effects. This may due to various reasons. First, eHealth interventions primarily targeted processes leading to an intention to change, leaving individuals in an intention-behaviour gap. Second, eHealth interventions often occur without contact with healthcare providers. Third, a limited amount of feedback is provided only at the beginning of these interventions, but not further on in the behaviour change process. Therefore, we developed an eHealth intervention 'MyPlan 1.0' to promote healthy behaviour in adults, based upon a self-regulation perspective. The study investigated the effectiveness of 'MyPlan1.0' on fruit and vegetable intake of Flemish adults visiting general practice. Second, it was examined whether there was a larger intervention effect for an intervention group guided by GPs compared to an intervention group recruited by researchers.

Methods: In 19 general practice, adults (≥18 years) were randomly selected by a researcher either for the intervention group or the waiting list control group that received general advice. In a third group the GP recruited adults for the intervention. The two intervention groups filled in evaluation questionnaires, and received 'MyPlan 1.0' for a self-selected behaviour (fruit, vegetable or physical activity). The waiting-list control group filled in the evaluation questionnaires, and received only general information. Self-reported fruit and vegetable intake were assessed at baseline(T0), one week(T1) and one month(T2) post baseline. Three-level (general practice, adults, time) linear regression models were conducted in MLwiN.

Results/findings: A total of 426 adults participated but a high attrition rate was observed in both intervention groups (70%) and in the control group (40%). In comparison with the control group, both the GPs’ intervention group [fruit χ2(1)=10,87,p=0,004; vegetable χ2(1)=5,26,p=0,022] and the researchers’ intervention group [fruit χ2(1)=18,04,p=0,001; vegetable χ2(1)=12,81,p<0,001] increased their intake of fruit and vegetables.

Conclusions: A stronger increase in fruit and vegetable intake was found when the eHealth intervention 'MyPlan 1.0' was used, compared to when usual care of health promotion in general practice was used. But, further investigation on which (combinations of) behavior change techniques are effective, on increasing response rates and the influence of delivery mode in routine practice is required.
Using Social Media to Promote Controversial Diets: the Low-Carb High Fat Diet (LCHF) in Sweden

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Purpose: Social media plays a growing role in our attitudes towards diets and health behaviors. The aim of this study was to investigate how three influential promoters of the low-carb high fat (LCHF) diet, a buzz diet in Sweden, transact their criticisms of nutrition authorities, and how they utilize social media (i.e. blogs) for their purpose.

Methods: Materials published on the three blogs between 2004 and 2015 was analyzed using a theory-driven qualitative thematic analysis. Information included presentation texts (e.g., "About" sections) and blog postings (including comments from users). A theoretical framework of postmodern medical paradigm, science popularization, and spreadability theory guided the analysis in order to scrutinize and report patterns identified in the material.

Results: The promoters use their personal experiences as successful examples when promoting the food regime. They advocate users’ dissemination of anecdotal evidence and use social media to form communities and share individual success stories. These subjective and emotional stories perpetuate the diet’s believability. As LCHF promoters have been criticized for using subjective evidence, new online scientific initiatives have also been started, such as crowdfunding initiatives to sponsor well-designed nutrition studies that would reinforce individual testimonies with credible research.

By highlighting attributes associated with trustworthiness, all three LCHF promoters make extensive use of professional titles and university degrees on their blogs when presenting themselves to the public. In order to question conventional science, they need to construct their own authority. With credentials accepted in the two worlds, they are able to act as mediators between established science institutions and laymen.

Conclusions: Using social media, evidence of scientific research can be contrasted with the immediate experiences of individual LCHF dieters. The individual truths presented on the blogs are each rendered as valid and this is enhanced by the postmodern notion of relativism—that there are numerous meanings and ways of knowing. In the digital age, information is found based on availability rather than accuracy. If interest groups start blogs that attack peer-reviewed science, and the scientific community does not engage in similar communication mode, they will miss an important opportunity to educate the public.
Digital marketing and young people: A content analysis of energy drinks' digital media platforms

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Objective: One of the contributors to escalating overweight and obesity is exposure to unhealthy food and beverage marketing. With advances in technology, food marketers increasingly promote their products through relatively unregulated digital media. Young people, who are immersed in digital technology, are specifically targeted. The purpose of this study is to explore the nature and extent of appealing strategies used by the ultra-processed food industry on digital platforms to promote unhealthy products to young people. Energy drinks, a relatively new and popular but unhealthy beverage, were used as a case study. This study will address research question- What promotional strategies are used by energy drink marketers to target young people on digital platforms, and to what extent?

Methods: Discourse analysis is adopted in this study. Content analyses of the marketing strategies used by the nine energy drink brands in Australia on Facebook, Twitter, YouTube, websites and advergames were conducted. Data were collected over one-month period in June 2015. Brand-generated content was captured and analysed with respect to the appeal strategies used.

Results: 135 Facebook posts, 96 Tweets, 82 YouTube videos, 7 official websites, and 15 advergames were analysed. Energy drink marketers utilised social media sites for brand community- and brand image-building, while websites were mainly used for product promotion. Common appeal strategies were thrill-seeking through extreme sports, success, perseverance, humour and functionality of drinks.

Conclusions: Energy drink brands are popular on digital platforms, as evidenced by the volume of user engagement. The appeal strategies utilised by energy drink marketers are attuned to young people’s desires, and this may negatively influence young people's behaviour and consumption patterns. Advergames may appeal to teenagers or young children. Regulations to govern the digital marketing of unhealthy products to young people are needed.
Attitudes toward nutrigenetic testing and DNA-based dietary advices – Results from a population survey

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: Individuals can now have easily access to their genotype giving them the possibility to receive personalized dietary advices based on genetic makeup through direct-to-consumer genetic testing. The aim of the study was to assess the perceived advantages/disadvantages of getting DNA-based dietary advices.

Methods: 2238 Quebecers (Canada), 18 years of age or older (mean age = 38.3±14.9), were recruited via social networks and from the Laval University employees/students lists. They filled an online survey including 37 questions, including four open-ended questions. A total of 1535 individuals completed the survey. 110 individuals were excluded for not having answered properly to validation items, bringing the total to 1425 individuals (252 men (17.7%) and 1173 women (82.3%)). Using a qualitative approach, common themes were extracted using NVivo software v10.2.0.

Results/Findings: 90.7% (n=1292) of respondents reported to be ready to follow a personalized diet based on the results of a nutrigenetic test. When asked about the perceived advantages of getting DNA-based dietary advices, “Health” was the most frequent theme (23.5%), followed by “Disease prevention” (22.2%), “Personalized dietary advices based on genetic makeup” (22.0%), “Improving the diet” (9.1%), “Food classified as being good or bad” (7.7%), “Weight control” (6.9%), and “Feeling better” (5.4%). Additionally, 24.4% of respondents perceived no disadvantage of getting DNA-based dietary advices. “Diet-related restrictions” was the most frequent disadvantage mentioned (12.9%) followed by “Worry/fear/anxiety” (8.1%), “The loss of pleasurable eating practices” (5.5%), and “The risk to develop food obsession” (5.0%).

Conclusions: Individuals are highly interested by getting DNA-based dietary advices for disease prevention and for health-related issues. Restrictions associated with the diet and the loss of the pleasure of eating were among the major concerns raised by respondents. Strategies that avoid promoting a restrictive approach while focussing on health benefits should be encouraged.
P1.005

The impact of a sales promotion on the sales of healthier food items at a sports stadium in the US

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SIG: Policies and environments

Awards: No

Purpose

The foods and beverages available at sporting events tend to be high in calories, fat, or sugar. To try to improve the food environment, a health department partnered with the local professional baseball stadium in 2015 to offer and promote healthier food concessions. Eleven healthier items were added to the concession menu. Additionally, during four of the games the healthy items were discounted using a 2:1 strategy—the customer received two servings of the healthier food items for each one purchased. The research question explored: Did the 2:1 promotion result in an increase in sales of the healthier food items?

Methods

The healthier foods added to the concessions menu were: low-fat hot dogs, nuts, hummus with pretzels, granola bars, non-fried cheese sticks, yogurt, salad, carrot and celery sticks, applesauce, chopped-fruit cups, and pieces of fresh fruit (apples, oranges, bananas). The data included the sales for each food item per game from the 61 baseball games that occurred from April through August 2015. Four of the sixty-one games offered the 2:1 promotion. Wilcoxon Rank Sum test was used to compare the sales of the healthier food items during non-promotion games to the sales of the healthier food items sold during promotion games. Results are reported by median and interquartile range.

Results

Among the eleven healthier food items, there were four with a statistically significant increase in sales at the games with the 2:1 promotion. The foods with a significant increase in median sales per game between non-promotion games and promotion games were low-fat hot dogs (1 [0, 1] vs. 3 [2, 3.5], p=0.04), carrot and celery sticks (0 [0, 1] vs. 2.5 [1, 3], p= 0.01), applesauce (0 [0, 1] vs. 3[1, 5.3], p =0.03) and pieces of fresh fruit (5.5 [3, 9] vs. 20.5 [12, 26], p=0.01)

Conclusions

The use of the 2:1 promotion was an effective strategy for increasing the sales of healthier food items recently introduced to the menu at a sports stadium in the US. Local communities interested in improving the food environment are encouraged to consider similar promotional techniques.
Food Decision Making: A Systematic Interdisciplinary Mapping Review

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SIG: No, this does not fit in any of the above mentioned special interest groups
Awards: No

Purpose

As the number of publications on consumer food choice has been steadily increasing for the last three decades it is necessary to gain an interdisciplinary overview of the state-of-the-art and to discover research gaps. This study explores how publication amount, frequency, and topics have changed over time. It is shown which determinants are addressed in which scientific disciplines, and which determinants suffer from a lack of research.

Methods

An extensive literature search in ten electronic databases resulted in 1,820 publications from 485 different journals from ten disciplines (including nutritional science, medicine/health science, behavioral science, food technology, biology, psychology, social psychology, sociology marketing/consumer research, business administration/economics) across a period of 60 years. To handle the large number of publications, the paper suggests and applies the interdisciplinary mapping review as an innovative method. The determinants of food decision making are categorized in line with the recently proposed DONE (Determinants Of Nutrition and Eating behavior) model within the DEDIPAC knowledge hub. In sum, the paper analyzes a dataset with 2,996 entries.

Findings

The distribution of the publications published from 1954 to 2014 indicates that research interest was low for almost four decades. Starting with 1990, a steady increase in publication number is noticeable, with currently almost 200 publications per year. Most research is conducted in medicine/health and nutritional science, followed by behavioral science and food technology. Although there are some linkages across neighboring disciplines (e. g., behavioral and nutritional science), only few publications address multiple research disciplines, indicating a lack of interdisciplinary research. The majority of studies investigate biological and psychological determinants. Studies on policy-related and environmental influences are scarce. Most of the disciplines investigate determinants from an individual perspective, while economics focus on environmental determinants (e. g., extrinsic product attributes).

Conclusions

This study is the first to systematically review quantitative studies in the field of food decision making across different disciplines. The findings stress that research in food decision making is extensive in single disciplines, but lacks of interdisciplinarity. The paper calls for cross-disciplinary research and makes suggestions on how to fill the identified voids.
**SO.1.1**

**Behavioral economics strategies and home dinner vegetable intake among low-income children**

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**SIG:** Children and families

**Awards:** No

**Purpose:** Behavioral economics strategies have been shown to improve child dietary behaviors in the school setting, however the effectiveness of home-based strategies is less clear. The aim of the study was to determine if 9 behavioral economics strategies, implemented during dinner meals at home, increased low-income children’s (aged 9 to 12) vegetable intake and liking.

**Methods:** Over the course of 6 weeks, caregivers (n = 39) were randomly assigned 6 of the 9 strategies to incorporate during mealtimes (one new strategy/week). Food records (3 days/week), completed by caregivers, were used to measure child dinner vegetable intake on the days that strategies were implemented. Pairwise comparisons of dinner vegetable intake by strategy were evaluated using Tukey Honestly Significant Difference (HSD). To assess feasibility, at the end of each week caregivers rated the level of difficulty of the assigned strategy and reported facilitators and barriers to implementing the strategy. At baseline and study conclusion home vegetable availability and liking data were collected.

**Results/Findings:** Children consumed significantly more vegetables with the ‘Serve at least two vegetables’ strategy (LS mean of 1.21 cups) than two other strategies: ‘Pair vegetables with other foods child likes’ (LS mean of 0.81 cups, p < 0.013) and ‘Eat dinner together with an adult(s) modeling vegetable consumption’ (LS mean of 0.81 cups, p < 0.036). On average, caregivers rated the difficulty of implementing the strategies as 2.6 (1 - not difficult, 10 - very difficult), with mean scores for individual strategies ranging from 2.1 to 2.9. Vegetable availability ranged from 10 to 11 different types of vegetables, and caregiver and child vegetable liking ranged from 6.7 to 7.1 (1 – hate it, 10 – like it a lot), with no differences from baseline to study conclusion. At baseline, caregiver and child vegetable liking was strongly correlated with home vegetable availability for individual vegetables.

**Conclusion:** Strategies were easy to integrate into dinner routines. Some strategies may have been less effective because they were not consistent with mealtime norms and/or were implemented by caregivers in various ways. Liking and availability were not likely to be relevant barriers.
**SO.1.2**

**Child Neophobia: Associations with Child Dietary Quality, Child Feeding Practices and Mealtime Behaviors**

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**SIG:** Children and families

**Awards:** No

**Purpose:** To describe associations between child neophobia scores (i.e., reluctance and/or refusal to eat novel foods or “picky” eating) and child diet quality, feeding practices and mealtime behaviors among 8-12 year old children.

**Methods:** Baseline data from the Healthy Home Offerings via the Mealtime Environment (HOME) Plus study were analyzed. Designed using Social Cognitive Theory and an ecological framework, data collection included personal, behavioral and environmental factors associated with dietary intake and weight, including feeding practices and mealtime behaviors, three 24-hour dietary recall interviews with children, child neophobia, and parent and child height/weight measured by trained staff. Parent-child dyads (n=160) participated (152 women, M=41.4 years; 53% boys, M=10.4 years). Pearson/Spearman correlations were used to assess associations between neophobia scores and dietary quality, feeding practices, mealtime behaviors, family problem solving and parent and child body mass index (BMI/BMIz).

**Results:** Child neophobia scores were inversely associated with meeting fruit and vegetable consumption recommendations (r= -0.27, p<.001) and Healthy Eating Index (HEI)-2010 diet quality scores (r= -0.21, p<.001) and positively associated with eating family meals from take-out sources (both r=0.17, p<.05). Child neophobia scores were also positively associated with parental report of child complaints about food served at meals (r=0.25, p<.01), making separate meals for children (r=0.24, p<.01) and parent BMI (r=0.19, p<.05). Although child neophobia scores were positively associated with parental role modeling of healthful eating (r=0.18, p<.05), child neophobia scores were not significantly associated with parental cooking skills, encouragement to try new foods, restrictive or pressure-to-eat feeding practices, family problem solving scores or child BMIz.

**Conclusions:** Although picky eating is associated with children’s poorer diet quality and parents report the extra effort they extend to please children at mealtimes, the study findings suggest many parents may not be willing to actively encourage consumption of new foods. Study findings suggest that picky eating is not just a toddler issue and may be pervasive across child weight status and parent cooking skill levels.
SO.1.3

Eating, feeling, and feeding: Does maternal binge eating predict child BMI percentile increases indirectly through child feeding practices and emotional responsiveness from three to five years of age?

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SIG: Children and families

Awards: Yes, for the Student Competition*

Purpose: The purpose of this study was to assess whether specific maternal emotion responses mediate the association between maternal binge eating (BE) and child feeding practices, and whether this pathway predicts child weight gain in early childhood. First, we hypothesized that maternal BE predicts child feeding practices indirectly through responses to children's negative emotions, statistically controlling for maternal BMI, child BMI percentile, and change from three to five years of age. Second, we hypothesized that the pathway from maternal BE to feeding practices through emotional responses would predict an increase in child BMI percentile from three to five years of age.

Methods: This study consists of two waves of data from the STRONG Kids Panel Study, which is a three-wave prospective cohort of families with preschool-aged children (M [SD] = 37 [6.94] months) in the Midwestern United States. Mothers (n = 260) at Wave 1 and Wave 2 were included in this study. The Coping with Children’s Negative Emotions Scale, the Comprehensive Feeding Practices Questionnaire, and the Eating Disorder Diagnostic Scale were used to assess mothers’ self-reported responses to negative emotion, feeding practices, and BE frequency respectively. We used bias-corrected bootstrapping procedures, maximum likelihood estimation, and direct and indirect effects analysis to test our hypotheses.

Results: For our first hypothesis, maternal BE predicted more Emotion Regulation, Food Reward, and Restriction for Health, and fewer Balance/Variety feeding practices, indirectly through mothers' distress reactions to children’s negative emotions. Accounting for distress reactions, maternal BE directly predicted more Restriction for Health and less Pressure to Eat. Maternal BE also predicted fewer Balance/Variety and Modeling feeding practices, indirectly through fewer Emotion-Focused Reactions to children’s negative emotions. For our second hypothesis, maternal BE predicted higher child BMI percentile indirectly through Distress Reactions, and Food as Reward feeding practices.

Conclusions: These results suggest that maternal BE and emotional responsiveness are important for understanding the interpersonal context of feeding behaviors, and the intergenerational transmission of eating behaviors. Distress reactions may serve as a risk factor, and Emotion-Focused reactions may serve as a protective factor against use of unhealthful feeding practices among mothers with BE.
A Reliable Observational Tool to Measure Food and Beverage Marketing in Sport Settings

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Purpose: Restricting exposure to unhealthy food marketing in settings where children gather is a recommended risk reduction strategy for childhood obesity. Food marketing in sport settings is problematic because foods advertised within a physical activity context may be perceived healthier than they actually are. No known comprehensive observational tools to measure food marketing exist. The aim of this project is to develop a reliable tool to measure the nature and extent of food marketing within public sport facilities.

Methods: The Marketing Checklist (MC) was informed by previous research measuring food environments and two conceptual models: a business marketing model (4Ps: product, price, place, promotion), and an impact-based model outlining that the effectiveness of marketing to children is determined by the exposure and power of marketing communications. After drafting, testing, review and revision, the MC was piloted by pairs of independent raters at five public sport facilities. Inter-rater reliability was calculated in SPSS Statistics 22 using unweighted Cohen’s kappa coefficients (categorical data), and intra-class correlations (ICC) (continuous data).

Results: The MC collects information on food/beverage promotions for 20 locations (e.g. windows, scoreboards, checkout) and 15 marketing types (e.g. supersize, free refills) within four sections: (1) Facility Grounds, (2) Entrance/Hallways, (3) Sport Areas, and (4) Food Service. The product/brand advertised, advertisement size and marketing techniques (child-targeted, sports-related) used are recorded for each food/beverage promotion. Preliminary results suggest almost perfect agreement between raters when identifying the presence of marketing (kappa=0.88, p<0.001) and the number of promotions per section (ICC=0.95, p<0.001). For promotions identified by both raters, there was almost perfect reliability for identifying the product/brand advertised (kappa=0.90, p<0.001), child-directed features (kappa=1.00, p<0.001), sports-related features (kappa=0.94, p<0.001), and its size (kappa=0.85, p<0.001).

Conclusions: The MC is the first reliable observational tool capable of documenting the exposure and power of food marketing in sport settings. It can be adapted for other settings (e.g. schools, grocery stores, restaurants, entertainment venues, etc.) to investigate children’s widespread exposure to unhealthy food marketing. Findings can be used by decision makers to inform comprehensive strategies to minimize children’s exposure to unhealthy powerful food marketing, beginning in children’s sports settings.
Objective: In much of the world, supermarkets are the primary source of food. Promotion and product placement within supermarkets are key drivers of purchasing decisions, but few interventions targeting them have been conducted. A rare collaboration between Australian retail, government and academic partners was established to fill this evidence gap.

Methods: A series of three within-store interventions were trialled during 2015-2016 in Australian supermarkets. The trials are controlled internally (4 week baseline vs. 6 week intervention period in the same store) and externally (3 intervention supermarkets vs. 4 control supermarkets). The primary outcome is store sales data (scanner data). Interventions tested include 1) changes to product positioning (increasing the proportion of healthy "green" products compared to unhealthy "red" products at end-of-aisle and island bin displays), 2) adding "Health Star" rating shelf labels to all 4.5 and 5 star rated products store wide and posters promoting fresh fruit and vegetables, and 3) in-trolley and floor based signage to promote healthy purchasing decisions. The change in products on display for intervention 1 (i.e. the exposure) was measured using twice-weekly audits of displays in all 7 stores.

Results: The first trial, involving changes at end-of-aisle and island bin displays was completed in August, 2015. Relative to control stores, intervention stores observed a 5% reduction in the proportion of red products on display between the baseline and intervention periods. Changes at back-of-aisle (-20%) and island bin displays (-49%) were cancelled out by increases in the proportion of red products at front-of-aisle displays (+23%). Intervention impact was heterogeneous, with the largest intervention store observing no change in front-of-aisle displays (+2%) and large reductions in red products at back-of-aisle (-59%) and island bin displays (-102%). The retailer assessed the intervention as being feasible and sustainable. Store sales data has just been obtained for intervention 1 and will be analysed shortly. The second intervention is currently underway. The sales and profit results of all three interventions will be presented.

Conclusions: The results of this novel trial of scalable and sustainable interventions will inform future multi-component trials. As a key food environment, supermarket interventions have exceptional population reach.
Purpose: Although robust, theory-based obesity prevention programmes exist, parental enrolment and continuing engagement are often challenges. As part of a larger programme to develop and evaluate a novel Optimisation intervention to improve parent engagement, we explored existing patterns and behaviours of parent engagement within the HENRY programme using a mixed methods approach.

Methods: ‘Let’s Get Healthy with HENRY’ is a widely commissioned group-delivered obesity prevention programme provided to parents of pre-schoolers across the UK. It comprises eight 2.5 hourly weekly sessions run in Children’s Centres. We analysed trends in parent recruitment and attendance using data routinely collected by HENRY facilitators. We then conducted an ethnographic study in five Centres that deliver HENRY to determine ‘best practice’ and identify common levers and barriers in parent engagement. We triangulated ethnographic observation data with data from 22 semi-structured interviews with stakeholders (commissioners, Centre managers, Centre staff and HENRY facilitators) and six parent focus groups. Thematic analysis explored potential Optimisation intervention characteristics and identified key facets of behaviour change.

Findings: 172 HENRY programmes run in 148 Centres within 24 sites provided data from 2014. Only 55.4% (ICC 0.02 95% CI:0 to 0.14) recruited the target of ≥8 parents, averaging 7.9 (SD 2.57) parents per course. Only 52.7% of Centres met attendance targets of ≥75% of parents completing ≥5/8 sessions (ICC 0.11 95% CI:0 to 0.26) and just 25.7% achieved both targets (ICC 0.01, 95% CI:0 to 0.12).

Analysis of ethnographic data (25 days (~150 hours) of observation) and other qualitative data suggested a need to target multiple levels of stakeholders to promote parent engagement. Themes generated around potential areas of change included: adopting a ‘Centre wide HENRY approach’; peer-to-peer recruitment; modifying recruitment eligibility criteria (supporting self-referrals); providing HENRY taster sessions; optimised programme planning; dispelling myths about HENRY’s purpose; branding revision; and appropriate feedback to commissioners.

Conclusions: Lack of parental involvement threatens the viability of many obesity programmes. It is imperative to create methods to encourage parent participation and demonstrate their effect. This evaluation of current practice and stakeholder perceptions is informing the development and trial of an Optimisation intervention to promote parent engagement.
Texas GROW! EAT! GO! Using Family-focused Garden, Nutrition and Physical Activities to Prevent Childhood Obesity: Combined Cohort Preliminary Results

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SIG: Children and families

Awards: No

Objective: The goal of the Texas GROW! EAT! GO!(TPEG) study was to measure the impact of different combinations of two existing family focused garden, nutrition and physical activity interventions on key outcome variables related to healthy eating and physical activity and child obesity status among low-income with 1326 3rd grade students and 1206 parents. Few, if any, trials of this scale that have focused on the synergistic effects of garden-nutrition-physical activity based interventions related to child BMI.

Methods: This 5-year randomized controlled trial with 4 treatment groups involved twenty-eight low-income schools. Child and parent measures developed included behavioral outcomes (i.e. diet, physical activity, and gardening), psychosocial variables related to these three behaviors, and demographic data. Pre-post-intervention and one year follow-up data was collected from children and parents, included child BMI. Process evaluation data included teacher implementation data, teacher and administrator attitudes. Treatment effects were estimated as the difference in the magnitude of pre-post change in the each of the three intervention groups, net of the estimated pre-post change in the comparison group. The test of treatment effects was a two-tailed test with significance threshold at 0.05. The primary outcome variable was BMI percentile between baseline and the 4th measurement period. Changes in the child, parent and child-parent interaction outcome variables are modeled as secondary outcomes.

Results: Study participants were 52% Hispanic, 18% African American, 16% Caucasian and 14% other. Behavior changes included: increased vegetable exposure and preference, increased MVPA, reduced consumption of sugar sweetened beverages, increased healthy family meal practices. Combined treatment effects indicated significant increases (0.0001) on vegetable exposure and preference; increased moderate (0.0007) and vigorous physical activity (0.001); and selection of fruit juice over soda (0.01). Child BMI significantly decreased for single treatments.

Conclusions: Data indicated that the combined treatment: CATCH + JMG + WAT resulted in more positive changes in vegetable exposure & preference, physical activity behaviors in children and with parent engagement. The single treatments resulted in significant decreases in child BMI compared to the control and combined treatments. Documented variation in classroom implementation (fidelity) across treatments may explain results.
SO.2.1

If THEY build it, will THEY act? A novel approach to increasing physical activity among breast cancer survivors

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SIG: Cancer prevention and management

Awards: No

Objective: Generic physical activity (PA) programs do not necessarily meet the unique needs of breast cancer (BC) survivors, highlighting the demand for innovative programs that are reflective of the 'real-world' in which survivors are most likely to find themselves. The goal of ProjectMOVE is to encourage BC survivors to come together and identify innovative ways to integrate PA into their lives. ProjectMOVE enables women to create options that are appropriate and meaningful to them by offering microgrants (small amount of funds awarded to applicant groups to develop and implement a PA initiative) and financial incentives (for increasing PA). The aim of this study is to determine feasibility and examine changes in PA behaviour and motivation, social support and quality of life. The purpose of this presentation is to describe the rationale and design of ProjectMOVE.

METHODS: ProjectMove is being tested in groups of female BC survivors living in British Columbia, Canada. Microgrant applications were made available via a project specific website. All submitted applications were reviewed and awarded funds based on evaluation criteria. Successful groups were also informed of a further $500 incentive for meeting their PA goals. An estimate of effectiveness concerning PA behaviour and motivation, social support and quality of life will be assessed via accelerometry and by self-report. Assessments will occur at baseline, 6 months and 12 months. Program feasibility will be guided by the RE-AIM framework and evaluated using focus groups, interviews and project reports.

RESULTS: A total of 20 applications were received, 15 of which were funded. Due to unforeseen circumstances, 2 applicant groups declined the funds. Currently, 13 groups are undergoing baseline testing. The findings of this study are the preliminary step in understanding the best practice approaches for maintaining PA promotion programs for BC survivors and for gaining further insights into the feasibility of microgrant approaches to increase PA among populations with unique needs.

CONCLUSIONS: This "bottom up" approach, where BC survivors are engaged in designing and implementing PA programs, has the potential to empower woman, providing them with the opportunity to optimise their own strengths and knowledge aimed at mitigating health concerns.
Effect of a lifestyle coaching intervention on physical activity level among overweight and obese pregnant women: findings from the randomized controlled DALI trial

Judith Jelsma, Jennifer Wessel, Michiel de Boer, Frank Snoek, Mireille van Poppel, on behalf of the DALI consortium

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Objective:

The aim of the current study was to investigate the effect of three lifestyle interventions on physical activity levels in mid-pregnancy and late-pregnancy in women with a BMI≥29 (kg/m^2). Since the literature on exercise among overweight and obese pregnant women reports a decline in physical activity levels as pregnancy progresses despite some evidence indicating exercise could improve cardiovascular condition and glucose tolerance and limit gestational weight gain.

Methods:

Pregnant women with a BMI≥29 (kg/m^2) were recruited <20 weeks’ of gestation into a randomized controlled trial in 9 European countries. Women were randomised to one of the four intervention arms; (1) healthy eating (HE); (2) physical activity (PA); (3) healthy eating and physical activity (HE+PA); (4) control. Women in one of the intervention groups received 5 face-to-face sessions with a lifestyle coach who was trained in motivational interviewing. Physical activity data was measured objectively with accelerometers and with pregnancy physical activity questionnaire (PPAQ). Data on physical activity were collected <20 weeks (baseline), at 24-28 weeks (T2), and 35-37 weeks (T3) of gestation. Linear multilevel models were used to assess the effect of the lifestyle interventions on physical activity compared to the control group, with a correction for baseline physical activity.

Results:

A total of 435 women were included in the study, with 130 (30%) women providing valid accelerometer data and 402 (92%) providing PPAQ data at baseline and at either T2 or T3. In respectively the PA and HE+PA group an effect was present for sport/exercise activity in mid-pregnancy (β=3.1 MET/week; 95%CI=1.8-4.4; β=2.8 MET/week; 95%CI=1.4-4.1) and in late-pregnancy (β= 1.9 MET/week; 95%CI=0.6-3.3; β=2.2 MET/week; 95%CI=0.8-3.6). In mid-pregnancy an effect was found for the accelerometer data on counts/min for the PA group (β=58.2 counts/min; 95%CI=5.7-110.8).

Conclusions:

In mid-pregnancy, a positive effect of the PA intervention compared to the control group was found, but no definite conclusion can be drawn on the effectiveness of the physical activity intervention in late-pregnancy due to different outcomes of both physical activity assessments. Future research is needed to investigate the extent pregnancy affects physical activity outcomes especially as pregnancy progresses.
Pumping iron in Australia: prevalence, trends and sociodemographic correlates of muscle strengthening activity participation from a national sample of 195,926 adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective

The current Australian Physical Activity Public Health Guidelines recommend that adults engage in regular muscle-strengthening activity (e.g. strength or resistance training). However, public health surveillance studies describing the patterns and trends of population-level muscle-strengthening activity participation are sparse. The aim of this study is to examine the prevalence, trends and sociodemographic correlates of muscle-strengthening activity participation in a national-representative sample of Australians aged 15 years and over.

Methods

Between 2001 and 2010, quarterly cross-sectional national telephone surveys were conducted as part of the Australian Sports Commission’s ‘Exercise, Recreation and Sport Survey’. Pooled population-weighted proportions were calculated for reporting: [i] no muscle-strengthening activity; [ii] insufficient muscle-strengthening activity, and [iii] sufficient muscle-strengthening activity. Associations with sociodemographic variables were assessed using multiple logistic regression analyses.

Results

Out of 195,926 participants, aged 15-98 years, only 9.3% (95% CI: 9.1-9.5) and 10.4% (95% CI: 10.1-10.7) reported sufficient muscle-strengthening activity in the past two weeks and in the past year, respectively. In the multiple logistic regression analyses, adults aged 50+ years (OR 0.40, 95% CI: 0.37-0.42), those with lower education levels (OR 0.49, 95% CI: 0.46-0.53) and those living in outer regional/remote areas (OR 0.59, 95% CI: 0.53-0.65) were less likely to report sufficient muscle-strengthening activity. In contrast, those living in the less socioeconomically disadvantaged area were more likely to report sufficient muscle-strengthening activity (OR 1.32, 95% CI: 1.20-1.46). Over the 10-year monitoring period, there was a significant increase in the prevalence of sufficient muscle-strengthening activity (6.4% to 12.0%, p-value for linear trend <0.001).

Conclusions

Among a large sample of Australian adults, the vast majority did not engage in sufficient muscle-strengthening activity. Between 2001-10, there was a trend for increased sufficient muscle-strengthening activity participation. However, in 2010, 88.0% did not report sufficient muscle-strengthening activity. This study highlights the urgent need for public health strategies to support population-level participation in muscle-strengthening activity. Such strategies should target older and lower educated adults, and those living in socioeconomically disadvantaged and outer regional/remote areas.
**SO.2.4**

**Breaking cardiac rehabilitation barriers: development of an mHealth platform for remotely delivered exercise-based cardiac rehabilitation**

Jonathan Rawstorn, Nicholas Gant, Ian Warren, Andrew Meads, Ralph Maddison

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**SIG:** E- & m-health

**Awards:** Yes, for the Student Competition*

**Purpose**

Exercise-based cardiac rehabilitation (exCR) is substantially underutilised in many countries; primarily due to barriers that limit accessibility to traditional hospital- and clinic-based programmes. Home-based programmes enhance accessibility but sacrifice clinical exercise specialist supervision and individualised coaching. Advances in mobile sensor and communication technologies could enhance the delivery and reach of exCR for those who cannot access traditional services. We aimed to design, develop and validate an evidence- and theory-based real-time remote exCR telemonitoring platform that can overcome traditional participation barriers while preserving clinical supervision and expertise.

**Methods**

An iterative process was undertaken to design and develop a mobile health (mHealth) exCR platform that combines the clinical expertise of centre-based exCR with the accessibility of home-based programmes. Platform objectives included real-time remote exercise monitoring, individualised coaching, feedback, behaviour change education, and social support, delivered via smartphone and wireless sensors. Sensor validity and data transmission reliability were assessed during simulated daily activities and exercise.

**Results:**

Platform components include custom smartphone and web-based applications (apps), middleware, and wireless sensors for heart rate, electrocardiography, respiratory rate, location, distance, and speed. Sensor validity and data transmission reliability were acceptable. Patients use the smartphone app to view exercise data (during exercise, and retrospective review), report cardiac symptoms, and receive audio notifications from clinical exercise specialists. Data are transmitted to a secure server via mobile broadband in real-time during exercise. The web-based app allows clinical specialists to view real-time exercise data including automated notifications for individualised exercise alerts and symptom reporting, and provide patients with real-time audio feedback including exercise prescription, coaching, behaviour change education, and social support. Exercise prescription and behaviour change content are based on clinical exercise guidelines, and behaviour change theory and techniques.

**Conclusions**

Our custom mHealth exCR platform combines clinical supervision with near universal accessibility, and provides a viable alternative for patients who are unable or unwilling to attend centre-based exCR. mHealth exCR has potential to increase the reach of clinically supervised exCR, and is currently being evaluated in a non-inferiority RCT. The platform has potential utility across a range of populations.
What predicts maintenance of regular walking after an online-delivered physical activity intervention among cancer survivors living in metropolitan and rural areas of South Australia?

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SIG: Cancer prevention and management

Awards: Yes, for the Early Career Award**

Purpose:

Physical activity has been associated with improved outcomes for cancer survivors. Rural-dwelling cancer survivors in Australia have poorer outcomes than their metropolitan counterparts due to lower access to support services. This study trialled an online lifestyle intervention (STRIDE) designed to increase regular walking among sedentary cancer survivors in South Australia. The aim was to identify predictors of maintenance of regular walking beyond the intervention that are unique to rural cancer survivors.

Methods:

Participants (n=46, 21 males, 25 females, age = 65.2 +/- 9.3) wore a sealed pedometer for seven consecutive days (5 week days and 2 weekend days). Minimum wear time was defined as 10 hours per day for four days, including a weekend day. Participants recorded their daily steps on the STRIDE website, as well as their Rating of Perceived Exertion (RPE) during walking and their daily affect using the Affect Scale. These data were used to set step goals each day, designed to encourage participants to stay within an RPE of 11-13 on the Borg Scale. Goals were set at three levels according to daily affect (feeling ‘bad’, ‘neutral’ and ‘good’), so that participants were able to select a step goal that was achievable on any given day. The Physical Activity Maintenance Assessment was used to measure participant motivation, barriers self-efficacy and relapse self-efficacy. Change scores were calculated as a percentage difference between baseline and 3-month follow-up for steps/day and predictor variables. Regression modelling tested the psychological predictors of steps/day and interactions with location (rural and metropolitan), controlling for baseline steps/day.

Results:

The psychological predictors of change in steps/day did not differ between metropolitan and rural participants. Changes in steps/day were predicted by changes in relapse self-efficacy and barrier self-efficacy, explaining 39% (p<0.0001) and 33% (p=0.001) of total explained variance in steps/day, respectively.

Conclusions:

Maintenance of regular walking beyond the STRIDE intervention was more likely among cancer survivors who increased their confidence to resume walking after an interruption and to overcome barriers to walking, regardless of their location of residence. Strategies to boost self-efficacy should be integrated into physical activity promotion in this population.
SO.2.6

Using an Internet-based breast cancer risk assessment tool to increase physical activity motivation

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SIG: Cancer prevention and management

Awards: No

Objective: Internet-based cancer risk assessment tools can help translate epidemiological risk prediction research into public health practice. Understanding how such tools affect key social-cognitive precursors of behavior change is crucial for leveraging them into effective interventions. The purpose of this investigation was to examine how a publicly-available Internet-based breast cancer risk assessment tool influences physical activity motivation and behavior.

Methods: Women (N=132) aged 40-78 with no personal cancer history indicated their perceived risk of breast cancer and were randomly assigned to receive personalized (www.yourdiseaserisk.wustl.edu) or non-personalized breast cancer risk information. The internet-based intervention took approximately 15 minutes. Immediately following the intervention (Time 1), participants reported intentions to engage in physical activity, confidence in their ability to engage in physical activity (self-efficacy), and belief that physical activity would reduce their risk of breast cancer (response efficacy). Five weeks later (Time 2), participants (N=127) reported their physical activity information-seeking behavior and their engagement in moderate physical activity. ANCOVAs examined whether personalized or non-personalized risk information elicited higher physical activity intentions, self-efficacy, and response efficacy at Time 1. Logistic regressions examined differences in physical activity information-seeking and engagement in physical activity at Time 2.

Results: At Time 1, personalized breast cancer risk information elicited higher physical activity intentions (p=.004), response-efficacy (p=.014), and self-efficacy (p=.04) compared to non-personalized risk information. No intervention effects emerged physical activity information-seeking or engagement in physical activity at Time 2, ps>.05. Among women who received personalized information, risk perceptions became more accurate, ps<.05, but few fully accepted the information. Those who rejected the information were more likely than women who accepted the information to believe that their breast cancer risk was lower than the estimate they recalled being provided.

Conclusions: Internet-based risk assessment tools can produce beneficial effects on important social-cognitive precursors of physical activity engagement, but lingering skepticism, possibly due to motivated reasoning, needs to be addressed before these effects can be maximized. Furthermore, increasing and sustaining regular physical activity in a population of healthy middle-to-elderly aged women likely requires a more intensive intervention than only providing personalized risk information.
SO.2.7

Effectiveness Of An Intervention Using A Home Based Physical Exercise Guide In Physical Performance And Biochemical Variables In Older Adults

Sheilla Tribess, Maria da Conceição Lopes Ribeiro, Andrêza Soares dos Santos, Lélia Lessa Teixeira Pinto, Jolison Meneguci, Jeffer Eidi Sasaki, Jair Sindra Virtuoso Júnior

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: The aim of this study was to analyze the effectiveness of an intervention using a home based physical exercise guide in physical performance (muscular strength, flexibility, aerobic endurance and dynamic balance) and biochemical variables (triglycerides, total cholesterol, cholesterol-HDL, glycemia) in older adults. Our hypothesis was that the intervention would be effective in increasing physical performance, which in turn would lead to improvements in the biochemical components. Methods: This was a quasi-experimental study realized in Uberaba, MG, Brazil. A convenience sample of 91 women with age between 61 and 80 years old, divided in two groups, intervention group (n=49) and control group (n=42). Participants answered a questionnaire, applied in individual interview, containing information on sociodemographics, physical and mental health, physical activity, behavioral variables, and also underwent physical performance tests (30-second chair stand; arm cur; chair sit & reach; back scratch; 8-foot up and go; 2-minute step test) and blood collection, before and after 12 weeks of intervention. The intervention was realized using the home based guide of physical exercises associated with motivational strategies (phone calls and home visits). For data analyses, were used procedures of descriptive statistics (frequency, mean and standard deviation) and inferential (chi-square test, test t of student to independent samples and ANOVA of repeated measures, p<0.05). Results: At the end of 12 weeks of intervention, it was verified that the intervention group showed improvements of resistance variables of upper (Pre: 11.6±2.9 repetitions; Post: 14.0±3.4 repetitions) and lower limbs (Pre: 9.6±2.8 repetitions; Post: 11.8±3.6 repetitions), aerobic endurance (Pre: 79.0±18.7 steps; Post: 92.3 ± 25.3 steps), glycemia (Pre: 96.4±15.3 mg/dL; Post: 11.8±3.6 mg/dL) and total cholesterol (Δ=-21.7±49.6 mg/dL). Conclusion: The intervention was well received by the older adults, being viable its applicability. The home based intervention using the physical exercises guide had positive impact in physical performance and in biochemical variables of the older adults, providing an attenuation of functional limitations.
Abstract

**SO.3.1**

**Diet quality score and risk of obesity and hypertension: the Australian Health Survey**

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**SIG:** Ageing

**Awards:** Yes, for the Early Career Award**

**Purpose:** Poor diet, characterised by a low diet quality score, has been associated with greater risk of chronic diseases, including hypertension, and obesity. However, the evidence is inconsistent across diet quality scores and by sex. The aim of the present study was to investigate the relationship between dietary quality and obesity and hypertension.

**Methods:** A total of 4971 adults were included from the Australian Health Survey 2011-2013, a cross-sectional, population-based survey. Two-day 24-hour dietary recalls were used to derive two diet quality score (dietary guideline index, DGI and recommended food score, RFS). Relationships between DGI and RFS and overweight/obesity status and hypertension were assessed via logistic regression and were adjusted for dietary (energy misreporting, dieting and alcohol intake [hypertension outcomes only]) and lifestyle (e.g. age, smoking, physical activity and level of education) characteristics.

**Results:** Individuals in the highest tertile of DGI, compared with the lowest, were less likely to be overweight or obese (men: OR 0.63, CI: 0.44, 0.90, P-trend=0.010; women: OR 0.67, CI: 0.48, 0.94, P-trend=0.020). Furthermore, in the highest tertile of DGI, women were less likely to have central adiposity (OR 0.55, CI: 0.39, 0.77, P-trend<0.001). Men in the highest tertile of DGI and RFS, were less likely to be hypertensive (DGI: OR 0.53, CI: 0.36, 0.98, P-trend=0.003; RFS: OR 0.62, CI: 0.42, 0.93, P-trend=0.018) compared with the lowest tertile. RFS was not associated with obesity-related outcomes.

**Conclusions:** Higher diet quality score, as estimated using DGI, was associated with lower risk of obesity in both men and women, whereas diet quality was only associated with lower risk of hypertension among men. Further comparisons of diet quality scores are warranted, as well as longitudinal studies to evaluate whether diet quality predicts future risk of obesity and hypertension.
SO.3.2

**Obesity, diet quality and absenteeism in the workplace.**

*Sarah Fitzgerald, Ann Kirby, Aileen Murphy, Fiona Geaney*

*University College Cork, Cork, Ireland*

**SIG:** Policies and environments

**Awards:** Yes, for the Student Competition*

**Purpose**

Previous research has indicated that obesity and obesity-related diseases including cardiovascular disease, stroke and diabetes are associated with workplace absenteeism. However, the relationship between absenteeism and adverse lifestyle factors including smoking, low levels of physical activity and poor dietary patterns remains ambiguous. Differences in outcome measurements and a reliance on self-reported measures of absenteeism and obesity may be contributing to this uncertainty. Using objective measures for absenteeism and health status outcomes, this study aimed to investigate what health status outcomes and lifestyle factors influence workplace absenteeism.

**Methods**

Cross-sectional baseline data were obtained from a complex workplace dietary intervention trial, the Food Choice at Work Study. Participants included 540 randomly selected employees from four multinational manufacturing workplaces in Cork, Ireland. Annual count absenteeism data were collected from the Human Resources Department of each workplace. Physical assessments included objective health status measures (i.e. body mass index (BMI), midway waist circumference and blood pressure). Food Frequency Questionnaires (FFQ) measured diet quality from which DASH (Dietary Approaches to Stop Hypertension) scores were constructed. A zero-inflated negative binomial (zinb) regression model examined the association between health status outcomes, lifestyle characteristics and absenteeism.

**Results**

The mean number of days absent was 2.5 days with a standard deviation of 4.5 days. After controlling for socio-demographic and lifestyle characteristics, the zinb model indicated that absenteeism was positively associated with central obesity and increased the expected rate of absences by 72%. Consuming a high quality diet and engaging in moderate levels of physical activity were negatively associated with absenteeism and reduced expected frequency by 50% and 36% respectively. Being in a managerial/supervisory position also reduced the expected frequency of absenteeism by 50%.

**Conclusions**

Modifiable health and lifestyle-related factors, including obesity, diet quality and physical activity and work-related factors including job position are associated with the frequency of workplace absenteeism. Workplace health promotion policies should incorporate recommendations that are designed to prevent and manage excess weight, improve diet quality and increase physical activity levels of employees to reduce frequency of workplace absenteeism.
SO.3.3

Factors influencing families’ initial and continued attendance at community-based family-focused childhood weight management programmes: A systematic review

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University College Cork, Cork, Ireland

SIG: Children and families

Awards: Yes, for the Student Competition*

Purpose:
Research suggests multi-component family-based lifestyle programmes are efficacious in treating paediatric obesity. However, success relies heavily on family attendance and retention. While attendance offers the support to make long-lasting, positive, lifestyle changes, in addition to the opportunity to identify underlying health issues, the majority of families referred to treatment decline. Moreover, for those who do attend, benefits are often compromised by high programme attrition. While non-attendance directly impacts on the children and their families, it also negatively impacts the health service due to missed appointments and loss of productivity. This systematic review investigated factors influencing attendance at community-based lifestyle programmes among families of overweight or obese children.

Methods:
Quantitative, qualitative and mixed-methods studies were included. A narrative synthesis approach was used to allow for the inclusion of a range of research designs. Articles published in English were included if they (1) were original research studies, (2) included children aged 4-12 years, (3) had a primary focus on pediatric weight management that (4) incorporated lifestyle (i.e. diet, physical activity and behavioural) components, and (5) reported on the factors influencing attendance at family-based programmes that were delivered in the community setting.

Findings:
Thirteen studies were included. Children enrolled primarily to have fun and make friends. However, the stigma associated with attending these programmes discouraged others. For parents, the main factors influencing enrolment included concern for their child's psychological health, the desire to reduce any adverse social experiences their child may be experiencing and to increase their child's self-esteem. Denial of the issue amongst parents presented a key barrier to enrolment and many parents refused to accept their child was carrying excess weight. Logistical factors such as time, transport, conflicting schedules and changing family circumstances influenced families' decisions to drop out of treatment while group support and good trainer-participant relationships were viewed by parents as crucial to continued attendance.

Conclusion:
Efforts are urgently required to optimise the effectiveness of childhood obesity treatment in the community setting. This study provides practical recommendations to guide future policy makers, programme delivery teams and researchers in developing strategies to boost recruitment and minimise attrition.
**How Does Television Viewing Influence Children’s Consumption of Sweet Foods and Beverages?**

*May O. Lwin, Shelly Malik, Jerrald Xunheng Lau, Andrew Yee Zi Han*

**Nanyang Technological University, Singapore, Singapore**

**SIG:** Children and families

**Awards:** No

**Purpose:**

Studies have shown the effect of food advertisements on consumption, but few have examined the singular influence of television viewing on the process of consumption of sweet foods and beverages (F&B). At the same time, the issue of over-consumption of sweet F&B among children has increasingly become a concern for authorities and health professionals, as excessive sugar consumption can lead to obesity and diabetes. Hence, this study investigates the mechanism on how television viewing can affect children's consumption of sweet F&B, particularly via television viewing's impact on attitudes toward unhealthy food.

**Methods:**

We administered a self-completed survey to 309 Singaporean children aged 10 to 16 years-old (M = 12.3). Measures include the total weekly hours of television viewing, whether they watched children’s channels, attitudes toward unhealthy food (which consists of three subscales toward consuming unhealthy food namely positive affect (feel happy, comforted, satisfied, and enthusiastic), negative affect (feel guilty, concerned, bored, and uncomfortable), and cognitive factors (consider unhealthy food to be healthy, safe, natural, and familiar), intention of consuming sweet F&B, and consumption behavior of sweet F&B.

**Results/findings:**

The structural equation modelling analysis revealed that among children who watched children’s channels, television viewing was associated with all three measures of attitudes toward unhealthy food, but only positive affect influenced intention to consume sweet F&B. Subsequently, intention predicted behavioral consumption of sweet F&B. Conversely, among children who did not watch children’s channels, television viewing was not associated to any of the attitudinal measures.

**Conclusions:**

Our findings revealed that mere viewing of children’s channels influenced intention and consumption of sweet F&B via positive affect, i.e., greater exposure to children’s channels enhanced positive affect toward unhealthy food, which subsequently leads to increased intention and consumption of sweet F&B. This suggests the need to regulate F&B advertisements and product placements on children’s channels programming. Media literacy education should also be implemented to teach children how to discern between television contents and advertisements, and foods which show up on television contents.
**SO.3.5**

**Effect of 12 weeks supervised exercise on fasting appetite-related peptides**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Early Career Award**

**Purpose:** Prolonged physical activity gives rise to a variable degree of body weight and fat mass loss, and is associated with high individual variability in appetite control (subjective hunger and energy intake). The response of tonic peptides (associated with appetite control) to exercise training with and without weight loss is not clear. We examined the role of fasting tonic peptides - glucose, insulin, leptin, total and acylated ghrelin in response to 12 weeks supervised aerobic training compared to the same period of no exercise.

**Methods:** Forty-four overweight and obese males (n=15, BMI=31.4±5.2kg/m², age=42.1±7.9years) and pre-menopausal females (n=29, 31.2±3.5kg/m² age=41.2±10.0years) were recruited onto the study. 29 individuals completed a 12 week exercise program and 15 individuals completed 12 weeks of no exercise. The exercisers were classified as Responders (n=14) or Non-Responders (n=13) depending on observed compared to expected body composition changes from measured energy expenditure from exercise. The exercise intervention was designed so that individuals expended 500kcal per session and completed 5 sessions per week, for 12 weeks. All exercise was supervised and recorded. A fasting blood sample was taken at week 0 and 12 for the measurement of fasting glucose, insulin, leptin, total and acylated ghrelin were compared between exercisers and non-exercisers and between exercise Responders, Non-Responders and non-exercising Controls.

**Results:** There was no effect of exercise or exercise response on fasting glucose. Insulin decreased in exercisers compared to control (p<0.02) and the reduction was particularly pronounced in Non-Responders who had higher insulin levels at baseline. There was no overall difference in leptin across the 12-weeks between exercisers and non-exercisers, however the exercise Responders showed a significant decrease in leptin (p<0.01) compared to Non-Responders and Controls who did not change. For total ghrelin there was an increase in Responders compared to no change in Non-Responders (p<0.01). There was an overall increase in acylated ghrelin in exercisers (p<0.02) but no difference between Responders and Non-Responders.

**Conclusions:** Exercise training improves fasting insulin and acylated ghrelin response irrespective of weight loss response. Leptin, total ghrelin and insulin also appear to be biomarkers for changes in body composition in response to prolonged exercise.
The Effectiveness Of A Combined Social And Physical Environmental Intervention On Need For Recovery In Office Employees: Results From A Randomised Controlled Trial.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose: To investigate the effectiveness of a combined worksite social and physical environmental intervention in office workers on need for recovery (NFR), exhaustion, detachment, relaxation, small breaks, stair climbing, physical activity and sedentary behaviour. Also, the effectiveness of the separate interventions was investigated.

Methods: In this 2x2 factorial design study, 412 office employees of a financial service provider participated. Participants were allocated to the combined social and physical environmental intervention, to the social environmental intervention only, to the physical environmental intervention only or to the control group. Outcomes were measured by questionnaires at baseline, 6 and 12 months follow-up. Multilevel analyses were performed to investigate the effects of the three interventions.

Results: In all intervention groups, a non-significant reduction was found in NFR. In the combined environmental intervention group (n=92), exhaustion and vigorous physical activities decreased significantly, and small breaks at work and active commuting increased significantly compared to the control group. The social environmental intervention group (n=118) showed a significant reduction in exhaustion, sedentary behaviour at work and a significant increase in small breaks at work and leisure activities. In the physical environmental intervention group (n=96), stair climbing at work and active commuting significantly increased, and sedentary behaviour at work decreased significantly compared to the control group.

Conclusion: None of the interventions was effective in improving the NFR. It is recommended to adapt the current interventions and to investigate the effectiveness of the interventions in employees with a higher NFR.
Does caffeine consumption induce higher volume of physical activity? Findings from a Japanese cohort study.

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\textbf{SIG:} No, this does not fit in any of the above mentioned special interest groups

\textbf{Awards:} No

\textbf{Purpose:} Coffee consumption has been associated with lower risks for dementia, cardiovascular diseases and diabetes. Considering the psychoactive properties of caffeine, such outcomes might be induced by a higher level of activity. The purpose of the present study is to investigate whether people with regular caffeine intakes present a specific pattern of physical activity (PA).

\textbf{Methods:} The Nutrition and EXercise Intervention Study (NEXIS) currently includes 1125 subjects aged between 23 and 88 years. Among them, 202 have been allocated to a 1-year PA intervention. Food and beverage intakes (including coffee and tea consumption) were estimated using the brief-type self-administrated diet history questionnaire. PA measurement were done on a 1-month period using accelerometer-monitors. First, a cross-sectional analysis has been performed. The 1125 subjects were assigned to either the high caffeine consumption group (equivalent to several cups of coffee per day) or low caffeine consumption group (one or less than one cup of coffee per day). PA was described using the following variables: moderate-to-vigorous PA (MET-h/day), daily step count, sedentary time, and volume of low-, moderate- and vigorous-PA (min/day). Second, the changes in PA were observed in the 202 subjects who completed the 1-year intervention. The relationship between the changes in PA and caffeine consumption was tested.

\textbf{Results/findings:} The cross-sectional analyses revealed significant higher levels of MVPA (4.0 vs. 3.5 MET-h/day), step count (10463 vs. 9850 steps), and significant higher volumes of moderate-PA (59.5 vs. 54.7 min/day) and vigorous-PA (2.7 vs. 1.7 min/day) in the high caffeine consumption group compared to the low caffeine consumption group (p<0.05). The longitudinal analysis revealed a good correlation between the change in moderate-PA and caffeine consumption after a 1-year intervention (r=0.179; p<0.05). Typically, regular caffeine consumers were able to increase about twice more (i.e. about 5min) their volume of moderate-PA, compared to subjects having milder consumption habits.

\textbf{Conclusions:} The present study suggests a positive effect of caffeine on 1) PA habits in Japanese adults, and 2) PA volume changes in inactive people engaged in a long-term PA intervention. Further studies are needed to understand whether caffeine-related PA habits can explain the positive effect of coffee consumption on health.
Reliability and validity of an athletic skills track to assess motor competence among 4- to 12-year old children in physical education

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SIG: Early care and education

Awards: No

Objective

Children’s motor skills are positively correlated with physical activity and health-related fitness. In order to increase our understanding of the longitudinal relationship between motor skills at young age and physical activity later in life valid assessment tools are needed. The purpose of the present study was to examine the reliability and validity of a novel, quick, convenient, and low-cost motor competence test, i.e. an Athletic Skills Track (AST), to assess children’s fundamental motor skills in a physical education setting.

Methods

During a regular PE lesson 717 Dutch children (344 girls, 373 boys; 4-12 years) completed two tests: the Körperkoordination-Test für Kinder (KTK) and an age specific Athletic Skills Track (grade 1-2: AST-1, grade 3-5: AST-2 and grade 6-8: AST-3). The ASTs consist of a series of 5 to 7 fundamental movement skills to be completed as fast as possible. The AST was completed twice, once at baseline and once two weeks later. The reliability of the AST was examined by calculating the intraclass correlation coefficient (ICC), by Bland & Altman plots and by examining the internal consistency of the tasks of the AST. The validity of the AST was examined by correlating the time needed to complete the track and the KTK Motor Quotient (MQ).

Results

The test-retest reliability of the ASTs was high ((AST-1: ICC=0.881 (95% CI: 0.780-0.934); AST-2: ICC=0.802 (95% CI [0.717-0.858]); and AST-3: ICC=0.800 (95% CI: 0.669-0.871). The Bland & Altman plots showed that ±95% of the data points were lying within ± 2 SD of the mean difference (AST-1: 96.3%; AST-2: 94.9%; and AST-3: 96.2%), indicating an acceptable level of agreement. Cronbach’s α coefficients of the ASTs ranged between 0.70 and 0.76. Overall there was a moderate to high correlation between the KTK MQ and the ASTs (AST-1: r = -.747, p = 0.01; AST-2: r = -.646, p = 0.01; and AST-3: r = -.602, p = 0.01).

Conclusions

The Athletic Skills Track is a feasible, reliable and valid motor competence test that can be used in a PE setting to gain insight in children’s fundamental motor competence level.
SO.4.2

PROFICIENCY AT OBJECT CONTROL SKILLS BY NINE- TO TEN-YEAR-OLD CHILDREN IN SOUTH AFRICA: THE NW-CHILD STUDY A.E. PIENAAR & M. VISAGIE

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SIG: Socio-economic inequalities

Awards: No

Objective

A growing body of evidence indicates that many children do not obtain proficiency in fundamental movement skills or are delayed in this regard. Adequate proficiency at object control skills, which is influenced by biological and environmental constraints, underlies the development of more complex sport-specific skills. Movement skills are also assumed to be basic to the development of context specific and skilful movement and an important steppingstone to lifelong physical activity. This study describes proficiency at six object control skills and demographic correlates associated with each skill and each skill criteria in 9- to 10-year-old children who were randomly selected from 20 schools (N = 826) and tested with the Test of Gross Motor Development-2.

Methods

Cross-tabulation and hierarchical linear models were used to analyze the effects of sex (433 boys, 393 girls), ethnicity (619 Black, 207 White), and high (n = 312) and low (n = 514) socioeconomic school environments.

Results

Twenty-three percent of the sample showed below average proficiency. Significant sex and socioeconomic school environment differences were found favouring boys and children from higher socioeconomic environments, although kicking showed significant interaction effects. Our results were also consistent with recent studies worldwide demonstrating lower proficiency in object control skills compared to the findings of previous studies.

Conclusion

It is concluded that environmental opportunities are the primary cause of differences across skills and the rates at which the skills are learned. This study provided evidence that environmental and biological constraints such as a poor socioeconomic environment and sex can be constraints in the proficiency that children reach at the age of 9-years in object control skills. However, cultural habits, sport preferences, environment, and opportunity can mediate this effect in poor socioeconomic environments by providing opportunities to practice skills, as was evident from the better kicking skills of children from lower socioeconomic environments.
SO.4.3

The effect of BMI and gender on FMS proficiency among adolescence.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Objective:

Fundamental movement skills (FMS) have been defined as basic observable patterns of movement (Gallahue & Ozmun, 2011). Research has shown that the mastery of FMS is associated with higher levels of physical activity (Cliff et al., 2009; Lloyd, Saunders, Bremer, & Tremblay, 2014). It is well known that adolescents are below expected FMS levels which may have a knock on effect on their physical activity participation (Booth et al., 1999; Hardy et al., 2013, 2010; Mitchell et al., 2013; O’ Brien et al., 2015). There is contrasting data available regarding the effects of a person’s Body Mass Index (BMI) on their FMS proficiency with most studies focusing on children (Dwyer-Lindgren et al., 2013; Lubans et al., 2011). Despite this being viewed as an important relationship a gap in literature remains among adolescents. It is hypothesised that BMI will have a significant effect on FMS proficiency however this may differ for males and females due to the onset of puberty at this age.

Methods

Data was collected from 436 participants (male N=219, female N=217) with an age range of 11-13 years. In total 15 FMS skills were tested using the TGMD, the TGMD-2 and the Victorian Skills Manual. BMI calculations for participants were carried out taking into account participants’ age (Cole, et al., 2000). Participants were divided into groups based on their BMI score; 1=normal weight (N=330), 2=overweight/obese (N=106). Data was statistically analysed using SPSS version 21.0 for windows.

Results:

There was no significant interaction effect found between gender and BMI on FMS scores (p>0.05). There was a significant main effect for both gender [F(1, 3)= 35.50, p=0.000] and BMI [F(1, 3)=44.43, p=0.000)] in relation to FMS proficiency (partial eta squared <.1) with males being consistently more proficient at FMS than females across all BMI categories. Similar results were observed for locomotor skill groups and object control skill groups, however, the effect BMI had on the performance of each individual skill differed greatly.

Conclusions:

Adolescence is a complex stage of development which must be researched further to prevent increasing physical activity drop out rates.
**SO.4.4**

**Organized sport trajectories from early childhood to late adolescence and their associations with health in young adulthood**

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**SIG:** Children and families  
**Awards:** Yes, for the Early Career Award**

**Purpose:** To identify organized sport participation trajectories from early childhood to late adolescence among participants in the Raine Study, an Australian pregnancy cohort, and to examine their associations with body composition in young adulthood.

**Methods:** Binary participation in organized sport was assessed at ages 5, 8, 10, 14, and 17 by parent-report. Physical activity and body composition were assessed at age 20. Repeated measures latent class analyses were used to identify patterns of participation in organized sport separately for girls and boys. Percent body fat and lean body mass were compared between trajectory classes using generalised linear models adjusted for the probability of trajectory class membership.

**Results:** Three trajectory classes were identified among girls: consistent sport participators (47.5% of participants), sport dropouts (34.3%) and sport non-participants (18.1%). Three trajectory classes were identified among boys: consistent sport participators (55.2%), sport dropouts (36.9%), and sport joiners (8.1%). Among girls, lean body mass (p=.003) and lean mass index (p=.06) differed between trajectory classes. Among boys, physical activity (p=.018), percent body fat (p=.002), lean body mass (p<.001) and lean mass index (p<.001) differed between trajectory classes. The relationships remained when adjusted for current physical activity levels. Among both girls and boys, those identified in the consistent participant groups had the overall best health profile at age 20. However, there were benefits conferred with inconsistent sport participation. For example, girls who dropped out of sport had higher lean mass index than those that never participated.

**Conclusions:** This study identified unique trajectories of organized sport participation in girls and boys, and these trajectories were associated with body composition in young adulthood. In order to maximise the benefits of sport participation, interventions are needed to identify and encourage both girls and boys in the dropout trajectories to stay in sport. Additional strategies may be needed for girls in the non-participator trajectory class to initiate involvement. Boys in the joiner trajectory may benefit from interventions to begin sports earlier.
SO.4.5

Objectively measured physical activity, sedentary time and motor skills associations in 5-6 years old children

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SIG: Children and families

Awards: Yes, for the Student Competition *

Objective: The relationship between physical activity (PA) and motor skills is a widely studied subject. However, not many studies have included the sedentary time in the research frame. In addition, the studies on the gender differences in motor skills are so far diverse. The first aim of this study was to compare the proficiency in motor skills by gender. The second aim was to examine the association between the motor skills and the PA, including the sedentary time, the kindergarten attendance and the body mass index (BMI, kg/m2). We hypothesized that motor skills is positively associated with the PA, and motor skills is negatively associated with sedentary time. Also, we hypothesized that motor skills is significantly associated with kindergarten attendance.

Methods: The data came from the longitudinal STEPS study (Steps to the healthy development and well-being of children) carried out in Turku in Southwest Finland (n=1797 families). The study participants were 5-6 year old children who attended the sub study of Physical Activity and Motor Skills (n=158). The PA was measured objectively with the Actigraph GT3X accelerometers, and motor skills with the complete form of BOT-2. We used a linear regression to examine the associations between motor skills, PA, sedentary time, gender, BMI and kindergarten attendance.

Results: Girls were significantly better in strength than boys (p=0.011). Girls were also better in fine motor integration, manual dexterity, bilateral coordination and balance. Boys’ upper-limb coordination correlated with PA (r=0.31, p<0.05). Girls’ sedentary time correlated with fine motor precision (r=0.24, p<0.05) and strength (r=0.23, p<0.05). Sedentary time was in linear association only with strength (p=0.044), gender (p=0.012) and BMI (p=0.013), adjusted for kindergarten attendance. PA was in linear association only with body coordination, within children who did not attend kindergarten (p=0.043). Children, who attended kindergarten, had better scores in other motor skills. The BMI was significantly associated with motor skills.

Conclusions: We found few associations between the motor skills and PA and sedentary time. These results indicate that motor skills are associated more significantly with other things than the PA or sedentary time. These possible factors are the BMI and kindergarten attendance.
Fundamental movement skill competence and body composition (measured by dual energy X-ray absorptiometry) in 9-11 year old children: a cross-sectional study

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SIG: Children and families

Awards: No

Purpose
This study aimed to examine cross-sectional relationships between fundamental movement skills (FMS) and objectively-measured body composition using dual energy x-ray absorptiometry (DXA) among primary school aged children. To the authors’ knowledge, this is the first study to use DXA to analyse the association between FMS and lean components of body composition.

Methods
This secondary analysis pooled data from the A-CLASS project and REACH Y6 study conducted in Liverpool, North West England. Two hundred and twenty 9-11yr. old children (Mage: 10.3±0.9 years; 91 boys) were included in the analyses. Percent total body fat (BF%), trunk fat (TF%), fat mass index (fat mass/height²: FMI), lean mass index (lean mass/height²: LMI), fat to lean mass ratio (F:L ratio) and bone mineral density (BMD) were determined by DXA, whilst anthropometric measurements (height, weight, sitting height, hip and waist girths) were also recorded. Eight FMS were assessed using video analysis and process-orientated measures. Partial correlations, adjusted for sex and maturity offset (years from peak height velocity), were used to explore associations.

Results
Small positive associations were found between FMS competence (locomotor \( r = .26 \), object-control \( r = .15 \)) and total FMS \( r = .24 \)) and BMD. Moderate inverse associations \( r = -.38 \text{ to } -.44 \)) were found between FMI, F:L ratio, BF% and TF%, and total FMS, though associations were larger for locomotor skills \( r = -.47 \text{ to } -.53 \)) than object-control skills \( r = -.19 \text{ to } -.22 \). Neither total FMS \( r = -.07 \), nor locomotor \( r = -.06 \) or object-control skill competence \( r = -.05 \) was associated with LMI.

Conclusions
The findings support previous research highlighting an inverse association between markers of central and whole body adiposity, and FMS competence, in what is likely a reciprocal relationship. In addition, results indicated that better FMS was correlated with stronger bone and F:L ratio profiles, though other factors may influence children's development of lean mass. Lower FMS - in particular low locomotor skill competence - may provide a barrier to participation in physical activity, which may contribute to weight gain and future health concerns.
Title: ‘Improve My Move’: Background and methodological considerations in the development of an Irish youth movement programme.

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SIG: Early care and education

Awards: Yes, for the Student Competition*

Purpose:
Recent research has shown that the majority of post-primary Irish youth are insufficiently active and fail to reach a level of proficiency in basic movement skill execution (O’Brien et al., 2013; 2015; Belton et al., 2014). Fundamental Movement Skills (FMS) are the basic observable building blocks of movement (Hands, 2012), whereas, Functional Movement Screening (FMS™) assesses biomechanical patterns and functional limitations (O’Connor et al., 2011). Physical activity (PA) participation levels decline dramatically during adolescence and evidence suggests that competency in a range of FMS may serve as a protective factor against this trend (Lubans et al., 2012). By critically examining FMS and FMS™, the aim of this baseline study (2015-16) is to assess participants’ psychomotor competencies within a range of selected movement tasks. From this, the next phase of the project will seek to design, develop, implement and examine the effectiveness of a movement-oriented intervention for Irish youth.

Methods:
Cross-sectional data will be collected in 2016 on 250 adolescents, aged 12 to 16 years old, across three urban post-primary schools in Cork, Ireland. Data gathered during physical education class will include FMS proficiency, functional movement screening, perceived movement competency, physical activity participation (self-report and accelerometry) and anthropometric characteristics. The specific data in relation to adolescent movement will be assessed using established instruments, namely the The Test of Gross Motor Development-2 (TGMD-2) (Ulrich, 2000), and the Functional Movement Screen (Cook et al., 1998).

Conclusions:
These baseline findings will guide the development of an appropriate and innovative post-primary school-based intervention (‘Improve My Move’), specifically designed to improve the quality of basic human movement during adolescence. This project will extend the evidence-base for feasible childhood programmes aiming to increase overall health, wellbeing and PA participation. This study is the first of its kind in Ireland, seeking to critically examine adolescent movement skill proficiency, at both a fundamental and functional level.
Lessons learnt from the qualitative process evaluation of the Bristol Girls Dance Project: Implications for the design and implementation of after-school physical activity interventions

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SIG: Early care and education

Objective: To consider key implementation issues associated with the delivery of the Bristol Girls Dance Project (BGDP) and identify improvements that may aid the design of after-school physical activity interventions.

Methods: A qualitative process evaluation of the BGDP, a two-armed cluster randomised controlled trial, was conducted. The BGDP was a 20 week school-based intervention, consisting of two 75 minute after-school dance sessions per week, which aimed to encourage Year 7 girls (aged 11-12) to be more physically active. The study took place in 18 secondary schools (nine control, nine intervention) in the Greater Bristol (UK) area. 571 girls participated.

This paper reports on qualitative data collected from three stakeholder groups; nine focus groups with a total of 59 girls in intervention schools, and interviews with 10 dance instructors and nine school contacts who were involved in the delivery of the BGDP intervention. Focus groups sought the views of girls on intervention engagement, teaching styles, and experiences of the intervention. Interviews with dance instructors and school contacts explored views on implementation and dissemination. A framework analysis was used to analyse the data.

Results: The qualitative data elicited three themes associated with the delivery of BGDP that affected implementation: the project design, session content, and intervention organisation. The context in which schools operated also played a significant role in influencing the implementation of the intervention. As a theme, ‘project design’ found issues associated with recruitment, timetabling, and session quantity (number and frequency of sessions) to influence the effectiveness of BGDP. ‘Session content’ found that dance instructors delivered a range of content and that girls enjoyed a variety of dance styles and group work. Themes within ‘project organisation’ suggested that an ‘open enrolment’ policy and greater parental involvement may facilitate better attendance.

Conclusions: After-school physical activity interventions have potential for increasing physical activity levels among adolescent girls. However there is a need to consider the context in which interventions are delivered and implement them in ways that are appropriate to the needs and requirements of participants. We provide numerous suggestions on how physical activity interventions can be better implemented in the school environment.
The HomeStyles Play More Sit Less Guide and Phone Discussions Promote Active Playtime in Families with Preschool Children

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SIG: Children and families
Awards: Yes, for the Student Competition*

Objective: The HomeStyles program aims to help parents of preschool children alter home environments and lifestyles to prevent childhood obesity. This study assessed the Play More Sit Less HomeStyles instructional guide's effect on parent cognitions and behaviors related to physical activity.

Methods: Parents (n=29) completed a baseline survey, reviewed the 4-page guide and participated in a short phone discussion with a dietitian, then completed a follow-up survey.

Results: Most participants were female (93%), white (83%), and had a college degree (97%). At baseline, 86% felt strongly that the time preschool kids spent watching TV should be limited, however 41% of their children exceeded total screen-time recommendation. Using 5-point scales, parents indicated it was important for children to be physically active and reported they encouraged their children to be physically active (means=3.8±0.96SD, 4.48±0.54SD). However, children were only moderately active (20.55±11.17SD, on 0-42 point scale). Content analysis of phone discussions focusing on the guide, which provides tips and ideas for increasing active playtime and decreasing screen-time, revealed that some parents used TV time to reward good behavior and allowed TV at mealtimes, and many permitted more screen-time on weekends. After reading the guide, many planned to limit screen-time and encourage active playtime. Many reported the guide made them more aware of their screen-time habits and benefits of reducing screen-time and increasing active playtime, with parents frequently citing improved sleep habits, weight management, and family social interactions, and reduced child irritability. Goals set by many parents after reading the guide were to actively limit TV time, encourage active play or alternative activities (e.g., reading) instead of screen-time, monitor or be more aware of family screen-time, communicate more with spouses about the importance of limiting screen-time, and improve the quality of children’s screen-time (e.g., limit to educational shows). Parents were very confident in their ability to meet these goals, mean=8.9±1.06SD on 10-point scale. At a later phone discussion, most reported that they successfully met the screen-time goals.

Conclusion: The Play More Sit Less guide, along with a brief phone discussion, has the potential to improve parent cognitions and behaviors related to physical activity.
SO.5.3

Strong culture, healthier lifestyles: what activities can Australian Indigenous children engage in afterschool to strengthen connections to culture and healthy lifestyles?

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Purpose: Current statistics show a 10-year life expectancy gap between Indigenous and non-Indigenous Australians. Previous attempts to reduce this gap have largely been ineffective due to lack of consideration of culture as the central point to health. Enabling Indigenous people to have a strong connection to their culture, and bringing culture to the centre of any health promotion program is fundamental to Indigenous health and wellbeing. The aim of this research was to explore perspectives of Australian Indigenous children, parents/caregivers and local Elders on activities that connect children with Australian Indigenous culture and healthy lifestyle choices, with a specific focus on nutrition and physical activity.

Methods: Using a descriptive qualitative approach, focus groups were conducted with 40 Australian Indigenous children aged 5-12 years (7 focus groups) and 16 parents/caregivers/Elders (5 focus groups) residing in three regional and rural communities in New South Wales, Australia. All focus groups were audio-taped and transcribed verbatim. Data were coded and categorised into key themes using inductive thematic analysis.

Results: Responses were categorised into the following themes - "Places", "Things to do", "People" and "Food/Drink". These themes were all interconnected and linked back to culture. Cultural activities commonly discussed included gathering native food (bushtucker) and participating in Indigenous dances, arts/crafts, games and sports with family members. The coast and bushland were common environments where participants engaged in cultural activities. Engaging in cultural activities gave participants a sense of identity and promoted emotional wellbeing.

Conclusions: Providing opportunities for children to engage in health enhancing cultural activities that connect them to their culture is a promising avenue for promoting healthy lifestyles in this population group. This study contributes to our understanding of current Australian Indigenous children’s activities, eating behaviours and cultural experiences and will inform the development of an afterschool Indigenous cultural program to be piloted in a larger study.
Using complex system principles to develop and trial a novel obesity prevention intervention: The Healthy Lifestyles Programme (HeLP)

Katrina Wyatt, Jenny Lloyd

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SIG: Children and families

Awards: No

Purpose: The development of a novel obesity prevention programme and accompanying RCT process evaluation using complexity principles

Background: Obesity is a major public health problem, sometimes referred to as a ‘wicked issue’. Wicked issues are more than complicated problems; they arise from complex dynamic systems with multiple interdependencies and feedback loops and demand a new approach to their prevention and management. Understanding obesity as a wicked issue suggests that the nature and interdependency of the relationships within the system are central to affecting the behaviours of the family, school and child.

Methods: Conceptualising the school and family environment as complex systems has underpinned the development of a novel childhood obesity prevention programme, the Healthy Lifestyles Programme, HeLP. Personnel involved in programme delivery are as much a part of the intervention as the programme components and careful consideration has been given to the personal qualities necessary for successful delivery. A process evaluation has been designed to capture system and individual properties such as engagement, uptake fidelity and adaptation.

Results: The HeLP intervention and trial design has been co-created with children, parents and teachers. Drama-based activities are used to allow the children to explore possibility spaces of new behaviours before identifying personal goals for new behaviours. Multiple feedback loops between the phases of the programme seek to build and reinforce new ways of thinking about and changing children and family behaviours. Each aspect of the programme has been defined in terms of its function as well as its form, allowing for local adaptivity. The process evaluation has captured child, teacher and school engagement. Each school is being considered as a ‘case’ and the process evaluation is looking for patterns between cases which support or inhibit uptake of programme for schools, children and their families.

Conclusion: The HeLP trial is one of the first interventions and evaluations which embraces and the open and dynamic characteristics of social systems. Responding to calls for obesity to be seen as a truly complex issue we have developed a programme which seeks to affect system level properties to support individual behaviour change.

349 words
SO.5.5

Mediating effects of dietary intake on the relationship between television viewing with BMI and the metabolic syndrome in adolescents

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: To determine the mediating effects of dietary intake on the relationship between television (TV) viewing, BMI and the metabolic syndrome (metS) among a large representative sample of adolescents in the United States.

Methods: The analysis was based on adolescents (12-19 years) participating in the 2003-06 US National Health and Nutrition Examination Survey. BMI z-score was calculated using age- and sex-adjusted height and weight, and metS was calculated using age- and sex-adjusted waist circumference, systolic/diastolic blood pressure, non-high-density lipoprotein cholesterol, triglycerides and plasma glucose. Hours (per day) spent watching TV were measured via a self-reported questionnaire. Dietary intake was assessed using two 24-hour recalls. A series of mediation analyses was conducted examining five dietary mediators (total energy intake, fruit and vegetable consumption, discretionary snack consumption, sugar-sweetened beverage (SSB) consumption and diet quality) on the relationship between TV viewing with BMI and the metS.

Results/findings: In total 3,161 participants had complete BMI profiles, and 1,379 participants had complete metS data. Approximately half of the sample were males, 38% were overweight or obese and 9.1% were classified as having the metS. Overall, TV viewing was significantly related to BMI (β=0.099, p<0.001), and remained significant after adjusting for each dietary mediators. However, no significant mediation was found with any of the dietary mediators. TV viewing was also significantly associated with the metS (β=0.163, p=0.46), and remained significant after adjusting for total energy intake and discretionary snack consumption. Fruit and vegetable and SSB consumption were found to be significant mediators, explaining 4.1% and 8.7% of the relationship between TV viewing and metS, respectively.

Conclusions: Contrary to our hypothesis, this study found that five aspects of dietary intake were not a significant mediator in the TV viewing and BMI relationship. However, consumptions of fruit and vegetables and SSB were found to be significant mediators in the TV viewing and metS relationship. This highlights the complexity of the relationships between TV viewing, dietary intake and cardiometabolic health outcomes. Further research is needed using longitudinal and experimental designs, and examining whether other sedentary behaviours have similar findings.
The impact of a school-based and family physical activity intervention on learners’ health behaviour

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SIG: Children and families

Awards: No

Objectives The aim of this study was to determine the impact of a school-based physical activity and family intervention on learners in a selected township in KwaZulu-Natal.

Methods. A quasi-experimental, non-equivalent groups design with an intervention programme and assessment pre- and post-intervention. Two schools (one control and one experimental) in Clermont Township, KwaZulu-Natal were purposively identified by the provincial Department of Health. Grade six learners (n=129), their parents (n=19), school principals (n=2) and educators (n=21) participated in this study. Learners completed a battery of fitness tests and completed a physical activity questionnaire. Principals and educators were interviewed and were required to complete the principals completed the International Physical Activity and Environment Network and the Situational Analysis of the School Environment questionnaires. Additionally, parents participated in focus group sessions. Aspects of the intervention were implemented in the experimental school for a four month intervention period by the educators. The school-based physical activity intervention was designed to introduce various methods of physical activity and healthy nutritional habits within physical education lessons in the school curriculum.

Results. Post-intervention results showed significant increases in the physical fitness of learners. Improved passion and knowledge from teachers to teach physical education was reported. Furthermore, the improved knowledge of physical activity and healthy lifestyle practices by parents, in turn, encouraged learners to participate in physical activity during lessons and after school.

Conclusion. Findings show that the introduction of various methods of physical activity within the schools’ existing curriculum, working with educators and parents can improve physical fitness and healthy eating habits in the learners without disrupting normal learning and teaching in the school. Furthermore, with limited exposure to physical activity and a positive parental influence, a positive attitude and subsequent practice towards physical activity participation can be promoted.
Effects of a school-based physical activity intervention on adiposity in adolescents: The ‘Physical Activity 4 Everyone’ cluster RCT.

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Objective:
The Physical Activity 4 Everyone (PA4E1) study is a multi-component physical activity intervention implemented in secondary schools from socio-economically disadvantaged communities, and resulted in a significant differential change in the primary outcome, daily minutes moderate-to-vigorous physical activity (MVPA) favouring the intervention group. The aim of this study was to determine the 12-month and 24-month adiposity outcomes of the study.

Methods:
A cluster randomised controlled trial was conducted between 2012 and 2014. The study involved 10 secondary schools in New South Wales, Australia. The school-based intervention included seven physical activity strategies targeting: the curriculum (teaching strategies to maximise physical activity in health and physical education lessons, student physical activity plans, implementation of an enhanced school sport program); school environment (physical activity during school breaks, modification of school policy); and parents and the community (parent engagement, the promotion of community physical activity providers). The secondary outcomes, students’ weight (kg), body mass index (BMI) and BMI z-score, were collected at baseline (Grade 7), 12- and 24-months. Linear Mixed Models were used to assess mean difference from baseline to 12-months and 24-months between intervention and control groups.

Results:
A total of 1150 students (mean age=12 years) provided outcome data at baseline, 1051 (91%) at 12-months and 985 (86%) at 24-months follow-up. At 24-months, there were significant group-by-time effects for weight (mean difference= -0.62kg, 95%CI= -1.21;-0.03, p=0.01) BMI (mean difference= -0.28, 95%CI= -0.49;-0.06, p=0.01) and for BMI z-score (mean difference= -0.08, 95%CI= -0.14;-0.02, p=0.02) favouring the intervention group.

Conclusion:
The PA4E1 school-based intervention was effective in achieving reductions in adiposity among adolescents from socio-economically disadvantaged communities. The PA4e1 program, may assist in preventing unhealthy weight gain among adolescents.
SO.6.1

International comparisons of built environment and transport-related walking and cycling: IPEN Adult Study

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Objective
Mounting evidence documents the importance of urban form for active travel, but international studies could strengthen the evidence. The aim of the study was to document the strength, shape, and generalizability of relations of objectively measured built environment variables with transport-related walking and cycling.

Methods
The IPEN Study is a cross-sectional study, which has maximized variation of environments and demographics by including multiple countries and by selecting adult participants living in neighborhoods based on higher and lower classifications of objectively measured walkability and socioeconomic status. Analyses were conducted on 12,181 adults aged 18-66 years, drawn from 14 cities across 10 countries worldwide.

Frequency of transport-related walking and cycling over the last seven days was assessed by questionnaire and four objectively measured built environment variables were calculated. Associations of built environment variables with transport-related walking and cycling variables were estimated using generalized additive mixed models, and were tested for curvilinearity and study site moderation.

Results
We found positive associations of walking for transport with all the environmental attributes, but also found that the relationships were not linear for residential density, intersection density, and the number of parks. Our findings suggest that there may be optimum values in these attributes, beyond which higher densities or number of parks could have negative impact. Cycling for transport was associated linearly with intersection density (only for any cycling) and land use mix, but not with residential density or number of parks.

Conclusion
Across culturally and geographically different countries and cities, our study underscores the importance of density, land-use mix, parks and street connectivity for supporting active travel in adults. The study adds some interesting new findings. First, a threshold effect of residential density on walking for transport was found, and residential density did not have a significant effect on cycling for transport. Second, both land-use mix and street connectivity were important for both walking and cycling for transport. Third, there was variation across sites how parks were related to active transport, and especially for cycling local policies and cultures of park use seem to play an important role for the potential positive effect.
SO.6.2

The Park Prescription Study: using mixed-methods to develop a physical activity based intervention for a multi-ethnic Asian population

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose
International research findings have highlighted the (cost-) effectiveness of prescribing physical activity to improve people’s health. Evidence also supports the role that natural environments play in enhancing health and the prevention of chronic diseases. Yet, few studies have looked into combining these promising approaches; i.e., physical activity prescription with a focus on the use of parks and green spaces. This mixed-methods study informs the development of a ‘Park Prescription’ intervention as a health promoting intervention for inactive community-dwelling individuals in Singapore.

Methods
Participants aged 40-65 years were recruited from the Singapore Population Health Community Screening Programme. They were asked to complete a survey and attend one of three focus group discussions. The survey included topics such as; current physical activity behaviour, knowledge of local parks, and the type, duration, and intensity of physical activities within the parks that would be of interest. In the focus groups, the concept of ‘Park Prescription’ and barriers and facilitators of physical activity (in parks) were explored.

Results
Ninety-seven participants (54.6±8.5 years, 38% males) filled in the survey. Although ‘exercising’ was reported by 30% of the participants as a reason to visit any park in their local area, no one reported having engaged in active sports during their most recent visit. The majority were interested to join self-guided or guided walking tours, with a smaller group being at least somewhat interested in other activities including tai-chi and Zumba. The preferred duration of activities in the park was 30 minutes, with a light-to-moderate intensity. The focus groups largely confirmed the survey results, and in addition highlighted the importance of social interaction. Common barriers mentioned were; time constraints, feeling too tired and concerns about hot weather and haze, whereas proximity/accessibility to the park facilitated park use.

Conclusions
Findings from this formative research informs the design of the final ‘Park Prescription’ intervention, including face-to-face physical activity and park use counselling and offering participants a weekly structured exercise program in the park. Its effectiveness in promoting physical activity, park use, as well as physical and mental well-being will be tested in a 1-year Randomized Controlled Trial.
Is neighbourhood urban form associated with different types of neighbourhood-based physical activity?

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SIG: Policies and environments

Awards: No

BACKGROUND: Studies consistently find associations between urban form and walking, yet few have investigated urban form in relation to other types of physical activity. The study objectives were two-fold: 1) to estimate the associations between neighbourhood urban form and four neighbourhood-based physical activities including transportation walking (TW), recreational walking (RW), moderate-intensity physical activity (MPA), and vigorous-intensity physical activity (VPA), and; 2) to estimate the association between neighbourhood urban form and total neighbourhood-based physical activity.

METHOD: N=4423 (response rate=35.2%) adults (Calgary, Canada) completed telephone-interviews capturing physical activity, gender, age, education, home ownership, dependents <18 years of age, reasons for residing in the current neighbourhood, and postal code. Postal codes were geocoded and used to create a 1.6km network-based ‘walkshed’ around each participant’s home. Within each walkshed, we estimated walkshed area, population density, proportion of green space, path/cycleway length, business destination density (i.e., stores and services), bus stop density, sidewalk length, park type mix, and recreational destination mix using existing spatial databases. We converted all environment variables to z-scores. Covariate-adjusted generalized linear models, estimated the associations between built characteristics and ‘participation’ (odds ratios: OR) and ‘minutes’ (unstandardized β; among participators only) in neighbourhood-based TW, RW, MPA, VPA, and total physical activity.

RESULTS: TW ‘participation’ was associated (p<.05) with destination (OR=1.10) and intersection density (OR=1.51), and sidewalks (OR=1.19) while TW ‘minutes’ was associated with destination density (β=19.15 min/wk), city owned trees (β=6.41 min/wk), and recreational destination mix (β=-8.84 min/wk). RW ‘participation’ was associated (p<.05) path/cycleways only (OR=1.17). MPA ‘participation’ was associated with recreational destination mix (OR=1.09) and sidewalks (OR=1.10) however, MPA ‘minutes’ was negatively associated with population density (β=-9.32 min/wk) only. VPA ‘participation’ was associated with sidewalks (OR=1.11) and path/cycleways (OR=1.12) but negatively associated with the proportion of green space (OR 0.89). VPA ‘minutes’ however, was associated with tree density (β=7.27 min/wk). Total minutes of neighbourhood-based physical activity was positively associated (p<.05) with sidewalks (β=18.11 min/wk) and destination density (β=25.59 min/wk).

CONCLUSION: Different built characteristics may be associated with specific physical activities. The impact of built environment modifications on all physical activity types should be considered in the planning and design of neighbourhoods.
Development of a national walkability index: addressing the challenge of land use data

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose:

Land use mix is an important component of walkability. However in Australia, no national land use dataset exists, making it challenging to calculate nationally comparable walkability indices. Therefore, this study aimed to identify a dataset that could be used for this purpose by comparing associations between walkability and transport walking for three land use datasets, including a custom dataset developed for this study.

Methods:

The Victorian Integrated Survey of Travel and Activity provided data on participant demographics, residential location, trip mode, and trip origins and destinations. From this, a context specific measure of transport walking within the residential neighbourhood was derived.

Walkability indices were calculated around residential addresses of adults residing in Metropolitan Melbourne who travelled to or from their neighbourhood on the survey day (n = 16,890).

The walkability index comprised dwelling density, street connectivity, and land use mix. Three different walkability indices were calculated for each participant using distinct land use datasets: a ‘benchmark’ parcel-level dataset (not available nationally), meshblocks, and a custom dataset. Land use datasets were visually inspected and compared.

Walkability indices were categorised into quartiles. Analyses were repeated at three scales: 400, 800, and 1600 m.

Multilevel logistic regression was undertaken using Stata. Each walkability index and scale combination was assessed in separate models which were adjusted for sex, age, income, household structure, day of week, work status, study status, vehicle availability, and driver’s license.

Results:

In general, across all walkability indices and scales, the odds of any neighbourhood transport walking were significantly higher (p<0.001 or p <0.01) for those living in more walkable neighbourhoods. The magnitude of the odds ratios ranged from 1.5-7.4 across all models and showed similar patterns regardless of the land use dataset used. However, visual inspection of the land use datasets revealed that meshblock land use did not adequately represent the mix of uses in capital cities.

Conclusion:
For Australian research we recommend a custom land use dataset similar to that used in this study. International researchers with limited data access could use a custom land use dataset approach.

SO.6.5

The health benefits of the great outdoors: A systematic review and meta-analysis of greenspace exposure and health outcomes

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Background: There is much evidence to suggest that exposure to greenspace may be beneficial to health, however a greater understanding of the magnitude of effect by which greenspace is associated with health is needed. Several studies have shown greenspace to be associated with lower mortality, as well as reduced cardiovascular disease and psychiatric problems yet there is evidence to suggest that these health benefits may not be simply associated with the physical activity opportunities provided by green environments.

Objectives: Previous systematic reviews have investigated the link between greenspace and physical activity/obesity, but none have looked at the association between greenspace exposure and the broader range of health outcomes. This systematic review was undertaken to fill this evidence gap and help define the mechanisms by which greenspace may be beneficial to health.

Methods: A systematic review. Health outcome search terms were taken from the World Health Organisation lists of disease and greenspace search terms were taken from a previous systematic review on greenspace and obesity (Lachowcyz and Jones, 2011). MEDLINE, EMBASE, CINAHL, PsychINFO and AMED were searched from inception up to January 2015.

Results: After assessment for eligibility using the predefined inclusion and exclusion criteria, 104 studies were included. Data was synthesised and meta-analysis carried out where appropriate. Meta-analysis results have shown increased greenspace is associated with a non-significant decrease in both systolic (-3.05mmHg) and diastolic (-3.36mmHg) blood pressure. Following sub-group analysis, participants who underwent forest-based interventions had significantly decreased salivary cortisol levels (-0.07μg/dL (-0.11, -0.03)) and heart rate (-3.71bpm (-5.60, -1.81)) compared to control groups. Further findings have illustrated health-denoting relationships between greenspace and diabetes, self-rated health and birth weight.

Conclusions: This systematic review demonstrates the broad range of health outcomes associated with greenspace exposure. The ability to synthesise literature was limited by heterogeneity of study design, exposure and outcome measures. Further research is needed to hypothesise and investigate potential mechanisms by which greenspaces are beneficial to health.
"How is defined my neighborhood?" Determinants of self-defined neighborhood size across 5 European urban regions (The Spotlight project)

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SIG: Policies and environments Awards: No

Objective. The neighborhood is recognized as an important unit of analysis in research on the relationship between obesogenic environments and individual behaviors. In most studies linking contextual characteristics at residential neighborhood level to nutrition and physical activity behaviors, pre-defined boundaries (census tract, buffer) are used to define residential neighborhoods. However, pre-defined boundaries may not match with neighborhood limits as perceived by residents. The aims of our study were to document variability in size of self-defined neighborhoods, and to assess associations with individual and contextual characteristics in 5 European urban regions (in Belgium, France, Hungary, the Netherlands and United Kingdom).

Methods. A web-mapping tool was developed to self-draw the limits of perceived neighborhoods. All geographical coordinate points were included in a Geographical Information System (GIS) to form an enclosed area (polygon boundaries) representing the self-defined neighborhood of a given participant. Three-level Poisson regression models were used to assess associations of mean size (in km²) with individual (age, gender, educational level, employment status, BMI, residential length, attachment to residential neighborhood) and contextual characteristics (both residential density and SES levels of administrative neighborhood, and region of residence).

Results. Data were obtained from 4,374 subjects from 60 neighborhoods across the 5 European regions. The mean (SD) size of self-defined neighborhood was 1.96 (4.00) km² with differences between regions (ranging from 0.78 km² in Paris to 3.53 km² in Budapest). Among individual-level factors, age, gender, educational level, length of residence, and neighborhood attachment were significantly associated with self-defined neighborhood size. Participants living in areas with high residential density drew smaller self-defined neighborhoods (compared to participants living in low residential density areas). In addition, the analyses provided evidence that the effect of the study region was limited.

Conclusion. The results demonstrate substantial variation in self-defined neighborhood associated with a number of individual and contextual characteristics. This variation should be taken into account when operationalizing what a neighborhood is, as well as for the use of self-defined neighborhoods as study areas when investigating associations between environmental characteristics and health behaviors.
The Association between Parent Perceived Neighborhood Safety and Encouragement with Child Outdoor Physical Activity among Texas Children

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SIG: Children and families

Awards: Yes, for the Student Competition*

Purpose: A growing body of research has studied the relations between perceived neighborhood safety and parental encouragement for child physical activity, yet these potential predictors have not been studied together to predict child outdoor physical activity. The overall objective of this study is to examine these predictors of child outdoor physical activity and parent and child report of child outdoor physical activity.

Methods: This cross-sectional analysis examined data from the Texas Childhood Obesity Research Demonstration (TX CORD) program. Using self-administered surveys, data were collected from fifth grade students attending 31 elementary schools across the cities of Austin and Houston and their parents to include 748 parent-child dyads. Mixed effects logistic regression models adjusted for sociodemographic covariates were utilized to assess associations between (i) parental perceived neighborhood safety and parental encouragement for child's outdoor physical activity, (ii) parental encouragement for child's outdoor physical activity and parent-reported and child-reported child's outdoor physical activity, and (iii) parental perceived neighborhood safety and parent-reported and child-reported child's outdoor physical activity.

Results: Parental perception of neighborhood safety was positively associated with encouragement for letting their children to play outside (OR=1.02, 95% CI=1.00-1.05), with a trend towards significance. A significant association was found between parental encouragement for outdoor physical activity and child report of outdoor physical activity (OR=1.66, 95% CI=1.08-2.55). Parents who encouraged their children to engage in outdoor physical activity reported even higher odds for children's outdoor physical activity compared to parents who did not encourage their children (OR=5.51, 95% CI=3.46-8.76). Parental perception of neighborhood safety was not associated with either parent or child report of child's outdoor physical activity, even after adjusting for parental encouragement of outdoor physical activity.

Conclusions: Parent encouragement of outdoor physical activity is an independent predictor of child outdoor physical activity and should be targeted to increase physical activity in children in behaviorally-based interventions. In addition, environmental factors were not significant with child outdoor physical activity.
**SO.7.1**

*Interactions between neighborhood social environment and walkability to explain Belgian older adults' physical activity and sedentary time*

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**SIG:** Ageing

**Awards:** No

**Purpose:** This study investigated the cross-sectional association between the neighborhood social environment of older adults and their self-reported and objectively-measured levels of physical activity (PA) and sedentary behavior (SB). Moreover, since socio-ecological frameworks posit that PA and SB are determined by an interplay between different factors, this study investigated interactions between the neighborhood social and physical (walkability) environment and the association with PA and SB in this age group.

**Methods:** Community-dwelling Belgian older adults (n=431) reported cross-sectional data on neighborhood social environmental factors, including ‘talking to neighbors’, ‘social contacts with neighbors’, ‘social trust and cohesion’, and ‘neighborhood satisfaction’. The physical environmental factor, neighborhood walkability, was measured objectively. Outcome measures used in the present study were self-reported walking for transport, walking for recreation, and TV viewing time and objectively-measured MVPA and overall sedentary behavior. Multilevel regression analyses were conducted using MLwiN 2.30, investigating main effects of neighborhood social environmental factors and possible interactions of neighborhood social environment factors with walkability.

**Results:** ‘Talking to neighbors’ was positively associated with higher levels of MVPA, transport walking and recreational walking, but no main effects of the social environment were found for the SB variables. Interaction analyses showed that only in high-walkable neighborhoods, ‘neighborhood satisfaction’ was positively associated with transport walking; ‘talking to neighbors’ was negatively associated with overall SB; and ‘social contacts with neighbors’ was negatively associated with TV viewing time. In low-walkable neighborhoods, no associations between the neighborhood social environment and PA/SB were observed. Neighborhood social trust and cohesion was not associated to any of the outcome variables, neither did we observe interactions between walkability and this neighborhood social environmental variable.

**Conclusions:** These Belgian data findings suggest that a combination of both a favorable neighborhood social and physical environment might be important to promote higher levels of older adults' transport walking and lower levels overall SB and TV viewing time. More research is needed to unravel the interplay between different socio-ecological factors to explain PA and SB in this population age subgroup.
**SO.7.2**

**Everybody’s working for the weekend: changes in enjoyment of everyday activities across the retirement threshold.**

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**SIG:** Ageing

**Awards:** No

**Objective**

There is strong evidence of a link between happiness and health, and momentary hedonic affect is an important component of happiness. One factor determining affect is the type and context of activity we are engaged in. The aim of this study was to explore the associations between use of time and enjoyment in adults in the peri-retirement period.

**Methods**

Using a computerised use-of-time recall, a sample of adults [71 males, 70 females; age 62.0 (4.5) years] recalled every activity they did on four separate days at each of four time points (3-9 months pre-retirement, 3, 6 and 12 months post-retirement). The participants recalled a total of 71,975 activity instances across 1964 person-days. After recalling each activity they were asked how much they enjoyed it on a 0-10 scale. Participants also completed a questionnaire on self-reported health, wellbeing and sleep quality, and negatively associated with loneliness. An individual Enjoyment Index was calculated as the time-weighted average of each participant’s enjoyment ratings, averaged across the four days of each time point. Unweighted enjoyment ratings were also calculated for each of nine mutually exclusive and exhaustive activity domains (Sleep, Chores, Work, Social, Screen Time, Self-care, Quiet Time, Transport and Physical Activity).

**Results**

The mean (±SD) Enjoyment Index was 7.35±0.90. The Index was significantly and positively associated with self-reported health, wellbeing and sleep quality, and negatively associated with loneliness. Mean Enjoyment Index values increased significantly (p<0.0001) from pre-retirement (7.07 ± 0.86) to post-retirement (7.39 ± 0.90, 7.32 ± 0.91 and 7.40 ± 0.85 at 3, 6 and 12 months post-retirement respectively, mean effect size = 0.33). Enjoyment varied across activity domains (p<0.0001), the most enjoyable domains being Physical Activity (mean rating = 7.85 ± 1.24), and Social (7.83 ± 1.45), and the least enjoyable Work (7.06 ± 1.43) and Chores (7.14 ± 1.44). Enjoyment of all domains except Physical Activity increased across the retirement threshold.

**Conclusion**

Enjoyment of everyday activities increased after retirement and remained elevated for at least 12 months. Work appears to constitute a relative hedonic deficit.
Efficacy Of Two Different Exercise Programs On Health Indicators In Aging African Women

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SIG: Ageing

Awards: Yes, for the Student Competition *

Introduction: There is a consensus that aging people should be involved in regular physical activity. However, research on interventions methods for these populations in African are scarce. **Objective:** To evaluate and compare the effectiveness of two different types of exercise interventions in health indicators in a group of aging African females. **Method:** 69 elderly woman (66.9±6.6 years old) participated in the study in acquisition intervention phases without interruption, three times a week classes and one hour of exercise a day. The acquisition phase lasted 12 weeks. The subjects participated randomly in two exercise groups, namely Formal (EFG) and Playful (ELG). The EFG held 20-minute sessions of aerobic work ergometer cycle with exercise intensity controlled between 65 to 85% of maximum heart rate (HR max), plus 8 muscular endurance exercises to 15 repetition maximum (RM) while the ELG conducted exercises recreational activities including games and traditional dances. The percentage of body mass index (% BMI); body fat (% FAT); the distance walked in 6 minutes (6MW) and self-efficacy (Autef) were evaluated in the pre and post1 intervention. **Results:** Acquisition was observed in %BMI (EFG=-2.0%, p=0.098; ELG=-0.7%, p=0.217), % FAT (EFG = 2.20%, p <0.001; ELG = 1.60%, p = 0.001), 6MW (EFG=6.84%, p <0.001; ELG=4.08%, p=0.002) and Autef (EFG=6.14%, p=0000; ELG=12.96%; p=0.003), with no statistical difference between the groups. **Conclusion:** The results suggest that the African older women can benefit from participate on exercise programs regardless the type of exercise applied in this study. This benefits included improved the levels of cardio respiratory fitness and self-efficacy.
**SO.7.4**

**Effects of a higher protein weight loss diet and exercise training on body composition and strength in overweight older women**

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**SIG:** Ageing

**Awards:** No

Weight loss typically improves physical function in overweight older adults; however, concurrent reductions in both lean mass and strength increase risk of sarcopenia. Exercise training during weight loss attenuates muscle and strength loss. The beneficial impact of a higher protein weight loss diet, with or without exercise, on body composition and muscle strength during weight loss is less established. **Purpose:** The aim of this study was to compare the effects of a higher protein weight loss diet (HP), combined with exercise (HP+EX), or a conventional protein diet plus exercise (CP+EX) on body composition and muscle strength in sedentary overweight women. **Methods:** Postmenopausal women completed (n=61, BMI=31.1±5.1 kg/m², 69.2±3.6 y) a 6 month intervention after randomization to HP (n=20), HP+EX (n=19), or CP+EX (n=22). The moderate-high intensity supervised EX intervention (75 min/session; 3 sessions/week) included cardiovascular and strength training. A dietitian prescribed a ~500 kcal/day reduced diet with 30% or 18% kcal/day from protein for HP and CP, respectively, and ~30% kcal/day from fat. Measures included body composition via dual-energy X-ray absorptiometry; thigh composition via magnetic resonance imaging; thigh muscle strength via maximal isokinetic knee torque using isokinetic dynamometry at 60 deg/s. A mixed model ANOVA with Group (G; between-subjects factor) and Time (T; within-subjects factor) with post-hoc analyses determined treatment effects. **Results:** Retention was similar across groups (n=27*3 groups=81 randomized; 75%). Weight loss (7.5±4.1 kg; -9.2±4.8%) and reductions in whole body fat mass and lean mass did not differ between groups (all G*T=P>0.05). Thigh muscle loss was greater in HP (-4.0±3.2 cm²) compared to HP+EX (-0.9±1.8 cm²) and CP+EX (-0.9±3.1 cm²) and paralleled changes in thigh muscle strength with HP losing (-6.4%) and HP+EX (+7.2%) and CP+EX (+5.7%) gaining strength (both G*T=P<0.05). **Conclusions:** Exercise training during weight loss in older women is critical to preserve muscle and strength; however, a higher protein diet does not appear to influence body composition changes when combined with exercise. Research is needed to explore the potential interactions of various dietary protein intake levels and exercise/physical activity programs for optimal body composition change with weight loss in older women.
Objective neighbourhood characteristics and neighbourhood-based physical activity of Dutch older adults - a GPS- and accelerometer study

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SIG: Ageing

Awards: No

Purpose: Studies have generally linked neighborhood characteristics to overall physical activity, including activities that took place in other locations than the neighborhood. The aim of this study is to compare whether we find stronger associations of neighborhood characteristics with neighborhood-based physical activity than with overall physical activity.

Methods: Older adults (n= 107) provided valid GPS- and accelerometer data (2011-2012). Multivariate multilevel regression models were used to examine associations of objective area characteristics (aesthetics, functional features, safety, and destinations) of the 400-m, 800-m, and 1200-m street network buffers surrounding participants homes, with: 1) neighborhood physical activity, i.e. physical activity within these same buffers, outside home; 2) overall physical activity in all locations, in- and outside home.

Results: On average, participants spent 161.8 minutes per day outside their residences, i.e. 67.2 minutes light or moderately active, and 94.6 minutes sedentary. About half of all active outside-home time was spent within the 400-m buffer (30.7 minutes), ranging up till 50.2 minutes within the 1200-m buffer. For neighborhood physical activity, associations were found with safety and aesthetics of the 400m-buffer, destinations of the 800m-buffer, and destinations and safety of the 1200m-buffer. Overall physical activity was only associated with destinations in the 800m- and 1200m-buffers. When inside-home physical activity was removed from the overall physical activity outcome, findings were almost similar to neighborhood physical activity.

Conclusions: More associations with neighborhood characteristics were found for neighborhood physical activity than for overall physical activity. However, when only outside-home overall physical activity was considered, similar associations with neighborhood characteristics were found as for neighborhood physical activity. Thus, for older adults, excluding inside-home physical activity from total physical activity may give a sufficient spatial match when investigating environment- physical activity associations, since this population group spend most of their outdoor time in their residential area anyway.
The Short-Term Effects Of A Sports Stacking Intervention On The Cognitive And Perceptual Motor Functioning In Geriatrics Moodley

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SIG: Ageing

Awards: Yes, for the Student Competition*

Purpose: To determine the short-term effects of a sports stacking intervention on the motor and cognitive functioning in geriatrics. The motor functioning evaluated hand eye coordination, reaction time and selected psychometric tests. The cognitive functioning evaluated memory and balance.

Methods: This quasi-experimental design with a pre- and post- intervention selected a convenient sample of 60 geriatric participants in a retirement home located in the eThekwini region, KwaZulu-Natal. Participants were between 60 - 90 years old, had no physical disabilities, had no sports stacking experience, had no medical conditions of Alzheimer's or Parkinson's disease or medication for Vertigo, hand-eye coordination or memory, had no orthopedic complications, and were sedentary. All participants' height and weight measurements were recorded. Performance on hand-eye-coordination (plate tapping test) reaction time (position speed test), Memory (SOMCT questionnaire), balance (Sharpened Romberg test), and psychometric tests (Lawton Active Daily Living Questionnaire) were tested pre- and post-intervention. Thirty participants were exposed to an eight week intervention twice a week for 60 minutes while the control group (n=30) remained inactive. Pre- and post-test results were analysed using the statistical program SPSS Version 19. Paired t-test statistics were used to test significant differences pre- and post-intervention.

Results: The intervention group showed improvements in their reaction time ($x^{-}=4.464$) and plate tapping ($x^{-}=2.629$) times. However, the control group also had an increase in reaction time ($x^{-}=1.933$) and plate tapping ($x^{-}=1.538$) times. The improvements found in the control group were not as significant as what was found in the intervention group. Overall, there was no changes in the balance results pre- and post-intervention. There was no significant results found in their memory, psychometric and hand-eye co ordination tests. However, the intervention groups’ sports stacking times improved.

Conclusions: From all the data gathered it was apparent that the sports stacking intervention proved to be beneficial in improving motor functioning in geriatrics. Additional research needs to be conducted using a larger sample size.
SO.7.7

EFFECTIVENESS OF A PEDOMETER INTERVENTION IN INCREASING PHYSICAL ACTIVITY AND PROMOTING CHANGES IN METABOLIC SYNDROME COMPONENTS IN OLDER ADULTS

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: The aim of this study was to analyze the effectiveness of a pedometer intervention in promoting physical activity and changes in metabolic syndrome components in older adults. Our hypothesis was that the intervention would be effective in increasing physical activity, which in turn would lead to improvements in the components of metabolic syndrome. Methods: A convenience sample of 62 women aged 60+ years classified with presence of metabolic syndrome was included in this study. Participants answered a questionnaire containing information on sociodemographics, health, and behavioral variables, and also underwent anthropometric (body mass, height, waist circumference), blood pressure and biochemical (triglycerides, HDL-C, total cholesterol, and blood glucose) assessments. Participants were then assigned to an intervention or control group. The intervention group was asked to use a pedometer daily and was encouraged to increase the number of steps/day by 10% monthly. The control group was asked to keep their habitual routine. After 12 weeks of intervention, participants answered the same questionnaire and underwent the same assessments conducted at baseline. At the end of the intervention period, 14 participants from the intervention group reached the action stage of the ‘Stages of Behavior Change’, while no older adults from the control group reached this stage. For data analyses, descriptive (mean, and standard deviation) and inferential (t-test, and repeated measures ANOVA) statistics were used. Results: The intervention group showed an increase in number of steps/day (Pre: 2915.0±1437.1 steps/day, Post: 5568.7±2872.1 steps/day), and significant reductions in fasting glucose (Pre: 117.9±62.1 mg/dL, Post: 106.7±29.3 mg/dL), triglycerides (Pre: 168.9±70.7 mg/dL, Post: 156.3±54.3 mg/dL), and total cholesterol (Δ= -4.7±41.6 mg/dL). Conclusion: A 12-week pedometer intervention was effective in increasing physical activity, changing behavior and improving metabolic parameters in older adults. Our results demonstrate that pedometers may be used as an strategy to promote physical activity and metabolic health improvements in community-based interventions.
Activity clusters and mental health in young adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Objectives: To identify latent classes of physical activity and sedentary patterns among young adults and their associations with mental health.

Methods: Australian young adults (\(n=773\), mean age, 22.1) participating in the Raine Study wore an Actigraph GT3X+ accelerometer on the hip. Sex-specific latent class analyses identified classes of individuals using nine indicators derived from accelerometers: daily steps, total daily MVPA, variation in MVPA, average intensity of MVPA, duration of MVPA bouts, sedentary-to-light ratio, variation in sedentary-to-light ratio, duration of sedentary bouts, and breaks from prolonged sedentary time. Mental health variables from SF-12 and DASS-21 were compared between classes using generalized linear models.

Results: For women (\(n=324\)) and men (\(n=304\)) four classes were identified. Both women and men had three similar classes identified: an average class, with average levels of each indicator (45% of women, 41% of men); non-MVPA active class, with high steps but average MVPA amount and intensities and a positive sedentary profile (29% of women, 19% of men); and an inactive and sedentary class, with low steps, low MVPA and a poor sedentary profile (20% of women, 33% of men). For women a high MVPA low sedentary class with high steps, high total MVPA, MVPA variation, MVPA intensity, and MVPA bout duration and a positive sedentary profile was identified (6% of women). For men a high MVPA class with high MVPA variation, MVPA intensity, and MVPA bout duration with an average sedentary profile was identified (6% of men). In women, the inactive and sedentary class had poorer self-rated mental health compared to all three other classes and higher depression scores than those in the average class (mean difference 0.4, 95%CI: 0.1, 0.6). In men the high MVPA class had improved self-rated mental health compared to the average (4.3, 95%CI: 0.4, 8.2) and inactive and sedentary (5.5, 95%CI: 1.3, 9.8) classes and lower depression scores than the other three classes.

Conclusions: Above average MVPA profile was cross-sectionally associated with improved mental health in men and an inactive and sedentary profile was associated with poorer mental health in women. This pattern may be indicative of regular exercisers or sports participators.
Different measures of physical activity and fitness in association with academic achievement

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: The evidence regarding the association between physical activity and academic performance has been somewhat inconsistent, perhaps due to the different methodologies used to measure both physical activity and academic performance. The purpose of this study was to determine how different measures of physical activity and fitness are associated with academic achievement.

Methods: In 2013, there were 977 children from nine schools throughout Finland who participated in the study. They were in grades 4–7 (age range 9.2–15.3 years, 52.4% girls). Children’s moderate to vigorous physical activity (MVPA) was measured objectively by using an ActiGraph GT3+ accelerometer for seven consecutive days. Children also self-reported their MVPA by describing on how many days they were physically active for a total of at least 60 minutes per day during a) the last seven days and b) for a usual week. Children’s aerobic fitness was measured with a maximal 20 m shuttle run test. Self-reported physical fitness was also assessed. Academic achievement scores (grade point average (GPA)) were provided by the education services. Structural equation modeling was applied to examine the associations. Confounding factors such as gender, age, body mass index, mother’s educational level, and children’s learning difficulties were taken into account.

Results: The results are presented using standardized estimates. Objectively measured MVPA was not associated with GPA ($β=0.017$, $p=0.667$). Self-reported MVPA was positively associated with GPA both for the last seven days ($β=0.066$, $p=0.041$) and for a usual week ($β=0.124$, $p<0.001$). Also aerobic fitness ($β=0.249$, $p<0.001$) and self-reported physical fitness ($β=0.154$, $p<0.001$) had a positive association with academic achievement.

Conclusions: The objectively measured aerobic fitness had the strongest positive association with academic achievement after controlling with confounding factors. In addition, self-reported physical activity and fitness were positively associated with academic achievement. It seems that the method used to measure physical activity has an effect on the association between physical activity and academic achievement. Measures reflecting regular or long-term physical activity may have a stronger association with academic achievement than measures reflecting short-term physical activity.
SO.8.3

Successful implementation of "Move for Well-being in Schools".

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SIG: Theories of motivation

Awards: Yes, for the Early Career Award**

Purpose:

The potential of physical activity for mental health of children are well-established, but is conditional of the context and social climate. 'Move for Well-being in Schools' is an ongoing multicomponent intervention study, aiming at increasing positive experiences with physical activity and thereby increasing well-being. The activities are induced by teachers throughout the school day. The purpose of this analysis is to measure important factors associated with successful implementation.

Methods:

'Move for Well-being in Schools' is a randomized controlled trial with 2x12 schools targeting children in 4th-6th grade (10-13 years). Teachers conduct activities in three areas: Physical Education (PE), recess and in-class-activities. Involved teachers are prepared for the one year intervention on three full-day workshops; web-based materials; and local school coordinating groups. The intervention was designed to target student autonomy, relatedness and competence (self-determination theory). A process survey was conducted 10 weeks after the second workshop. The following questions were stated: Do you feel well-prepared to do conduct the activities (self-efficacy); do you expect a positive impact on student well-being (relevance); do you find it challenging to motivate the students for the activities (student resistance); do you have time to plan and execute activities (resources). For the following results the response categories 'to a high degree' and 'to some degree' are collapsed and presented.

Results:

A total of 116 teachers initiated the survey (response rate=69%). The questions regarding PE were only answered by the PE-teachers (n=40). In-class-activities had highest rating on teacher self-efficacy (94%) and lowest on student resistance (25%). Recess had the lowest rating on resources (19%) and together with in-class-activities the highest rating on relevance (90%). PE had the highest rating on resources (58%) and student resistance (68%), but lowest on relevance (70%).

Conclusions:

In-class-activities appear to be the easiest to implement, as teachers feel confident, have the necessary time, perceive the activities as relevant and meet little student resistance. Recess activities are challenging as very few teachers feel they have the time and they are not very confident in the activities. PE is challenged by high student resistance, but is the area where most resources are available.
The globalisation of physical activity interventions for childhood obesity prevention: is physical health all that is at stake?

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Background: Within the context of the global childhood obesity epidemic, numerous global health interventions have emerged. Indeed, in 2009 Active Healthy Kids Canada (AHKC) partnered with Healthy Active Kids Kenya (HAKK) in the promotion of physical activity to children. Although Kenya has very low obesity rates, this partnership constructs Kenyan children as being at significant risk of a future obesity epidemic.

Objectives: The objectives of this research were to: 1) gain a local understanding of physical activity promotion by exploring how children are being differentially constructed as being at risk of obesity in Canada and Kenya, and 2) examine how new social and physical risks may emerge for Kenyan children within global obesity prevention programmes.

Methods: This research draws on qualitative methods to investigate the promotion of physical activity to children in Canada and Kenya. Interviews were conducted with 15 members (i.e., directors, researchers, students) of the Canadian and Kenyan physical activity promotion programmes (AHKC & HAKK). Archival materials (i.e., research reports, intervention documentation) produced by the two organisations were also collected. All interviews and archival documents were qualitatively analysed using Bacchi’s (2009) approach to discourse analysis.

Results: Preliminary findings suggest that ‘risk’ with regard to children’s physical activity is differently constructed in Canada and Kenya. Canadian children are considered primarily at risk of obesity due to sedentary leisure, and interventions thus promote outdoor active play to prevent risk. In Kenya, physical activity promotion requires a greater negotiation of diverse risks, both physical and social. While the risk of future obesity is considered important for preventive efforts, playing actively outdoors as a solution is also confronted with other realities children may face: serious and immediate social and physical risks (e.g., crime and violence).

Conclusion: The risks children encounter in Kenya are significantly different from concerns that Canadian children face, and as such pose different problems for physical activity programmes. Continuation of this work will address important emerging ethical questions: i) how are risk and health negotiated through local understandings of leisure in childhood? ii) does the introduction of physical activity programmes displace other activities that Kenyan children engage in?
Physical activity and sedentary time during childhood and adolescent cognitive performance.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective
Among youth, executive function tasks have been shown to be positively related to academic achievement and negatively related to obesity-related behaviors. Youth executive function (low inhibition) is also associated with adulthood unemployment and compromised health. Given the immediate and long-term outcomes related to executive function, it is important to explore the influential role of childhood behaviors. This study examined the association between childhood physical activity/sedentary time and adolescent cognitive tasks. Cross-sectional associations during adolescence were also examined.

Methods
Data came from the Study of Early Child Care and Youth Development. During childhood (9 yrs) and adolescence (15 yrs), physical activity and sedentary time were assessed with an accelerometer across seven days. At 15 yrs, participants completed cognitive tasks to assess impulse control (WAI impulse subscale), interference (Stroop task), working memory (OSPAN), cognitive planning (Tower of London), and risk-taking (BART). Associations (longitudinal and cross-sectional) between accelerometer-derived variables and cognitive tasks were examined using linear regression. Unstandardized (B) coefficients (95% CI) were reported after minimal (accelerometer wear time) and full adjustment (wear time, birth weight, gestational age, ethnicity, birth order, mother's age, mother's education, and BMI z-score).

Results
Sedentary time at 9 yrs predicted greater cognitive planning (B = 0.049) and risk-taking (B = 0.026) at 15 yrs in girls. Higher activity (vigorous and MVPA) at 9 yrs was associated with lower levels of adolescent impulse control in boys (B = -0.006 and -0.003, respectively) and lower risk-taking in girls (B = -0.204 and -0.080, respectively). At 15 yrs, sedentary time was associated with working memory (boys = 0.059; girls = 0.057) and cognitive planning (boys = 0.060; girls = 0.037). Cross-sectional analyses also revealed an inverse association between cognitive planning and light activity, and also separately between working memory and light activity and MVPA. Reported associations remained significant after full adjustment (P < 0.05).

Conclusions
As expected, associations were relatively stronger for cross-sectional, compared to longitudinal, analyses. Although significance was reported for some longitudinal associations, continued study is necessary to understand the role of habitual sedentary exposure and physical activity on subsequent cognitive tasks.
Acute effects of reduced sitting time on executive function in young children

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose:
It has been suggested that to enhance executive function in children, the amount of time spent sitting should be limited. The purpose of this study was to examine the acute effects of a reduced sitting day on executive function in pre-school-aged children.

Methods:
A sample of 24 children (54\% boys; mean age=4.7 years) participated in a within-subject randomised cross-over trial. Each child spent 2.5hr in a whole room calorimeter and was randomly assigned to two different protocols; a typical preschool day (50\% sitting) and a reduced day (25\% sitting) where sitting activities were replaced with standing activities. MVPA was kept constant across the two protocols. Sitting time was objectively assessed using an activPal accelerometer. Three executive functions (inhibition, working memory and shifting) were assessed using the Early Years Toolbox. A mixed model was used to test the difference in each of the three executive functions between the typical and reduced pre-school day.

Results
No significant differences were found in each of the three executive functions measures inhibition, working memory and shifting between the typical and reduced preschool day. Inhibition and working memory scores improved slightly on the reduced preschool day compared to the typical day (mean=0.74 vs. 0.72; p=>0.05, 2.17 vs. 2.14; p=>0.05). Shifting scores were somewhat lower on the reduced day compared to the typical day (6.7 vs. 6.9; p=>0.05).

Conclusion
This study suggests that replacing sitting time with standing is unlikely to result in changes in executive function over an acute period of time among young children.
Dietary recommendations aiming to improve children’s diets also benefit academic achievement

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SIG: Early care and education

Awards: Yes, for the Student Competition*

Objective Adequate nutrition is essential to children’s health and development. While research has suggested the association of diet and academic performance, no earlier study has assessed the importance of adherence to established dietary recommendations for academic performance.

Methods Data from a cross-sectional children’s health survey of 1,595 grade 5 (10-11 years) students in Alberta, Canada was used. Dietary intake was assessed using a validated food frequency questionnaire. Adherence to dietary recommendations developed by Health Canada (food groups), the United States Department of Agriculture (saturated fat), and the WHO (free sugars) was assessed. Survey data was linked to standardized provincial exam results written in grade 6. Academic achievement was represented by average percentage achieved on exams. Multivariable mixed effects linear regression models were employed to assess the association between adherence to recommendations and academic performance. Gender, energy intake and socioeconomic status were included in the models as potential confounders.

Results Children who met current recommendations for free sugars (<10% total energy intake) scored on average 3.70% better on exams (β: 3.70 [95%CI: 1.83, 5.29]). Within the subgroup of adhering students, we observed a gradient of decreasing academic achievement with increasing sugar intake (-0.54% decrease in exam scores per 1% increase in free sugar [-1.02, -0.66]). Those who met recommendations for milk and alternatives (3-4 servings) scored 2.70% better on exams (β: 2.70 [95%CI: 0.42, 4.98]). Compliance with other dietary recommendations was not found to be associated with academic achievement in a statistically significant manner.

Conclusions Adherence to current dietary recommendations has benefits for both health and academic achievement. This evidence justifies the promotion of healthy eating in schools. It also supports restricting the sale of sugary drinks and foods in schools as this competes with their key objective of optimal academic achievement.
Reliability of a parental questionnaire for assessing correlates of physical activity and sedentary behavior among toddlers

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SIG: Early care and education

Awards: Yes, for the Early Career Award**

Objective: To examine internal reliability and test-retest reliability of a questionnaire developed to understand modifiable correlates of toddler’s physical activity and sedentary behavior within the Socialization Model of Children’s Behavior (SMCB).

Methods: Findings are based on 118 parents of toddlers (19.3±2.7 months) recruited from four immunization clinics in Edmonton, Canada as part of the PREPS study. The PREPS questionnaire was developed to include relevant items for each construct of the SMCB including: children’s behavior (physical activity, sedentary behavior, sleep), children’s personal attributes (activity temperament), parental cognitions (barrier self-efficacy and outcome expectations for limiting screen time and supporting physical activity), parental behaviors, (modeling and limits of screen time and sitting, modeling and social support of physical activity), and home and neighbourhood environment (neighbourhood safety, suitability of playgrounds, availability of electronic and physical activity equipment, electronic equipment in the bedroom, yard space). The majority of items were based on a previous questionnaire developed by the research team, questionnaires identified in the literature, and those used by a national survey. Cronbach’s alpha (α), intra-class correlations (ICC; continuous variables), and Kappa statistics (Κ; categorical variables) were calculated to assess reliability.

Results: Of the nine variables assessed for internal reliability, eight were rated as good (α≥ 0.70) at time 1 and time 2. Negative outcome expectations for supporting physical activity (time 1: α=0.61; time 2 α=0.68) was the exception. Of the 17 continuous variables assessed for test-retest reliability, six had good (ICC≥0.75), nine had moderate (ICC=0.50-0.74), and two had poor (ICC<0.50) reliability. Children’s physical activity (ICC=0.094) and negative outcome expectations of screen time limits (ICC=0.417) were the two variables with poor reliability. Of the six categorical variables assessed for test-retest reliability, two had fair (Κ=0.21-0.40), one had moderate (Κ=0.41-0.60), one had substantial (Κ=0.61-0.80), and two had perfect (Κ=0.81-1.00) reliability.

Conclusions: The majority of variables had moderate to perfect reliability, suggesting the PREPS questionnaire is a useful tool for assessing SMCB constructs in toddlers. Future work will assess the model fit of the SMCB in predicting physical activity and sedentary behaviour in a larger sample of toddlers using the PREPS questionnaire and accelerometer measures.
SO.9.2


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SIG: Early care and education

Awards: No

Objective
Few school-based interventions have been successful in reducing physical activity decline in adolescent populations. As a result, a very limited number of cost effectiveness analyses have been conducted. This study aims to report the cost and cost effectiveness of the Physical Activity 4 Everyone (PA4E1) intervention implemented in secondary schools.

Methods
The PA4E1 cluster randomised controlled trial was implemented in 10 secondary schools (5 intervention: 5 control) and consisted of intervention schools receiving seven physical activity promotion strategies and six additional strategies that supported school implementation of the physical activity intervention strategies. Costs associated with the implementation of the physical activity intervention and intervention implementation strategies within five intervention schools were compared to the costs of usual physical activity practices of schools in the control group. The total cost of implementing the intervention was estimated from a societal perspective, based on the number of enrolled students in the target grade at the start of the intervention (Grade 7, n = 837). The economic analysis outcomes were the incremental cost effectiveness ratios for the following: minute of MVPA per day gained and MET hours gained. Project records were used to estimate intervention costs.

Results:
The intervention cost AUD $329,952 over 24 months, or $394 per student in the intervention group. This resulted in a cost effectiveness ratio of $49 per additional minute of MVPA, and $0.53 per MET hour gained.

Conclusion: PA4E1 is a cost effective intervention for increasing the physical activity levels and reducing unhealthy weight gain in adolescents, a period in which physical activity typically declines.
Association of Access to Quality Physical Activity Resources with Body Composition in Mexican School Children

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SIG: Policies and environments

Awards: No

Purpose
Research in high-income countries has shown that access to physical activity resources (PAR) may reduce overweight prevalence. Little is known about these relationships in middle-income countries, like Mexico. This study examined the association of quantity and quality of PAR with measures of body composition in Mexican school children.

Methods
Children (N=1,236, M= 9.6, SD=1.1 years, 53.1% female) in grades 3 through 5 at participating schools who were apparently healthy, ambulatory, present on the day of assessment, had parent informed consent and child assent were measured for BMI and waist circumference (WC). Parents completed survey measures of demographics in this cross-sectional study. PAR were audited with the PAR Assessment (PARA, ©2010) in school neighborhoods (800 meter radial buffer; Guadalajara n=10, Mexico City n=13, Puerto Vallarta n=4). Neighborhood socioeconomic status (SES) was calculated by weighting the buffer proportion of each census tract Urban Poverty Index (UPI; educational attainment, household income, household size, population density) score by the total population within the buffer. Separate multilevel logistic regression models were constructed for each outcome (BMI percentile, WC and overweight status). PAR quantity and quality indices were introduced as quintiles, and models were adjusted for individual characteristics (age, sex, number of children in the household) and neighborhood UPI. Neighborhood buffers were introduced as the clustering variable.

Results
Median BMI percentile was 78.3 (SD=29.2), mean WC was 67.7 cm (SD=12.4), with 42.1% of the sample overweight. The final sample included 135 PARs (parks 36%, combination resources 24%, sport facilities 19%, plazas 6%, fitness clubs 6%, schools 5%, open spaces and other 4%). Quantity of PARs and BMI percentile were positively associated (p trend=.023), and several single categories of PAR were associated with WC and overweight status, suggesting that the positive relationship between neighborhood PAR and body composition may exist in normal weight rather than overweight children.

Conclusions
Observed relationships between PAR and body composition may be more complex in middle income countries and warrant further investigation, as PAR within Mexican communities may be prime channels for implementing health promotion messages and programming that reach the wide majority of the population.
**SO.9.4**

**Children’s route choice during active transportation to school: differences between shortest and actual route**

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**SIG:** Policies and environments

**Awards:** Yes, for the Student Competition*

**Background:** This study uses an innovative method to investigate which characteristics of the built environment are supportive or hindering for active transportation to school (ATS). Characteristics of the actual walking and cycling routes between home and school are compared with the shortest possible route to school. This will give a better understanding of environmental correlates that are associated with route choice during ATS.

**Methods:** Children (n=184; 86 boys, 98 girls; age range: 8-12 years) from seven schools in suburban municipalities in the Netherlands participated in the study. Actual walking and cycling routes to school were measured with a global positioning system (GPS) device that children wore during an entire school week. Measurements were done in the period April-June 2014. Route characteristics for both actual and shortest routes were determined with a buffer of 25 meters and divided into four categories (Land use, Aesthetics, Traffic and Type of street). Comparison of characteristics of shortest and actual routes was done with conditional logistic regression models.

**Results:** Average distance of the walking trips was 462.1±360.5 meters, whereas cycling trips were on average 894.4±891.1 meters long. Actual trips were not significantly longer than shortest possible routes. Children mainly traveled through residential areas on their way to school (>80% of the route). Moreover, percentage of water along the actual route was higher compared to the shortest routes (both for walking and cycling). Traffic lights were the only traffic measures that were found to be positively associated with route choice during ATS. On the other hand, zebra crossings were less often present along the actual routes (walking route: OR=0.17, CI=0.05-0.58; cycling route: OR=0.31, CI=0.14-0.67), and streets with a high occurrence of accidents were less often used during cycling to school (OR=0.57, CI=0.43-0.76).

**Discussion:** This study showed a novel approach to examine built environmental exposure during active transport to school. Most of the results of the study could be explained because children that walked or cycled to school seemed to avoid the busy roads on their way to school.
Cluster analysis of children’s lifestyle behaviours using a compositional analysis approach: a 12-nation study

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SIG: Children and families

Awards: Yes, for the Student Competition*

Objective: The paradigm shift currently underway in the physical activity field calls for the compositional nature of daily time use to be considered. This study used a compositional analysis approach to identify clusters of children based on their lifestyle behaviours, and explored whether children's weight status and health-related quality of life differed among clusters.

Methods: Design: This study used cross-sectional data from the International Study of Childhood Obesity, Lifestyle and the Environment. Participants: Children aged 9-11 years (2767 boys and 3274 girls) from 12 different countries. Measures: 24-hour accelerometry, and self-reported diet and screen time were used as clustering input variables. Outcomes were BMI z-scores based on measured height and weight and health-related quality of life (KIDSCREEN-10). Analysis: To accommodate the compositional nature of 24-hour time use, accelerometer-measured activity behaviours were transformed to centred log ratios before clustering. Separate analyses were performed for boys and girls. Once clusters were identified through hierarchical and k-means algorithms, differences in BMI and health-related quality of life were compared across clusters using ANOVA. Chi-squared was used to determine whether cluster membership differed by country.

Results: A four-cluster solution emerged from analyses, with similar lifestyle behaviours defining clusters for both boys and girls. Clusters were characterised as: (1) "Techno-actives" (high physical activity, high screen time, high food intake); (2) "Screenies" (low physical activity, high screen time, high unhealthy diet score); (3) "Retro-actives" (high physical activity, low screen time); and (4) "Inactives" (low physical activity, low screen time). Body mass index z-scores varied significantly across clusters for both boys and girls, being highest in Screenies and lowest in Techno-actives. Health-related quality of life varied significantly only across the girls' clusters, and was highest for Retro-actives, and lowest for Techno-actives. Cluster membership varied by country, notably South African and Kenyan children were over-represented in the Techno-active clusters.

Conclusions: Based on lifestyle behaviours, children can be clustered into groups of differing BMI (boys and girls) and health-related quality of life (girls). Findings suggest that the adaptation of potential interventions to specific groups of children may be beneficial for the improvement of weight status and health-related quality of life.
SO.9.6

Associations between BMI, the desire to be larger and self-reported physical activity in 12-year-old children

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SIG: Theories of motivation

Awards: Yes, for the Student Competition*

Purpose: Declines in physical activity (PA) behaviour are often observed through early adolescence. Considerable attention has been given to the desire to be thinner in influencing these physical activity patterns; however, the same cannot be said for young peoples' desire to be larger in body size. The present study aimed to fill this gap by exploring time varying (i.e., within-person changes) and stable (i.e., individual differences) associations among children's body mass index (BMI), their desire to be larger, and their self-reported PA levels. Mediation processes and the moderating influence of gender were investigated.

Methods: Participants were 705 children (M = 12.4 ± 0.3 years (at baseline), 387 females), all recruited from UK schools. Study variables were measured five times over an 18 month period (BMI was measured three times). PA and the desire to be larger were self-reported using validated questionnaires and BMI was calculated from measurements of children's height and weight. Data were analysed utilising multilevel modelling techniques using MLwiN 2.25 software.

Results: Intrapersonal increases in BMI over the study period were associated with lower levels of physical activity (b = -.22, p < .001). Although increases in BMI also predicted less desire to be larger (b = -1.49, p = .002), this desire did not predict PA (b = -.05, p = .08), therefore, no mediation was evidenced. These processes did not differ across gender. Individual differences in BMI did not directly predict PA levels (b = -.00, p = .89). However, differences in BMI negatively predicted differences in the desire to be larger (b = -1.82, p < .001), and individual differences in the desire to be larger negatively predicted PA (b = -.148, p = .004). Importantly, significant gender interaction effects suggested that this process occurred in boys but not girls.

Conclusions: Results suggest that children's relative changes in BMI might be more useful in predicting self-reported PA patterns, compared to normative BMI scores. Moreover, the desire to be larger might be a negative predictor of PA levels in young adolescent males.
Association between childcare educators' practices and preschoolers' physical activity level and dietary intake

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SIG: Early care and education

Awards: Yes, for the Student Competition*

OBJECTIVE: Since preschoolers spend 30 hours or more per week in childcare centres, childcare educators may be positive role models for healthy eating and physical activity (PA) behaviours among these children. The purpose of this study was to identify which childcare educators’ practices are associated with preschoolers’ dietary intake and PA levels.

METHODS: This cross-sectional analysis included 723 preschoolers from 51 randomly-selected childcare centres in New Brunswick and Saskatchewan, Canada as part of the Healthy Start study. Physical activity was assessed using Actical accelerometers worn during childcare hours for five consecutive days. Children’s dietary intake was measured at lunch using weighed plate waste and digital photography on two consecutive days. Childcare educators’ practices were also assessed by direct observation during these two days, using the Nutrition and Physical Activity Self-Assessment for Child Care tool (NAP SACC). Associations between educators’ practices and preschoolers’ PA and dietary intake were examined using multivariate linear regressions.

RESULTS: Average daily intake in fruit and vegetables (59.8g) and fibre (2.8g) was low, while the intake in sugar (12.4g) and sodium was high (481.2mg). Children spent considerably more time in sedentary activity (306.7 min/day), and very little time in moderate-to-vigorous PA (MVPA) (11.1 min/day). Children’s caloric intake was higher (β=0.54, p=<0.001) when educators modelled healthy eating and lower (β=-0.88, p=<0.001) when they either educated children on nutrition or did not use food as rewards for good behaviour (β=-1.04, p=0.01). Children ate more fruit and vegetables (β=0.12, p=0.032) and fibre (β=0.05, p=0.001) when educators used satiety recognition practices, and more fibre (β=0.05, p=<0.001) and sugar (β=0.04, p=0.003) when they verbally encouraged children to eat healthy foods. None of the PA related practices were associated with total PA, MVPA, light PA or sedentary time.

CONCLUSIONS: Educators’ nutrition practices are associated with children’s dietary intake at lunch in childcare centres. Therefore, childcare centres should continue to encourage healthy nutrition practices as a way to promote healthy eating among preschoolers. Although PA practices where not associated with children’s PA levels, educators should aim to create opportunities to increase PA and reduce sedentary time in childcare centres.
A tool to facilitate calculation of percent body fat measurements generalizable to Americans 8 years and older

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: To describe the American Body Composition Calculator (ABCC) for Researchers, a SAS tool designed to implement percent body fat calculations based on recently developed sets of equations that are generalizable to the American population 8 years of age and older (Stevens, et al., Int J Obesity, Epub ahead of print, 2015).

Methods: Dual-emission X-ray absorptiometry (DXA) assessed percent body fat from the 1999-2006 NHANES was used as the response variable for development of 14 equations for each gender that included between 2 and 10 anthropometrics. Models were developed using the Least Absolute Shrinkage and Selection Operator (LAASO) in 11,884 males and 9,215 females. Seven of the 14 gender-specific models had R2 values of approximately 0.8 and exhibited low bias by age, race/ethnicity and body mass index (BMI). The developed equations were complex including non-linear terms, interactions and as many as 52 coefficients. A SAS macro was written and independently tested to facilitate calculation of percent body fat in large data sets. In addition, investigators not involved with the development of the equations pilot tested the instructions for use of the macro.

Results: The ABCC macro is downloaded by the user and run in SAS using instructions provided online. Users apply specific variable names to their data, and the program returns a column of the calculated percent body fat, one for each subject. Our testing showed the ABCC macro produced identical results to at least 4 decimal places to those obtained by an independent investigator who applied the same equations to the same data using an Excel spread sheet. Investigators who were not involved in the development of the equations were able to follow the step-by-step instructions to use the program. The macro and instructions are available at http://abcc.sph.unc.edu.

Conclusions: To our knowledge these are the first equations that have been shown to be valid and unbiased in both youth and adults to estimate DXA assessed body fat. The ABCC facilitates their use by researchers.
Nudging the food environment towards healthier choices: A systematic review of positional influences on food choice.

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Objective: Nudging or ‘choice architecture’ refers to strategic changes in the environment that are expected to alter people’s behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. Nudging strategies may be used to promote healthy eating behaviour. However, to date there is a lack of systematic scientific evidence that would enable practitioners and policy makers to implement or argue for the implementation of specific measures to support nudging strategies. This systematic review investigates the effect of positional changes of foods on food choice.

Methods: Seven scientific databases were searched using relevant key words to identify interventions that manipulated food position (proximity or order) to generate a change in food selection, sales or consumption amongst normal weight or overweight individuals across any age group. From 2576 search results, 15 papers, comprising 18 studies met the inclusion criteria.

Results: This review identifies that changes in both food product order and proximity can influence food choice and may be promising approaches to impact on changing consumer behavior. However, there is a strong need for high quality studies that quantify the magnitude of positional effects on food choice in conjunction with food intake, particularly in the longer term.

Conclusions: Future studies should use outcome measures such as change in grams of food consumed or energy intake to allow quantitative assessment of impact and potential impact on nutritional health. Further, more research is needed to assess potential compensatory behaviors that could result secondary to positional interventions. Practical advice for laboratory and field experiments is presented and implications for policy makers are discussed.
Evaluation of a Youth-led Intervention for Childhood Obesity Prevention Among Urban, African-American Youth: Perceptions and Impact among Youth-leaders

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: Youth-led interventions potentially create two forms of impact: on the youth-participants receiving the intervention and on youth-leaders delivering it. However, few youth-led nutrition interventions assess the impact of the intervention on youth-leaders. The purpose of this study is to comprehensively assess the impact of the B'More Healthy Communities for Kids multi-level intervention on 16 Baltimore-based young people who served as youth-leaders versus a comparison group of 10 youths who were not youth-leaders.

Methods: In-depth interviews were used to assess youth-leaders' perceptions of the study impact. Structured questionnaires assessed differences over time in diet, psychosocial factors, and leadership skills of youth-leaders versus the comparison group, using a difference-in-differences analysis, which allowed for the non-random group design.

Results: In-depth interview themes revealed that youth-leaders perceived that the intervention impacted them, as well as youth-participants, and the social networks of both groups. Difference-in-differences analyses found that youth-leaders experienced greater increases in intentions to eat healthfully versus the comparison group (β=2.7, Robust Standard Error=1.2, p=0.03), and perceived significant decreases in support for healthy eating from their friends, compared to the comparison group (β=-3.2, Robust Standard Error=1.4, p=0.03).

Conclusion: These results show that youth-leaders perceived multiple levels of intervention impact and increased their own intentions for eating healthier. However, the increase in youth-leaders’ healthy eating intentions did not translate into improvements in their dietary intake. Additional youth-led interventions are needed to build on these results, and to create stronger programs that will progress from changing behavioral intentions to actual behavior change among the youth delivering interventions.
‘We need to know more’: Exploring the role of exercise in the management and treatment of eating disorders.

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SIG: E- & m-health

Awards: Yes, for the Student Competition*

Objectives: Health professionals have recently begun to explore exercise as a treatment method to support main therapies for eating disorders (EDs). Yet little research exists that explicitly and comprehensively examines exercise management and utilization as a supportive treatment for EDs in North America. The purpose of this study is to explore the perceptions of ED health professionals concerning the role of exercise as a supportive treatment method for EDs and to identify potential best practices for incorporating exercise in ED treatment.

Methods: Purposeful sampling was used to identify international health professionals with expertise in ED treatment and management (n=13). Expertise was determined through published scholarly research on exercise and EDs, and/or by current clinical work and interest in the roles of exercise within ED treatment. Explorative semi-structured interviews were conducted to capture participants’ insights into the role of exercise in treatment and management of EDs. An interview guide was created based on the research literature and project objectives. Verbatim transcripts were analyzed using a thematic analysis supported by NVivo.

Results: All participants believed exercise held potential to act as a supportive treatment for EDs due to various benefits for patient health and prognosis. However, participants also described a lack of evidence based information and resources available to those working in the field, specifically regarding how to incorporate exercise and/or what type of exercise would best support ED treatment. Participants explained that the status of exercise as a novel and potentially controversial method to treatment acted as a barrier. Additional practical barriers (i.e., funding, appropriate staffing, challenge of introducing new philosophy in established programs) were also identified. In order to integrate exercise effectively and safely into treatment protocols, participants recommended a revaluation of the role of exercise and the barriers that currently restrict exercise in ED treatment.

Conclusion: Findings from this research will help to address the large knowledge gap concerning the role of exercise in the treatment of EDs. Moreover, it will be the first to initiate potential best practice approaches and recommendations for incorporating exercise into the treatment of ED.
Ps. 1.011

Psychological predictors of dietary adherence in Chinese overweight and obese adult participants of a lifestyle modification program

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose:
Dietary adherence has been reported to be associated with weight loss. The aim of this study is to identify psychological predictors of dietary adherence after one month participation in a community-based Lifestyle Modification Program (LMP) among Chinese overweight and obese adults.

Methods:
Chinese overweight and obese Chinese adult participants newly enrolled in LMP were recruited. Data on 82 participants (79.3% female, mean age 40.5±9.9, BMI 28.3 ± 4.2, body weight 74.4± 13.4kg, 53.7% had attained at least tertiary education, 48.8% with monthly family income HKD20001-50000) were analyzed. A structured self-reported questionnaire was administered at baseline and one month after joining the program to measure their perceived support from registered dietitians/nutritionists, nutrition knowledge, self-efficacy, motivation and stage of change of maintaining a healthy diet. Body weight was measured at baseline and one month using Seca 220. The primary outcome, dietary adherence, was represented by a total dietary adherence score with a range of 0 to 32 derived from evaluating a 4-day food record at one month. Higher score indicates higher dietary adherence. Univariate analyses including t-tests, ANOVA, Pearson and Spearman Correlations were done to identify potential psychological variables to be entered to multiple linear regression analysis. Multiple linear regression analysis was performed to identify significant psychological predictors of dietary adherence at one month with adjustment for age, sex, family income.

Results
At one month, participants lost 2.8 ±1.7 kg (p<0.001), corresponding to a reduction of 3.7% of initial body weight. Mean total dietary adherence score was 23.3±0.6. There was significant increase in nutrition knowledge (p<0.001), self-efficacy (p<0.001) and stage of change (p<0.001) after one month participation. Higher total dietary adherence score was significantly associated with greater percentage of weight loss at one month (r=-0.223, p<0.05). Univariate analyses suggested that higher self-efficacy at baseline (r=0.262, p=0.01) and one month (r=0.281, p=0.01) were associated with higher total dietary adherence score. However, the significant relationships disappeared in the multiple linear regression analysis.

Conclusions
Participants in LMP had increased nutrition knowledge, self-efficacy and stage of change one month after joining the program. Self-efficacy may be a potential predictor of dietary adherence. Further studies with larger sample size are warranted.
Nudging buffet-consumers to a healthier meal composition independently of the individual's capacity to exert self-control

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Purpose: This study aimed to promote a healthy meal by 'making the healthy choice the easy choice'. The experiment was designed to increase visual variety at a lunch session, as a means to increase fruit and vegetable consumption. The study furthermore hypothesized that the effect would be independent of the individual's capacity to exert self-control and their strength of habits to consume fruit and vegetables. This study is the first to include measures of self-control and strength of habits as explanatory variables in a Nudging intervention.

Methods: A crossover design with a minimum 10-day wash out period in-between intervention and control was employed. Forty-four healthy adults were assigned to either start with intervention or control serving. The same food was available in both servings, but the intervention serving had the fruit and vegetable components separated into individual bowls to increase visual variety. Food choice and exact consumption quantities were measured using intelligent devices hidden in the buffet. Additionally, the participants completed: two executive function tasks for self-control, one self-administered self-control questionnaire, a brief food frequency questionnaire, and a questionnaire on fruit and vegetable habits, physical activity and bodyweight. Three analytical tools were used: a hierarchical regression analysis, paired t-test and Pearson's product correlation.

Results/findings: The quantity of self-served fruit and vegetable was significantly increased in the intervention setting (+34g, p=0.038), whereas no significant changes were found for the remaining meal components; rice and chili con carne. The effect of the intervention was found to be independent of individual capacity to exert self-control. Habits were further found to explain a great variance in the self-reported fruit & vegetable consumption.

Conclusions: Strong habits and low capacity to exert self-control in dietary situations might explain some of the social gradient within public health nutrition. Nudging interventions rely on automatic cognitive processes that require little or no reflective decision-making. This study illustrates how increasing visual variety can promote healthy food consumption across all levels of self-control. Future advancement in behavioral nutrition research should map the role of habits and self-control in the daily food choices consumers make.

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Purpose

Owing to large portions and over-consumption of processed foods, the growing prevalence and associated burden of diet-related diseases continues. Workplaces are recognised as potentially suitable environments to promote healthy dietary behaviours. However, uncertainty remains regarding the effectiveness of workplace dietary interventions. Interventions to date have been of low-intensity, poorly evaluated, and have failed to evaluate cost outcomes. A cost-effectiveness analysis (CEA) was employed to assess the Food Choice at Work (FCW) dietary interventions. The FCW study assessed the comparative effectiveness of a complex workplace environmental dietary modification intervention and an educational intervention both alone and in combination relative to a control workplace in four manufacturing workplaces in Cork, Ireland. Environmental dietary modification included: restriction of fat, sugar and salt, increased availability of fruit and vegetables, discounts for fruit, strategic positioning of healthier alternatives and portion size control. Nutrition education included: presentations, nutrition consultations and detailed nutrition information. This study aims to assess the cost-effectiveness of complex dietary interventions focused on environmental dietary modification and nutrition education methods both alone and in combination compared to the control workplace.

Methods

A decision analytical model populated with data from the FCW study will be constructed. Micro-costing will identify, measure and value resources used in intervention delivery. The primary outcome will be quality adjusted life years (QALYs), derived from quality of life scores emerging from EQ-5D questionnaires based on extrapolation of changes in BMI. Discounting will be employed. Sensitivity analysis will assess parameter uncertainty and heterogeneity. Cost-effectiveness ratios will be calculated for each intervention and analysis of relative value for money will be reported along with net benefit.

Results

Data analysis is on-going (will be completed in Feb 2016). Preliminary findings indicate that the complex dietary interventions are cost-neutral for the workplaces.

Conclusion

This study is the first to assess the cost-effectiveness of complex workplace environmental dietary modification and/or nutrition education interventions in manufacturing workplaces. Participating workplaces have similar worldwide structures and operations, ensuring findings are generalisable nationally and transferable internationally. Findings will critically inform employers, public health policy makers, catering stakeholders and the food industry on the cost-effectiveness of workplace dietary interventions.

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SIG: No, this does not fit in any of the above mentioned special interest groups
Awards: Yes, for the Student Competition*

Objective
The widespread use of in-store marketing strategies to induce unhealthy impulsive purchases has implications for food choice. This mixed methods study developed and evaluated a supermarket-based healthy checkout intervention substituting confectionery with healthy snacks. The study was part of the SoL Project; a Danish community-based participatory health promotion intervention.

Methods
The checkout intervention was initiated and developed by researchers and store managers informed by a qualitative pre-intervention study (52 short in-store interviews, 11 semi-structured telephone interviews and three focus group interviews) with local costumers on food shopping practices and store perceptions. The intervention was implemented by supermarket staff. Confectionery at one checkout counter in each store was substituted with healthy snacking products in four stores for a period of four weeks. Consumer awareness and perceptions of the intervention were assessed by 46 short semi-structured exit-interviews. Effects of the intervention were evaluated by linear mixed model analyses of supermarket sales data.

Results
The pre-intervention study identified consumer concern and annoyance with store placement and promotion strategies tempting children and other ‘weak’ customers, thus the creation of confectionery-free checkouts was welcomed. Exit-interviews found awareness of the confectionery-free intervention to be low, while attitudes towards the intervention were positive. Most respondents believed that the intervention might help other customers make healthier choices, while many did not expect the intervention to influence their own shopping. Statistical analyses suggest an intervention effect on sales of carrot snack packs when comparing sales during and sales before the intervention with control stores (P=0.052). No significant effect of the intervention on sales of neither other healthy snacking products nor confectionery was found.

Conclusions
This healthy checkout study found indications of an increase in sales of one of the healthy snacking products displayed, but found no effect on total confectionery sale. This might be explained by the modest character of the intervention. More research is needed to assess feasibility, long-term sales and health effects of confectionery-free checkouts in retail settings. Consumers appreciate in-store help and inspiration to make healthy food choices. Thus, a healthy checkout is not only a relevant health-promoting initiative, but also provides a possible branding opportunity for supermarkets.
Reactance to persuasive health messages as a function of message framing and message source

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose: Persuasive health messages do not always have the intended health-promotional effect; they sometimes backfire and lead to unhealthier behavior. Such boomerang effects may be due to reactance (i.e., motivation to restore one’s sense of self-determination after perceiving a threat to decisional freedom). Across various health domains, messages that use forceful language have been shown to induce more reactance than messages that use subtle language. While message source has also been proposed as a likely moderator of reactance, this factor has not often been investigated empirically. The current study jointly investigates effects of message framing and source on reactance to a healthy eating message.

Methods: Eighty students were included in an experimental 2x2 between-subjects design. Participants were exposed to a supposed blog from either a younger (peer) woman or an older (non-peer) woman, constituting the source manipulation. The blog called upon readers to replace unhealthy snacks by healthier alternatives, using either controlling (e.g., “do it because you have to”) or autonomy-supportive (e.g., “why not give it a try”) language, constituting the framing manipulation. After reading the blog, participants rated their level of reactance and estimated how much reactance the blog would induce in others. Baseline consumption of healthy and unhealthy snacks was controlled for.

Results: ANOVA’s showed a main effect of message forcefulness on both participants’ own reactance and estimated others’ reactance (all p’s < .05). No main effect of message source was found, but an interaction between message framing and message source was observed on female participants’ reactance (p < .05). While the controlling message always induced more reactance than the autonomy-supportive message, this effect was much more pronounced for the peer blog than for the non-peer blog.

Conclusion: Controlling messages induce more reactance than autonomy-supportive messages. Furthermore, for women, this effect was more pronounced when the message stemmed from a peer - with whom the participants likely identified more strongly - than from a non-peer. Results suggest that interventions using persuasive health messages may be more effective when autonomy-supportive language is used. Furthermore, persuasive health messages may be accepted more easily from non-peers than from peers.
Development and reliability testing of the Toronto Nutrition Environment Measures Mobile Survey-Store (ToNEMMS-S)

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Purpose:

Food environments are important influences on diet and health. Existing food environment measurement instruments, such as the Nutrition Environment Measures Survey (NEMS), do not adequately capture access to culturally acceptable foods for diverse populations. Adapted food environment instruments may be useful in capturing a wider range of food environment exposures for ethnocultural population subgroups. The purpose of this study was to develop and test a nutrition environment mobile survey that captures accessibility of ethnocultural food options in Toronto, Canada. This survey is called the Toronto Nutrition Environment Measures Mobile Survey-Store (ToNEMMS-S).

Methods:

This was a cross-sectional observational study. The original NEMS-S was adopted to include various cultural food items reflecting the ethnocultural context of Toronto. Key interviews with Canadian food environment researchers, local dietitians, public health nutritionists, community agencies, and food system research consultants were undertaken to ensure face validity of the tool. Extensive field testing was undertaken to enhance users’ experiences. A dietitian and community member conducted surveys individually. To assess reliability, Cohen’s kappa (k) and intra-class correlation coefficients (ICC) were assessed for inter-rater reliability for product availability, price, quality, cultural accessibility scores and overall store scores.

Results/findings:

A total of 55 food stores (2 bakeries, 2 dollar stores, 19 gas/convenience stores, 18 grocery stores, 4 pharmacies, 8 specialty stores, and 2 superstores) in Toronto, Canada were assessed in 2014. Inter-rater reliability was high for availability (average k = 0.91), price (average ICC = 0.964), cultural accessibility score (ICC = 0.981) and overall store scores (ICC = 0.991).

Conclusions:

To our knowledge, the ToNEMMS-S is the first tool that measures cultural accessibility based on population demographics. Limited access to fruits and vegetables and culturally acceptable foods are related to diet-related chronic diseases, particularly among immigrants. Thus, this topic has become a focus for policy and intervention development, and our findings may be useful in guiding future public health programming. The high reliability between the dietitian and community members also shows community members’ capacity to utilize our tool, suggesting a potentially broader use of our tool by the stakeholders at the community level.
P1.017

Young adults' eating patterns: A qualitative study

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objective: Young adults' frequently exhibit eating patterns which are associated with many diet-related chronic diseases. Eating patterns such as snacking and meal skipping have been found to be highly prevalent in this population. Little research however, has been conducted into the likely influences on these eating patterns in this population. Therefore the aim of this study was to examine young adults' beliefs about the likely influences on their snacking and meal skipping behaviours.

Methods: Semi-structured individual interviews were conducted with 22 young adults aged 18 to 30 years (12 female and 10 male), who were purposively recruited, according to gender, age and household composition criteria using convenience and snowball sampling. Methods of recruitment included poster advertisements and targeted Facebook advertising. The interviews were audio-recorded, transcribed, and coded to identify themes using N-Vivo software. Template analysis was used to thematically organise and analyse the data.

Results: The mean age of the interviewees was 25 ± 2.6 years, with interviews ranging in length from 39-50 minutes. Nineteen out of the 22 participants often skipped their meals. Breakfast was reported as the most commonly skipped meal (n=19), regardless of sex, age or living situation. Factors attributed to breakfast skipping included a self-reported lack of time and day of the week, with participants less likely to consume breakfast on weekends. Lunch was the second most commonly reported skipped meal (n=9). Skipping lunch was seen in both sexes and was more frequent in those working full time. The most frequently discussed influences for skipping lunch was being busy at work (n= 4). All the participants reported snacking on a daily basis. The biggest influence on snacking was convenience (time) with many participants explaining that snacks must be "quick to prepare" (n=10). Other influences included convenience (availability) of food, hunger and the social influence of friends.

Conclusions: This qualitative study identified factors that young adults considered to be important influences on their eating patterns. This information will be used to inform future quantitative research and could aid in the development of public health strategies or interventions targeted at young adults.
Smartphone apps for behavior change - Dietitians are yet to go digital

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SIG: E- & m-health

Awards: Yes, for the Student Competition*

Objective: Dietitians have expert skills in counselling and empowering individuals to make changes in diet and lifestyle behaviors. As behavioral counselling is costly and labour-intensive, the ubiquitous accessibility of smartphone health applications (apps) could assist dietitians in reaching and managing more people efficiently. This study investigated the prevalence and purpose of app use among dietitians and their clients.

Methods: A previously developed survey tool was adapted and piloted with dietitians from an Australian university and its associated teaching hospitals. Survey questions explored the use of health apps in dietetic practice, factors influencing app recommendations, and types of apps used by dietitians and their clients. This online survey was distributed nationally to Accredited Practising Dietitians (APDs) of the Dietitians Association of Australia (DAA) via a weblink in their weekly member email, and made available for 3 weeks.

Results: The overall response rate from 5852 DAA members was 395 (7%), with 297 (75%) completed surveys included for further analysis. Personal use of health apps by dietitians was high (87%) and 69% of respondents currently used them in dietetic practice. Health apps were mostly used as information resources for food choices or tools for client self-monitoring, but least used for goal setting. Ninety-one percent of dietitians had recommended a health app, with top recommendations being The Monash University Low FODMAP Diet (63%), MyFitnessPal (61%), and Easy Diet Diary (46%) for nutrition; and Fitbit for physical activity. Recommending apps to clients was more likely among dietitians who personally used health apps (OR=3.9; 95% CI 1.6 to 9.3). Clients were asked to use these apps primarily for self-monitoring, including raising awareness and tracking of their nutrition and physical activity behaviors. Most dietitians (78%) had encountered clients who had asked about or by themselves started using health apps, mainly calorie counters. These clients were predominantly younger (aged 18-45) and seeking assistance with weight management.

Conclusions: There is considerable use of smartphone health apps by dietitians in practice, primarily for providing information about best food choices or calorie counting. However, the failure to more extensively harness health apps for behavior change should be further investigated.
**FOOD (Food to Overcome Outcomes Disparities): Addressing Food Insecurity among Cancer Patients**

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**SIG:** Socio-economic inequalities

**Awards:** No

**Purpose**

Food insecurity affects the lives of tens of millions Americans and hundreds of millions worldwide. It is associated with compromised nutritional intake and poor health outcomes. Immigrants and minorities are especially vulnerable. Cancer patients in treatment are particularly at-risk. This pilot study compares the impact of hospital-based food pantries, pantries plus a food voucher program, and pantries plus home grocery delivery on food security status, cancer treatment adherence, depression, and quality of life.

**Methods**

Adult cancer patients with food insecurity were randomized into one of three study arms: 1) medically tailored food pantry co-located at the cancer clinic, 2) pilot food voucher program, plus access to the pantry, and 3) grocery delivery, plus access to the pantry.

Eligibility criteria included: ‘very low’ or ‘low’ food security scores on the USDA Household Food Security Module (scores of 5 or higher); within two weeks of starting chemotherapy and/or radiation therapy; in a household that is not currently receiving or applying for SNAP (federal food relief program formerly known as Food Stamps); speaks English, Spanish and/or Mandarin.

Food security scores, the ratio of missed/scheduled appointments, depression using the PHQ-9, and quality of life changes using the FACT-G were assessed pre-post intervention.

**Results/Findings**

Sixty four patients participated, 62% were female, 81% were foreign-born, 35% spoke Spanish, 76% were unemployed, 81% had government health insurance for low SES individuals, 34% had breast cancer, Food security improved an average of 3 points; the biggest improvement was in the pantry+voucher arm(7 points). Pantry only adherence was 95%; pantry+voucher 98%; and pantry+delivery 98%. PHQ-9 scores dropped across all groups, with the largest decrease, from 7.3 down to 2.3, in the pantry+grocery delivery group. FACT- G scores improved in all study groups, with the greatest improvement in the pantry+ grocery delivery group, which improved by +7.7 points to 75.1.

**Conclusion**

Food insecurity leads to poorer cancer treatment adherence and quality of life. The FOOD randomized controlled trial interventions led to important improvements in these domains. Results should guide further research, and program and policy development towards the establishment of emergency and ongoing food resources at clinic sites.
The development of a theory-based gamified smartphone application to promote vegetable intake in young adults

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SIG: E- & m-health

Awards: Yes, for the Student Competition*

Objective: Young adults are poor consumers of vegetables; with less than 5% of Australians aged 18-34 meeting the recommended 5 serves daily. Mobile-gaming in nutrition promotion is in its infancy but shows potential as a novel, age-relevant medium for the delivery of interventions. This study describes the development of a theory-based mobile-gaming application (app) aimed at increasing self-efficacy for vegetable consumption in young adults, thereby improving intake.

Methods: The design process was carried out through collaboration between the Nutrition and Dietetics and Information Technology departments at The University of Sydney. It comprised of four separate stages: (1) determining the app purpose and features, (2) deciding on behavior change theories, (3) selecting the platform, and (4) formulating the design and data collection interfaces.

Results: Three interactive prototypes were created over a 6 month period; 2 game-based and 1 self-monitoring app. These apps were underpinned by the knowledge-attitude-behavior (KAB) model and theories of self-determination, social learning, goal setting and reinforcement. They were developed with the purpose of improving knowledge of vegetable serves and increasing self-efficacy for vegetable consumption by addressing key barriers including perceived expense, time and skills required to cook vegetables. The mobile web application platform, based on the Apache Cordova project, was used to create web-based versions of the apps; allowing cross-platform compatibility. The web apps were deployed on both Android and iOS systems for preliminary user studies. A number of self-regulation and motivational techniques were used, such as self-monitoring, goal setting, challenges, leaderboards and rewards on achievements. Social networking features were also integrated into the gaming apps. Challenges encountered during the design process included choosing the right reward system, tailoring challenges to users, and ensuring the games were not short-lived.

Conclusions: The gamified apps may be an innovative medium for delivering nutrition education and supporting behavior change for a generation who are reliant on mobile technology. Further work is required to test the usability and acceptability of the apps with a sample of young adults. Researchers should consider implementing strategies to encourage continued engagement and the use of additional platforms to provide sufficient intervention for behavior change.
A systematic review of social media and game-based nutrition interventions targeted at young adults.

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SIG: E- & m-health

Awards: Yes, for the Student Competition *

Objective: Young adulthood is a critical time for the development of nutrition habits that have implications on future health. The increased popularity of social media and mobile-gaming among this age group presents a new direction for health promotion. This review evaluated the use and efficacy of social media and game-based strategies in nutrition interventions targeted at young adults aged 18-35.

Methods: The protocol was guided by the Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement. Ten electronic databases, Information Technology (IT) conference proceedings, and gray literature were searched for relevant articles published after 1990. Two independent reviewers conducted the screening, data extraction, and quality and risk of bias assessments. The primary outcomes recorded included knowledge gain, attitude or behavioral change, and/or change in physiological outcomes such as weight or body mass index (BMI). Results regarding user engagement and satisfaction were also extrapolated where possible.

Results: Fifteen studies met eligibility criteria (9 social media-based; 6 game-based). The overall quality of studies indicated a high risk of bias. Social media-based strategies included internet forum/blogs (n=5), Facebook (n=3), Twitter (n=1), YouTube (n=1) and chat rooms (n=1). Although 6 of 9 social media-based studies demonstrated a statistically significant improvement in their outcome measure, the reported rate of engagement with social media was low. Preliminary findings suggested that social media alone may not be as effective as when it is combined with other strategies. Virtual reality games (n=3), web-based games (n=2) and a mobile application (n=1) were used in the gaming interventions. A significant gain in knowledge was reported by the four gaming studies based on self-efficacy/attitude-promotion models. Longer-term measures of physiological and behavioral outcomes were limited and reporting on user engagement and acceptability of game-based interventions were lacking.

Conclusions: The use of social media and gaming for nutrition promotion is still in its infancy. Preliminary evidence suggests these strategies have some utility in nutrition interventions, particularly when designed using behavior change theory. However, further research using high quality, low risk of bias study designs is required with improved measurement of longer-term behavioral outcomes and reporting on user engagement.
Associations between eating patterns, nutrient intakes and diet quality in Australian adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: There is growing interest in how eating patterns influence health. Understanding how frequency of eating occasion (EOs), meals and snacks are associated with diet quality is needed to inform population dietary advice that encourages healthy eating. Existing research has largely focused on breakfast skipping, however evidence of associations for other eating patterns is equivocal. Therefore, the aim of this study was to examine associations between frequency of meals, snacks and all EOs with nutrient intakes and diet quality in a representative sample of Australian adults.

Methods: This study analysed dietary data (n=5242 adults, ≥19 years) collected via two 24-hour recalls during the 2011-12 Australian National Nutrition and Physical Activity Survey. An EO was defined as any occasion where food/drink providing a minimum energy content of ≥210 kJ was consumed and was separated in time from surrounding EOs by >15 minutes. Meals and snacks were self-identified by participants. Frequency of all EOs, meals and snacks were calculated. Diet quality was assessed using the Dietary Guidelines Index-2013 (DGI-2013). Linear regression was used to examine associations between eating patterns and nutrient intakes and DGI-2013. Associations were adjusted for sociodemographic and health behaviour covariates and energy misreporting. Survey weightings were also applied.

Results/findings: Frequency of meals, but not snacks, was positively associated with the DGI-2013 (men: β=5.6, 95% CI: 3.9, 7.3; women: β=4.1, 95% CI: 2.2, 5.9; P<0.001). A higher frequency of all EOs, meals and snacks was associated with meeting Australian Dietary Guidelines (ADGs) for food variety, fruit and dairy foods (P<0.05). Meal frequency was also positively associated with micronutrient intakes and meeting ADGs for cereals, lean meat and alternatives, and alcohol intakes (P<0.05). Conversely, a higher snack frequency was inversely associated with meeting ADGs for discretionary foods and added sugars (men only; P<0.05).

Conclusions: Results from this study suggest meal frequency may contribute more to optimal diet quality than snack frequency, however further research is needed to support these findings. Research examining the nutritional and food profiles of meal and snack patterns and their relationships with diet quality is needed to inform the development of “meal-based” messages that support healthy eating.
P1.023

A longitudinal analysis of changes in retail food environment in low-income communities over five years.

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SIG: Policies and environments

Awards: No

Purpose: Access to different types of stores influences the healthfulness of what people purchase and consume. Small retailers such as corner stores tend to stock primarily highly processed, energy-dense foods. Supermarkets carry many of the same unhealthy foods, but also carry a greater variety of nutritious foods, often at a lower price. Previous cross-sectional studies have shown disparities in access to supermarkets and corner stores. Federal and local efforts have been instituted to improve food environments in disadvantaged neighborhoods. This study examines longitudinal changes in prevalence of types of stores by neighborhood characteristics.

Methods: Data were collected in 2009, 2012, 2013, and 2014 on all retail outlets located within a 1 mile radius of four low-income cities in New Jersey, US from two commercial business lists. A standardized protocol classified stores into supermarkets, small grocery stores, convenience stores, meat markets, and vegetable markets. Census tracts and blocks were grouped based on median household income, majority race, and Supplemental Nutrition Assistance Programs (SNAP) participation. Descriptive statistics and multivariate models examined trends in prevalence of stores by neighborhood characteristics longitudinally.

Results: While the average number of supermarkets across all census tracts in the sample did not change (range: 0.21 to 0.22), the average number of convenience stores increased significantly over time (range: 2.6 to 3.2). Persistent over time, census tracts with majority black populations had ½ to 1/3rd the number of supermarkets compared to those with mixed populations. Tracts with the highest levels of SNAP participants persistently had half as many supermarkets compared to those with the lowest number of SNAP participants. There were twice as many corner stores in lower-income tracts (compared to higher-income), in majority Hispanic tracts (compared to majority white), and in the highest SNAP tracts (compared to lowest) across all years of data collection. Results will also be presented by census block groups, for all types of stores, and based on multivariate analyses.

Conclusion: Significant disparities remain in access to healthy food. Interventions are needed not only to improve access to supermarkets, but also to improve the healthfulness of corner stores that are so prevalent in disadvantaged neighborhoods.
“That’s good! The rally by young and old”. More Food Literacy through intergenerational cooperation? First results: nutrition.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective

The study aimed to improve health literacy of older adults and children. The intervention focused on health-oriented behaviour, especially the daily fluid intake of older adults. Healthy diet was an aim in both target groups and the focus was on fruits and vegetables as well as the reduced consumption of sweets.

Methods

The intervention was implemented and evaluated in eleven guided generation-spanning groups during 26 weeks. The intervention included 23 meetings, twelve with older adults, four with children and seven generation-spanning meetings. These were followed by ten meetings organized by older adults. 22 male and 65 female seniors participated at the beginning of the intervention. In addition, 91 children took part in the intervention. 32\% of the participants dropped out.

The baseline survey (t0) took place in 1.2013 and the first follow-up (t1) in 7.2013. A second follow-up (t2) was placed in 9.2013. The data was analyzed using Friedman- and Wilcoxon-test.

Results

The consumption of fruits rose significantly from 1 to 2 servings per day in both target groups (t1), whereas the consumption of fruits was reduced by the children in t2. The children reduced their consumption of vegetables in t1 and t2 compared to the baseline. Older adults reduced the consumption of sweets from 3 to less than 3 servings per week (t1) but they returned to their baseline level of sweets in t2. The children reduced their sweets from 2 to 1 serving per day in t1 and t2. Older adults increased their number of beverages from 6 to 8 glasses per day.

Older adults and children were asked about the current recommendation on the consumption of fruits, vegetables and beverages. In spite of the discussed themes during the intervention there is still a persistence of the difference between the "target-estimate" to the "real target" in the pre-post comparison.

Conclusions

Above all the rally improved the nutrition of both target groups. Though the knowledge of nutrition could be improved with limitations. Moreover, it is encouraging to see that Macy was accepted by both target groups. Therefore, the intervention will be introduced to further social services in Germany.
Inter-Programme Variation in Dietary Analysis

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SIG: E- & m-health

Awards: No

Purpose

In the UK, a Competence Framework for Nutrition for those working in Fitness and Leisure has recently been published by the Association for Nutrition and Public Health England. These are the first national guidelines produced that state the role and limitations of those working in sport to provide dietary advice. Under these guidelines, sports professionals are able to use dietary records such as food diaries as a tool to support behaviour change when guiding food choice in relation to government healthy eating guidelines. Whilst food diaries are known to have inherent sources of error affecting reliability, the reliability of food diary analysis using commercially available software has not been investigated in University undergraduate students studying sport related courses.

As such, the aim of this study was to investigate the variability between DietPlan (DP; nutrition analysis software that contains peer reviewed UK food composition data) and MyFitnessPal (MFP), a popular app used for dietary assessment in undergraduate sports students.

Methods

Undergraduate students studying nutrition as part of their sport degrees volunteered for the study (n=204) and were randomised to use either DP (n=87) or MFP (n=117) for analysis of the same one day food diary. The data was analysed descriptively using the median (Mdn) and Inter Quartile Range. Mann-Whitney U tests with a Bonferroni correction were used to determine between group difference in macronutrients and micronutrients.

Results

Significant differences were identified between MFP and DP in fat [Mdn = 37(15) g vs. 43(36) g; P < .001], cholesterol [Mdn = 60(12) mg vs. 84(47) mg; P < .001] and sodium [Mdn = 815(412) mg vs. 973(471) mg; P < .001] respectively.

Conclusions

It is of concern that the nutrients highlighted showed variation, when these are ones of particular importance for health. Further study is required to identify potential sources of variability (i.e. coding error relating to MFP specifically) and intra-user variability. Results from the study do, however, highlight the need for continuing training for undergraduate students in ensuring accurate dietary analysis due to the importance of the Competencies Framework for Nutrition in Fitness and Leisure.
Consumer understanding of Danish food-based dietary guidelines

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SIG: Policies and environments

Awards: No

Purpose: Nutrition recommendations are translated into food-based dietary guidelines (FBDGs) in order to promote healthy eating among consumers; yet the understanding and interpretation of these guidelines have been rarely studied. As a background evidence for renewing the food-based dietary guidelines in 2012, this study aimed at finding out how the then existing ten Danish food-based dietary guidelines were interpreted by the consumers.

Method: Forty-six Danish consumers were interviewed in two areas of Denmark: 51% were women, 47% with short education, age range 18-64 years, and average BMI of 23. In addition to questions related to awareness, importance and understanding of the FBDGs, respondents were asked about their eating habits and interest in healthy eating in general.

Results: When prompted without help, the best known recommendations were ‘eating fruit and vegetables six times per day’ and ‘fish twice a week’, but most recommendations were recognised with help. However, when assessing the ease of following the recommendations, fruit and vegetables recommendation was seen as a difficult one requiring both time and energy in food preparation. Another difficult recommendation was ‘eating less sugar’ as it would mean depriving oneself from treats and not being able to use sugar as a quick source of energy. The recommendation of ‘eating potatoes, rice, pasta or wholegrain bread’ was perceived as easy to follow, but having a confusing message. These listed staples were not regarded as having equal and respondents were divided in their opinions in the wholesomeness of these foods. Furthermore recommending eating the staples could be seen as a risk of promoting high energy intake. ‘Eat varied and maintain normal weight’ was another recommendation causing confusion among interviewees as it was difficult to see the link between variety in food and weight. This was also seen as an over-arching recommendation that covers the whole approach to eating.

Conclusions: Consumers interpretation of FBDGs revealed that although messages were well recognised, interpreting them could be difficult. Furthermore, interviewees found it challenging when trying to interlink the recommendations in order to find an approach that would advise their eating patterns in a holistic manner.
Sugar and fat interact to encourage overeating: microstructural analysis of a sweetened, fat-rich meal in relation to individual variation in eating attitudes

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University of Roehampton, London, UK

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose:

A primary factor attributed to the development of obesity is the overconsumption of energy rich, palatable foods, particularly foods high in fat and sugar. The combination of fat and sugar may have a distinct appetising effect, enhancing early meal appetite, delaying satiation and increasing overall intake; furthermore, understanding individual variation in this effect may contribute to predicting obesity risk. Main hypotheses: (i) Sweetness in a high-fat food will encourage greater intake (ii) Sweetness will alter sensory evaluation of food, and sustain hunger and the desire to eat (iii) Behavioural traits will predict appetite for and consumption of a high fat, sweetened food.

Methods:

Twenty-five non-obese participants (13 male, 12 female) aged 18-54 years, BMI mean (SD) = 22.7 (2.5), ate ad libitum a high fat sweet or non-sweet (but nutritionally equivalent) version of rice pudding (589.9 kJ, 8% fat w/w) at lunch on two separate days, in a counter-balanced order. The Sussex Ingestion Pattern Monitor (v2) was used to measure intake and ratings for hunger, taste, pleasantness and desire to eat on initial tasting and during the meal. Traits linked to obesity were assessed using the Revised 18-item Three Factor Eating Questionnaire (v2), Behavioural Inhibition/Behavioural Activation Scales, Power of Food Scale and 15-item Barratt Impulsivity Scale.

Results:

There was a significantly greater intake of sweet (309.11 ± 39.31 g) compared to non-sweet (227.35 ± 24.43 g) rice pudding, t(19)=2.35, p<0.05, CI [8.94-154.58]. Sensory and appetite ratings on initial tasting were significantly higher for sweet rice pudding (p<0.05). During the meal, sweetness tended to lessen the early reduction in hunger and desire for the food (p<0.07). Participants with low cognitive restraint showed a sustained desire (r=0.54, p=0.01 and liking (r=0.44, p=0.04) for sweet but not non-sweet rice pudding. No other traits were related to these outcomes.

Conclusions

Sweetness in a high-fat food delayed the onset of hunger, sustained the desire to eat and encouraged a higher intake of a fat-rich food, and these effects were more apparent in unrestrained eaters. These methods provide a useful model for understanding risks of overeating due to the sensory synergy of sugar and fat.
Development and Validation of a Nutrition Knowledge Questionnaire for a Canadian Population

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: The aim of this study was to develop and validate a nutrition knowledge questionnaire in a sample of French Canadians from the province of Québec. This questionnaire was specifically designed for the Canadian population taking into account current dietary guidelines.

Methods: Two subscales of nutrition knowledge were assessed, namely familiarity with Canada’s Food Guide and general nutrition knowledge. A total of 38 items were developed and evaluated by an expert panel for content validity (item relevance, clarity, simplicity, and ambiguity). Participants from a pre-test sample (n=30) were asked to comment on their understanding of the questionnaire for face validity. Construct validity was assessed by comparing the score obtained by the pretest sample to a group of 15 registered dietitians, expected to obtain a higher score on nutrition knowledge. A total 150 participants (75 men and 75 women) aged 18-65 years old from the region of Québec were recruited for the validation study, and 148 of them completed the questionnaire to assess internal consistency. To ensure test-retest reliability, 146 participants completed the questionnaire a second time at least 2 weeks following first completion. Pearson’s correlations were performed to assess associations between results from both completions.

Results: A content validity index was calculated using evaluations from the expert panel, which resulted in the removal of 2 items and reformulation of 4 items. Following face validity, 3 items were reformulated. Construct validity was found to be adequate, with consistently higher scores for registered dietitians when compared to other participants from the pre-test (21.2/26 (SD=2.29) vs 13.2/26 (SD=5.87), p<0.001). Internal consistency for the overall questionnaire was adequate (Cronbach alpha coefficient > 0.7). Assessment of test-retest reliability resulted in significant associations for the whole questionnaire and for specific subscales (total, r=0.57, p<0.001; familiarity with the Canada’s Food Guide, r=0.48, p=0.003; general nutrition knowledge, r=0.57, p<0.001).

Conclusions: This nutrition knowledge questionnaire is a suitable instrument that can be used in future studies targeting a Canadian population. Given that nutrition knowledge is a determinant of healthy eating, this instrument could help define which areas of knowledge could be improved for Canadians and eventually guide nutrition interventions.
Examining How Women’s Personal and Vicarious Eating Regulation Goals Relate to their Romantic Partner’s Perception of Support, Well-Being, and Relationship Quality

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SIG: Theories of motivation

Awards: No

When asked about the health behaviors that they would like their romantic partner to change, many women report that they would like their partner to eat better (Tucker & Anders, 2001). Purpose: Using a Self-Determination Theory framework (Deci & Ryan, 1985, 2002), the main purpose of this research was to examine the types of eating regulation goals (i.e., health- vs. appearance-oriented) that women have for themselves (personal goals) as well as for their partner (vicarious goals), and how these relate to their interpersonal style toward their partner, and to the partners’ psychological and relational well-being.

Methods: Participants were 131 heterosexual couples from the Province of Quebec (mean age: 44.7 years). They were recruited by a professional survey firm. Couples interested in participating in the study were directed to an online survey website that contained the questionnaire. All measures were completed via the Internet. Women were asked about their personal eating regulation goals as well as the goals they have for their partner. Men were asked about their perception of their partner’s interpersonal style (i.e., autonomy-supportive vs. controlling). Men’s psychological well-being and relationship quality were also assessed. Structural equation modeling analyses were conducted. Results: Results reveal that the type of eating regulation goals that women have for their partner (health vs. appearance oriented) reflects the type of goals that they personally pursue. In addition, women who have health-focused eating regulation goals for their partner are perceived as more autonomy supportive, which is associated with the partner’s report of higher relationship quality. Conversely, women who have appearance-focused eating regulation goals for their partner are more likely to be perceived as controlling, which negatively predicts the partner’s psychological and relational well-being. These results are obtained while controlling for men’s and women’s body mass index. Conclusions: Overall, these results attest to the importance of considering women’s personal health- and appearance-oriented eating regulation goals for a better understanding of the goals they have for their partner and their interpersonal style toward the partner.
The Number of Best Practice Food and Beverage Policies and Environmental Supports in Kansas Worksites Increase One-Year Following WorkWell KS Workshop

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SIG: Policies and environments
Awards: No

Objective: The purpose of this study was to assess the degree to which Kansas worksites that participated in a comprehensive worksite wellness workshop, WorkWell KS, implemented changes to worksite policies and environments to support access to healthy foods and beverages in the 12 months following their workshop participation.

Methods: The WorkWell KS baseline assessment was administered to 276 worksites across 29 communities in Kansas prior to their attendance at a WorkWell KS workshop. The 1 ½ day workshop addressed “best practices” regarding several topics, including access to healthy foods and beverages. One year following the workshop, 88 of the worksites completed the same assessment, identifying which of the recommended practices that worksites had implemented. Five items addressed healthy food and beverages policies and seven items addressed the food and beverage environment. A paired t-test was conducted to compare the average number of healthy food policy and environment strategies implemented at each worksite at baseline and follow-up.

Results: There were significant differences between baseline and follow-up measures for healthy foods and beverage policy and environment strategies implemented at worksites. At baseline, the average worksite had 0.83 policies supporting healthy foods and beverages, which increased to 1.29 policies at follow-up, t(87)=-3.761 p < 0.001. At baseline, the average worksite had 2.61 environmental supports in place, which increased to 3.41 at follow-up, t(85)=-5.035 p < 0.001. These significant increases represented at 54% increase in the number of healthy food and beverage policies in place at worksites and a 31% increase in the environmental supports for healthy foods and beverages at worksites.

Conclusions: The significant increases in the number of healthy food and beverage policies and environmental supports at worksites from baseline to one-year follow-up suggest that WorkWell KS is successfully delivering best practices to participating Kansas worksites. Furthermore, this suggests that WorkWell KS can prompt the implementation of policy and environmental changes to improve access to healthy foods and beverages in the workplace.
Associations of Regulation Styles for Eating Behaviors and Intuitive Eating with Diet Quality: Preliminary Results from the PREDISE Study

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SIG: Theories of motivation

Awards: Yes, for the Student Competition*

Purpose: It is well recognised that a high diet quality promotes better health outcomes, but a better understanding of correlates of healthy eating is needed to inform the development of more effective interventions. The purpose of this study was to investigate how characteristics of eating behaviors such as regulation style and intuitive eating are related to diet quality.

Methods: Preliminary results from 183 women and 96 men from the province of Québec, Canada, recruited in the context of the PREDISE study, are reported. The Healthy Eating Index (HEI), derived from dietary data collected through a web-based self-administered food frequency questionnaire, was used as a proxy of participants’ overall diet quality. Autonomous and controlled regulation of eating behaviors were assessed using the Regulation of Eating Behavior Scale, based on the Self-Determination Theory. The Intuitive Eating Scale-2 was used to assess a total intuitive eating score and four sub-scores representing: "Unconditional Permission to Eat", "Eating for Physical Reasons", "Reliance on Hunger and Satiety Cues", and "Body-Food Choice Congruence".

Results: Participants age ranged from 18 to 65 years (mean 48.7±11.9 years). A positive association between autonomous regulation for eating behaviors and the HEI score was observed (r=.34, p<.0001), while controlled motivation was negatively associated with the HEI score (r=.14, p=.02). Intuitive eating and the HEI score were positively associated in men (r=.22, p=.04), whereas no association was observed in women (r=.04, p=.64). The same pattern of results was found for the “Body-Food Choice Congruence” and “Reliance on Hunger and Satiety Cues” subscales. The “Body-Food Choice Congruence” subscale was also found to be a partial mediator of the positive association between autonomous motivation and the HEI score and a complete mediator of the negative association between controlled motivation and the HEI score.

Conclusions: These results suggest that a more autonomous regulation of eating behaviours is associated with a better diet quality, and that demonstration of higher intuitive eating behaviors is associated with better diet quality in men, but not in women. Further analyses are needed to further understand these associations.
**Purpose:** This study investigated suitability of chatbots for mental health interventions, specifically alcohol drinking habits assessment. The target group was young adults (18-24yrs), the highest consumers of alcohol per capita in Australia. Online and mobile interventions have been found effective for this group, through expectations of access to information anywhere anytime; perception of non-bias in automated recommendations; and assurance of privacy/anonymity.

**Methods:** A chatbot program was developed to perform a standard assessment of alcohol drinking habits (AUDIT-C, 3 items rated on 5-point scale) to determine the level of health risk. Additionally, the chatbot provided information and education on responsible alcohol use, giving recommendations and feedback post-assessment using a pre-populated database of factual response contents. Both phases of the intervention used conversation generation software providing semi-realistic interaction. The chatbot was developed using AIML programming language, enabling generation of adaptive, structured conversations. Usability and user-satisfaction were determined by cohort study of 17 volunteer participants (6 males, 11 females). Participants were observed using the chatbot to complete assessments, then receiving scores and undertaking post-assessment interactions, while their progression was timed.

**Results:** Mean session time was 9.5 mins (sd 1.1), with similar time spent performing assessment, and receiving information and feedback (55%-45%). Usability and user-satisfaction was measured quantitatively via survey and qualitatively via interview. The survey consisted of 8 questions derived from Lasen's (1979) Client Satisfaction Survey, with responses converted to 0-centred 5-point scale, normalized to (-1,+1). Mean satisfaction score was 0.70 (sd 0.14) with experience highest (0.82), appropriateness lowest (0.66). The interview was based on 4 discussion topics: positive and negative experiences, comments, and suggestions. These were analysed ethnographically using Bradley's (2007) categories for health services interventions, yielding 16 separate usage characteristics, with positives highest (5/16), suggestions lowest (3/16).

**Conclusion:** The intention of the trial was not to determine the accuracy of the assessment or measure subsequent behaviour change, rather it was to assess the suitability of having a relatively real and believable conversation with an online chatbot as a human surrogate for a health professional. Overall, the trial indicated strong positive reception of the intervention by users.
What would help with lifestyle and weight management pre-conceptually? A survey of all women and partners awaiting assisted conception at a Scottish Regional Centre.

Catherine Hankey, Katrina Pert, Wilma Leslie, Scott Nelson
University of Glasgow, Glasgow, UK

SIG: No, this does not fit in any of the above mentioned special interest groups
Awards: No

Purpose: Obesity and overweight compromise conception and are associated with poorer infant and maternal outcomes. As randomised controlled trials of pharmacological and lifestyle interventions during pregnancy have not been shown to be effective in improving outcomes, optimisation of pre-conceptual weight is critical. As around one third of UK pregnancies are unplanned, access to adults planning conception is challenging. However interventions to manage weight, improve lifestyle and maximise success of assisted conception (AC) services are lacking.

Methods: One hundred and eighty nine women awaiting AC at the West of Scotland centre, and their partners were invited to participate in a postal questionnaire survey to determine their views on participation in a weight management /lifestyle programme, and identify elements/approaches they would value. The questionnaire, adapted from an earlier survey (Leslie et al, 2012) comprised 15-items (7 closed questions). Non-responders were sent a reminder questionnaire after 2 weeks.

Results:

Between June 2015 and July 2015, 108 responses were received (29%), 51 couples and 6 women whose partners declined to participate. Participant age range was 26-49 years, mean BMI was 24.9 kg/m² with 36% overweight and 11% obese. Opinions on current weight did not differ significantly between partners and patients (p>0.05) with 46% patients and 53% partners “comfortable with their weight”.

Among those who expressed concern about their weight, access to sports and leisure facilities and advice on becoming physically active were most frequently cited as helpful in managing weight gain (15 patients/11 partners; 13 patients/6 partners, respectively). Access to on-line resources with advice and healthy eating information and weight management advice, in either a one to one or group setting, were less popular. Fewer participants expressed interest in receiving healthy eating advice, either on a one to one, or a group basis, whilst practical cooking skills classes were unpopular.

Conclusion: The poor response rate of suggests only moderate interest in pre-conception weight management in both waiting list patients and their partners.
Engagement in food shopping and preparation among adolescents and young adults in Canada

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose
Food skills, including shopping and food preparation, are an important aspect of food literacy. This study aimed to characterize meal preparation and food shopping behaviors among young people in Canada, and examine associations with eating habits known to be associated with diet quality.

Methods
A cross-sectional study was conducted among 2,008 participants aged 16 to 24 using an online commercial panel. Participants were asked a series of questions regarding engagement in food preparation in the last 7 days and food shopping behaviours in the last 30 days, as well as questions examining several dietary habits (frequency of eating breakfast, eating food prepared outside of the home, and vegetable and fruit intake), and socio-demographic factors. ANOVA and Pearson chi-square tests were used to test for examine significant differences between socio-demographic characteristics, and linear regression models tested the association between shopping and food preparation behaviours and dietary habits, adjusting for socio-demographic factors.

Results
Of the sample, most participants engaged in dinner preparation at least one day per week (84.3%); 15.7% never engaged in dinner preparation, and 10.9% engaged every day. Approximately one-third (37.3%) had helped with grocery shopping in the past week, 13.2% had only helped with grocery shopping once in the past 30 days, and 9.7% had not helped at all with grocery shopping. Several associations with socio-demographic factors were significant, including higher participation in both activities among females, older participants, and those with higher self-reported nutrition knowledge (p<0.05 for all). In regression models, more frequent engagement in dinner preparation was associated with increased consumption of vegetables and fruit (B=0.19 95\%CI 0.14-0.24), more frequent breakfast consumption (B=0.62, 95\%CI 0.017-0.11) and fewer meals consumed away from home (=0.31, 95\%CI -0.390 - -0.25); engagement in shopping at least once weekly was associated with increased vegetable and fruit consumption only (B=0.15, 95\%CI 0.28-0.70).

Conclusions
In this study, more frequent involvement in food preparation, and to a lesser extent, shopping for food, were associated with positive eating patterns. The results may suggest that interventions that address these aspects of food literacy may contribute to improving dietary habits among young people in Canada.
Cooking equipment and flavoring ingredients available in low-income households

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objectives: To ensure that food preparation advice is appropriate, the objective of this study was to examine what cooking equipment and flavoring ingredients are available in low-income households

Methods: This cross-sectional study was done in New Jersey with a convenience sample (n=502) of adults recruited from places where low-income adults gather (e.g., job training programs). One-on-one, structured interviews using close-ended questions were employed. Questions either assessed the availability of cooking equipment (ranging from kitchen appliances to kitchen tools such as baster, funnel, measuring cups); or the availability of flavoring ingredients (i.e., fresh and/or dried herbs, spices, bouillons, salts and blends). Cooking equipment questions were denoted in a dichotomous manner (“yes” or “no”), while those regarding flavoring ingredients were measured using five-point Likert-type scales (1 = “never”, to “5” = “usually or always”). Descriptive statistics were performed using SAS (version 9.3).

Results: The participants, with the mean age of 41.4±13.8, were mostly female (70.3%), unemployed (74.9%), and non-Hispanic (68.5%). While most had large appliances in their homes, less than 50% had small appliances, such as toaster ovens, sandwich grills, deep fryers, electric frying pans, food processors, electric griddles, hand juicers, electric juicers, or grinders for spices. Over 90%, however, owned microwaves. Cooking tools owned by less than 50% included meat thermometers, funnels, basters, plastic or metal molds, sifters, trivet cooling racks, garlic presses, measuring scales, mortars and pestles, and cheese cloth. With regards to flavoring ingredients, the top 10 ingredients owned by low-income participants were black pepper (4.10±1.44), table salt (4.00±1.55), adobo (3.69±1.69), ground garlic (3.59±1.66), ground cinnamon (3.54±1.76), onion powder (3.34±1.72), sazon (3.30±1.80), ground oregano (3.25±1.69), and paprika (3.20±1.66). The q0 least owned ingredients were dried savory 1.32±0.91, hibiscus (1.34±1.00), eucalyptus (1.36±1.03), habanero (1.45±1.04), tarragon (1.46±1.11), ground mint (1.46±1.06), fresh marjoram (1.47±1.10), ground marjoram (1.5±1.15), and chipotle chilies (1.51±1.09).

Conclusions: Low-income adults may have limited cooking equipment and flavoring ingredients available at home. Nutritionists and culinary professionals should be aware of these differences when developing recipes or providing cooking education to low-income audiences. Further research is needed to reevaluate these findings in different races/ethnicities.
LP1.036

Enhancing knowledge translation in nutrition through a healthy eating blog: a feasibility study

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SIG: E- & m-health

Awards:

Objective
Our study aimed to assess the feasibility of using an evidence-based healthy eating blog (HEB) promoting the consumption of F&V among adult women, prior to undertaking a full randomized controlled trial (RCT).

Methods
Eighty women aged 18 years and older (42±13 years) eating less than five servings/day of fruit and vegetables (2.75±1.84 servings) were recruited. Participants were randomized to the HEB group (n=40), which included a weekly blog post over a six-month period, or to a control group (n=40) that had no exposure to the HEB. Blog posts were written by a registered dietitian and focused on the improvement of F&V consumption by targeting four main determinants of the behavior: (1) knowledge; (2) attitude; (3) self-efficacy; and (4) motivation/goals. Feasibility was assessed by collecting blog browsing history data for each participant. Intervention was considered feasible if (1) more than 70% of questionnaires were completed, (2) attendance rate was over 90% for in-person appointments, (3) participants accessed 75% of the blog posts and (4) attrition rate was below 25%. Additional analyses were conducted to estimate the effect size of the intervention on F&V intake.

Results
During the intervention, 26 posts were published on the blog. Questionnaires were completed by 96.5±3.2% of participants on average, and all participants attended their in-person appointments (100%). Women accessed an average of 86.6±7.1% of the posts published during the intervention. Five percent of participants in the HEB intervention group (2/40 women) dropped out of the study for personal reasons. The difference between groups of 1.0 servings of F&Vs (p<0.001) indicated moderate effects of the intervention (Cohen’s d=0.54).

Conclusion
These results suggest that an intervention using a HEB is feasible. A larger scale RCT using the same methodology can be conducted to assess the effect of the HEB intervention on F&V consumption.
Mental Health Symptoms among Homeless Youth: Relationship with Nutrients Intake

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The Ohio State University, Columbus Ohio, USA

SIG: Socio-economic inequalities

Awards:

Purpose: Homeless youth are a vulnerable population with a high prevalence of mental health problems. Dietary and nutrients intake likely influence mental health etiology and resolution. The goal of this study was to describe the dietary and nutrients intake of homeless youth and their association with depression and anxiety symptoms; the most common mental health conditions among this population.

Methods: An observational study of homeless youth, recruited from a local drop-in center in Columbus Ohio was conducted. After providing informed consent, socio-demographic characteristics, dietary intake and mental health symptoms data were collected. Dietary intake was assessed using 24 hour dietary recalls collected on 2 nonconsecutive days. Depression and anxiety symptoms were measured by the Beck Depression and Anxiety Inventories respectively. The Cohen’s 14-item perceived stress scale measured stress levels. Nutrients intake were adjusted to usual intake and compared to Estimated Average Requirements (EAR) for age and gender to determine adequacy of intakes. Crude and adjusted regression analysis were utilized to estimate the association of energy adjusted nutrients intake with depression, anxiety symptoms, and stress levels.

Results: Of the 36 participants with currently available data, 39% were African American, 42% were White and one-quarter were female. Forty-four percent (95% CI: 27.9%-61.9%) were overweight or obese (BMI >25). The average stress score for participants was very high (26.4 ± 9.1). About 30.6% (95% CI: 16.3%-48.1%) revealed moderate or higher depression levels, while 5.5% (95% CI: 0.7-18.7%) indicated moderate anxiety levels. Over 85% of the sample had inadequate intakes of calcium, magnesium, vitamin A, and vitamin C, with 100% not consuming adequate amounts of vitamins D and E. Lower magnesium and Vitamin E intakes were associated with higher levels of depression (Magnesium levels [median (min, max)]: minimal/low depressive symptoms: 94.4 (64.8, 216.7) versus moderate/high symptoms: 115.0 (82.8, 230.0), p-value = 0.02) (Vitamin E: minimal or low depression symptoms: 2.9 (0.95-6.01) versus moderate/high symptoms: 3.4 (1.99-20.6), p-value = 0.05).

Conclusion: Initial results show a prevalence of inadequacy with nutrients intake among homeless youth. For several nutrients linked to mood and mental health, poorer intakes were associated with severity of symptoms for depression and anxiety.
Consumption of Energy Drinks and Related Factors among College Students in Taiwan

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective:
This study aims to investigate the intake of energy drinks and associated factors among college students in Taiwan.

Methods:
Data came from a survey conducted in Taiwan in 2015. Eligible participants completed a self-administered questionnaire concerning knowledge, attitude, and use of energy drinks and substances including tobacco, alcohol, and betel nut.

Results:
Among 576 surveyed college students, 24.2% reported consuming energy drinks in past 30 days, and males were more likely to use than females (36.1% versus. 18.7%, p<0.001). Major reasons of use of energy drinks included to keep alert at work (46.8%), curiosity about products (32.4%), admiration of flavor (31.7%), or to prepare for school exam (25.2%). Among energy drink users, half (51.8%) have never paid attention to the contents or nutrition label, and 15.1% reported that they have ever mixed energy drinks with alcohol. Majority of surveyed participants showed negative attitudes toward using tobacco (95.7%), alcohol (75.4%), or betel nut (95.5%); while half (53.1%) reported positive attitudes toward consuming energy drinks. Energy drink users tended to believe that the consumption will improve academic, work, and sport performance. Furthermore, the intake of energy drinks in past 30 days is significantly associated with the use of tobacco, alcohol, and betel nut.

Conclusions:
Among college students in Taiwan, half of energy drink users were unaware of the effective contents, while surveyed students demonstrated relatively positive attitudes toward consumption. The associations between intake of energy drinks and the use of other substances were observed, suggesting a possible target of future interventions.
Recommended guidelines of student meal programmes in higher education

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SIG: Early care and education

Awards:

Purpose

Meal programmes for students attending a university or a university of applied sciences are subsidised by the Government in the form of a meal subsidy paid by the Social Insurance Institution (the SII). As specified in the relevant Government Decree, student meals must meet general health and nutritional criteria. The purpose of this recommendation is to give more detail to the Decree and to promote positive health and nutritional trends among students.

Methods

A review of the existing literature on students’ nutritional needs and problems was carried out. The draft recommendation was written by multidisciplinary expert panel and was revised, based on comments by expert organisations. The final recommendation was approved by the National Nutrition Council of Finland.

Results

A student meal should meet about a third of students’ daily energy needs and comply with nutritional guidelines in Finland. Particular attention should be paid to the quality of fats and carbohydrates and the amount of salt consumed. Made from recommended ingredients, a student meal should consist of a main dish accompanied by salad, bread with spread and a beverage. Students must have at least two low-cost meal options to choose from. The planning and preparation of meals for students with vegetarian or special diets is guided by general guidelines applicable to all meals. Students should be referred to a food guide in the form of a recommended model plate, and they must be offered guidance with nutritional choices. Students themselves must pay attention to the spacing of meals, portion size, choice of beverage, the adequate intake of vitamin D, folic acid and iodine, and to dental health.

Conclusions

The recommendation is intended as a tool for meal service staff and as a source of information for students and anyone providing health services for them. The implementation of the recommendation is monitored by the SII. It is left to the students themselves to make sure that the rest of their daily meals and snacks are healthy and helpful in weight control while promoting a physical and mental state conducive to learning.
LP1.040

An evaluation of a policy based environmental and educational workplace diet intervention, with individual goal setting

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SIG: Policies and environments

Awards:

Objective: Workplaces have been identified as a potentially effective setting to change dietary behaviour. However, workplace diet interventions to date rarely implement healthy eating policies as a strategy to promote a healthy diet. Public health policy changes, on the other hand, have proven successful in tackling various health related issues, e.g. reducing smoking exposure, and improving school meals. The aim of this pilot-intervention was to evaluate the effects of a six-month policy-based environmental and educational workplace diet intervention, with individual goal setting techniques, on employees’ overall diet and health.

Methods: The pilot intervention was run in a medium-size insurance company, based in Northern Ireland and was strongly supported by management, who banned unhealthy food from the company premises and provided unlimited, free fruit to staff. Participants’ weight, blood pressure and waist circumference were measured. Urine samples, 24-hour diet recalls and a lifestyle questionnaire were completed by each participant. Changes in pre- and post-measures were analysed using paired samples t-tests. Qualitative feedback in the form of semi-structured interviews was collected from staff and managers pre- and post-intervention and analysed through thematic analysis.

Results: 79 out of 90 staff took part in the study and 63 staff completed the follow-up assessments. The results suggest that employees significantly reduced their mean sugar intake from by 6.7 % (SD: 17.45, p=0.004) on days when they are at work. Waist circumference dropped by 1.2 cm (SD 4.18, p=0.03) and systolic blood pressure dropped significantly by 6.7 mmHg (SD: 9.34, p<0.001). Staff reported an increase in knowledge and awareness and commented positively on the unhealthy eating ban.

Conclusion: These findings suggest that interventions based on workplace policy change could lead to meaningful changes in employees’ diet and health and may change workplace culture. Key elements when designing an intervention include having management support and clear communication with staff, while the intervention content needs to be designed with appropriate review of the literature and tailored to the workplace setting.
What works in the workplace? A systematic review of systematic reviews of diet interventions at work

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SIG: Policies and environments

Awards:

Objective: Systematic reviews have suggested that workplace well-being interventions are potentially effective in promoting diet-related behaviour change in large numbers of people. However, most reviews have included interventions addressing multiple health behaviours, making it difficult to draw conclusions about effective diet-related strategies. This systematic review of systematic reviews aimed to determine the effectiveness of dietary components in workplace interventions on diet behaviour, biological markers, workplace-related and study evaluation outcomes by examining previous systematic reviews, also assessing their quality.

Methods: The following scientific databases were systematically searched with predefined search criteria: Medline, EMBASE, CINAHL, Web of Science and Cochrane Library. Systematic reviews and Meta-analysis that clearly described the contribution of diet-related behaviour change techniques in a workplace setting to a change in outcome were included. Excluded were narrative reviews, reports and position statements. Data were extracted by the primary reviewer and checked for accuracy by a second reviewer. AMSTAR criteria were used to assess the methodological quality of included systematic reviews.

Results: The search identified 1525 titles, of which 20 systematic reviews and 4 systematic reviews of reviews met the inclusion criteria. Most systematic reviews were of moderate quality and focused on dietary behaviour change outcomes and some health-related biomarkers. Few reported workplace-related and evaluation outcomes. Systematic reviews tended to conclude that workplace diet interventions could be effective in achieving dietary change. Potentially successful intervention components included environmental changes to the workplace (e.g. increased access to healthier options) and group education, as well as tailored, individual advice and feedback.

Conclusion: Evidence for the effectiveness of diet workplace interventions and particular intervention components is often not clearly presented, making it difficult to draw conclusions. Future interventions, as well as systematic reviews, should (1) fully report process evaluation outcomes to elucidate successful intervention components and (2) measure work-related, including cost-effectiveness, outcomes, which will be important for broader implementation of such interventions.
Providing Access to Nutrition Counseling through Mobile Health Counseling Services in Bogor, Indonesia

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Department of Community Nutrition, Faculty of Human Ecology, Bogor Agricultural University, Bogor, Indonesia

SIG: Early care and education

Awards:

Purpose: Nutrition Counseling often use as a first-line strategy to increase nutritional status and reduce risk of metabolic syndrome. This paper reports on the application of an integrated mobile health counseling services to increase access to nutrition counseling in Bogor, Indonesia. The service is collaboration between Bogor municipality and Faculty of Human Ecology, Bogor Agricultural University launched in July 2014.

Methods: Counseling was conducted and data of body weight, height, Body Mass Index (BMI), total body fat, and visceral fat were collected by conducting measurement using a portable body composition analyzer. Data collected between March 2015 and December 2015 (n = 317) and used for creating nutritional status profile and as a basis for municipality to plan health intervention program.

Results: The data shown obesity problem was found among population between the age of 40 and 59 (53.6%), while underweight problem was observed in teenage population (53%). Through brief interview of eating habit, elder population tend to have high consumption of fried food and low physical activity. These two causes are common contributor for obesity occurance. Although the service was well received and free of charge, the number of respondent who countinously monitor their progress is still very low. Short duration of counselling is still not sufficient to effectively change their eating behaviour. Other challenges such as counsellor shortage and lack of promotion about the service have limited the service delivery and utilisation.

Conclusions: The mobile health counselling service is a valuable approach to get insight and understanding of the actual nutrition problem of population in Bogor. Increasing the number of counsellor by recruiting volunteer is required in order to improve quality of service.
Street food consumers in Cape Town, Western Cape and surrounding areas are open to purchasing healthier food options

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Background: The sight and smell of street foods are a common phenomenon in developing countries. In these settings, street foods are not only appreciated for their unique flavors, convenience, and affordability, they also contribute to the economy of the country, and has the potential for maintaining and improving the nutritional status of populations. Street Food (SF) contribute significantly to the diet of numerous people living in developing countries, including South Africa. In South Africa, 11.3% of the population purchase SF. Black South Africans are the most regular buyers of SF, with nearly one out of five (19%) consuming these at least twice a week. Furthermore, with an increasing urban workforce and people working away from home, SF become one of the most convenient sources of meals and snacks.

Purpose: With so many South Africans consuming SF on a regular basis it important to determine consumers purchasing habits, food choices and intentions to purchasing a healthier product.

Methods: A cross-sectional survey was conducted. Trained fieldworkers under the supervision of a fieldwork coordinator conducted structured interviews with 1121 consumers on a) socio-demographic factors; b) purchasing habits; c) consumption preferences; d) and nutrition knowledge using a validated questionnaire. Data was analyzed using IBM statistics SPSS version 23. Various levels of analysis were conducted.

Results: Most consumers were black, male, single, and had either some high-school education or matric. The main findings in the consumer survey indicated that people consume SF frequently (2-3 times per week). They spend a significant amount of their income (± 1/3 of income) on SF. Consumers indicated buying cold drinks and sweets regularly. Other items people purchased frequently, were peanuts, chips, fruit juice, biscuits and chocolates. A large number of consumers indicated purchasing fruit. Most consumers indicated buying cooked SF. Ninety-six per cent of consumers indicated that they would purchase healthier SF if these were available. Thus, one could assume that should healthy SF be available at a reasonable price, SF consumers would access these. Consumers’ nutrition knowledge was not ideal; however, their nutrition attitudes were positive.
Relationship between salt taste function, its consumption and cardiovascular risk factors.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Salt taste sensitivity is closely related to hedonic aspects of nutrition, and this is an important individual factor contributing to the nutritional behavior of salt intake, and subsequently to the cardiovascular risk. The purpose of this study was to evaluate the relationship between the sensory function related to salt taste, the salt intake and cardiovascular risk factors. Methods: 96 healthy subjects aged between 18 and 65 years were enrolled in this cross-sectional study. Salt taste sensory function was assessed by measuring detection (DT) and recognition (RT) thresholds, using a modified version of the ASTM-E679 method. Salt intake was evaluated by the 24h urinary-sodium-excretion (UriNa) as well as by 3 self-reported measures: sodium-food frequency questionnaire (Na-FFQ), discretionary salt questionnaire (DSQ) and 3-day record (3DR). Threshold values were log-transformed before statistical analysis. Spearman coefficient was used because data were not normally distributed. Results: Mean age of the participants was 51.2 (63 males and 35 females). The mean salt DT and RT were 5.1 and 28.6 mM respectively, and they were interrelated ($r=0.372$, $p<0.001$). Salt intake assessed by self-reported methods was 7.1 ± 3.3 g/day according to Na-FFQ+DSQ; 7.8 ± 2.9 g/day according to 3DR and 9.5 ± 4.3 g/day according to UriNa. RT, but not DT correlated with salt intake assessed by Na-FFQ+DSQ ($r=0.209$, $p=0.041$) and 3DR ($r=0.352$, $p=0.002$), and no correlations were observed between thresholds and UriNa. RT was correlated with waist circumference ($r=0.278$, $p=0.007$) and BMI ($r=0.293$, $p=0.004$), but no correlations were observed with blood pressure. Conclusions: The results of this study suggest that the RT, but not DT, partially explained the salt intake, reinforcing the relationship between taste function and the hedonic aspect of nutritional behaviors. The association between RT and obesity indices must be explored in further studies.
Objective: Hypertension remains a major health problem, affecting nearly 22% of the Canadian population. The high salt intake has been demonstrated to be an important modifiable risk factor in the development and progression of high blood pressure. The first step in planning a health program that promote a healthy salt intake is to obtain data on current intakes such as quantities and sources. However, for the French-Canadian population, there is no validated salt intake self-reported tool. This presentation summarizes preliminary results of a study of development and validation of self-reported tools assessing salt intake among French-Canadian adults: a sodium-food frequency questionnaire (Na-FFQ) and a discretionary salt questionnaire (DSQ).

Methods: The development and testing of reliability of the tools have already been described. For the validation phase, 96 healthy participants (35 females and 63 males) were recruited (51.2 ± 7.6 years). The concurrent criterion validity was assessed by correlations between the Na-FFQ and DSQ and the data from the 3-day record (3DR) and the 24h urinary-sodium-excretion (UriNa). Convergent validity was assessed by testing the correlations between the questionnaires and blood pressure, BMI and waist circumference. The Spearman correlation coefficient was used due to the abnormal distribution of data.

Results: Salt intake, according to the different measures, was: 5.0 ± 2.4 g/day (Na-FFQ), 2.2 ± 1.8 g/day (DSQ); 7.1 ± 3.3 g/day (Na-FFQ + DSQ); 7.8 ± 2.9 g/day (3DR) and 9.5 ± 4.3 g/day (UriNa). Correlations observed between Na-FFQ and 3DR and UriNa were r=0.318 (p<.006) and r=0.312 (p=0.002), respectively. For the QSD, no correlation was observed. Regarding the cardiovascular risk factors, only Na-FFQ exhibited a correlation with blood pressure: systolic (r=0.402, p <.001) and diastolic (r=0.378, p <.001); WC (0.396, p<.001) and BMI (r=0.247, p<.016).

Conclusions: The Na-FFQ exhibited good evidences of criterion and convergent validity and it can be a useful tool for the evaluation of sources of salt intake in the French-Canadian population. Further refinements in the QSD must be considered.
Objective: Experiments suggest eating behaviour is a key mediator of the association between shorter sleep duration and obesity. The association of sleep duration with eating architecture reported by free-living UK adults was investigated to understand the pathway between sleep duration and weight status.

Methods: Cross-sectional analysis of the UK adult National Diet and Nutrition Survey 2000 (n=1213, age 19-64 y). Eating architecture refers to the size, timing and frequency of eating occasions and includes: the energy content of eating occasions, the number of eating occasions per day, time intervals between eating occasions, timing of the first and last eating occasions and total eating period. Eating occasions were identified as all foods/drinks consumed at a unique time and were classified as meals, snacks or drinks using a food-based method. General Linear models were used to examine the independent association of hours of sleep duration grouped as short (<7 h), average (7-8 h), and long (>8 h) with eating architecture outcomes adjusting for covariates.

Results: Compared with long-duration sleepers (n (%) 683 (56)), short-duration sleepers (n (%) 116 (10)) were more likely to be male, have a manual occupation, be obese, have higher physical activity levels and total energy intake (all p<0.01). After adjustment short-duration sleepers reported an earlier first eating occasion (06:33 vs. 07:51, p<0.0001) and overall longer eating period (14 hrs 45 min vs. 13 hrs 7 min, p<0.0001). Overall eating occasions (9.3 vs 8.5 times/day, p=0.008), particularly drink occasions (4.5 vs. 3.8 times/day, p=0.004) but not meal or snack occasions, were more frequent among short sleepers. The average size of meals (573 vs. 534 kcal/meal, p=0.005), but not snacks, drinks or overall eating occasions, was larger among short-duration sleepers. No differences were observed by sleep duration for mean inter-meal intervals or timing of the last eating occasion.

Conclusions: Short-duration sleepers start eating earlier, have a longer eating period, more frequent eating occasions (particularly drinks) and eat larger meals. These specific features of eating architecture represent potential intervention targets to reduce total energy intake and risk of obesity among short-duration sleepers.
Fast Food and Body Weight Determinants of Inflammation in Adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Chronic low-grade inflammation is associated with several chronic diseases including diabetes, cardiovascular disease and some forms of cancer. Determinants of chronic low-grade inflammation include lifestyle factors such as an unhealthy diet and obesity. Frequent fast food consumption is associated with excess energy, saturated fat and refined carbohydrates. Survey data suggests that US adults consumed greater than 11.3% of their total daily calories from fast food, but few studies examined the association between fast food and serum markers of inflammation. We investigated whether fast food consumption predicted serum levels of inflammation and potential mediators that influence this relationship.

Methods: Participants were 1,255 White and African-American middle-aged and older adults from the Midlife in the United States (MIDUS) II biomarkers project. Fast food consumption was measured as the frequency of eating fast food or ordering food for take-out or delivery per week. Measures of inflammation were serum levels of C-reactive protein (CRP), Interleukin-6 levels (IL-6) and E-selectin. Body weight measures were body mass index (BMI) and waist circumference (WC). Statistical analysis included means, frequencies and multiple regressions controlling for age, gender, smoking, education and income.

Results: Sample characteristics: 78% white, 57 % female, 43% completed college or above, 47% smoke, mean age was 57, and BMI was 29.7. Forty-three percent of males were more likely to consume fast food between 1-3 times per week than females. Frequent fast food consumption significantly predicted serum levels of E-selectin (p < .05), but not CRP and IL6. Frequent fast food consumption was associated with BMI (p < .001) and waist circumference (p < .001). Mediation analysis revealed that BMI and WC totally mediated the relationship between fast food consumption and serum levels of E-selectin (both p < .001).

Conclusions: Fast food consumption predicted serum levels of inflammation and high body weight mediated this association. These results have implications for interventions aimed at promoting healthy dietary patterns and healthy weight to reduce the risk of chronic diseases and cancer.
Exploring preferred methods of peer support approaches to encourage adherence to a Mediterranean Diet in a Northern European population at high risk of Cardiovascular Disease.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Epidemiological studies and RCTs have demonstrated that adherence to a Mediterranean diet (MD) can reduce cardiovascular disease (CVD) risk. Though methods used to achieve dietary change have been intensive and expensive. Peer support has been suggested as a possible cost-effective method to encourage adherence to a MD in at risk populations. Development of such a programme has not been explored in the literature, thus the purpose of this study was to use mixed-methods to determine the preferred approach for a peer-support intervention to encourage adherence to a MD. This represents the first stage of the TEAM-MED feasibility study.

Methods: Qualitative (focus groups) and quantitative methods (questionnaire and preference scoring sheet) were used to determine preferred methods of peer support. Sixty-seven high CVD risk participants took part in 12 focus groups (60% female, mean age 63 years). Discussions were stimulated using vignettes to contextualise the peer-support concepts, facilitating understanding. Focus group data was transcribed anonymously, coded using Nvivo10 and thematically analysed. Quantitative data was analysed using IBM SPSS11.

Results: Group peer-support was most preferred qualitatively and quantitatively. The mean preference score (1 being most preferred and 5 being least preferred) for group support was 1.5, compared to 3.4 for peer mentorship, 4.0 for telephone support and 4.0 for internet support. Three key themes were identified from the transcripts to elucidate why group peer-support was the most preferred method:

1. Building a Collective Message: participants discussed how a group approach could help lay a strong foundation for developing a group identity, learning from each other’s experience and becoming accountable to each other.

2. Catalysing Motivation: participants felt a group peer support model would facilitate interpersonal motivations including encouragement, competitiveness and accountability.

3. Stepping Stones of Change: Participants conceptualised change as a process, and discussed that throughout the process different models of peer support might be more or less useful.

Conclusions: Group peer-support was the most preferred method to encourage a population at high risk of CVD to adhere to a MD. This study informed the development of the TEAM-MED intervention as per MRC recommendations, and a feasibility RCT is underway.
**P1.049**

**Associations between children's psychosocial factors and their transportation cycling and the moderating effects of gender, family SES and independent mobility**

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**SIG:** Children and families

**Awards:** Yes, for the Student Competition*

**Objective:**

Promoting children’s cycling for transport is a useful strategy to increase their physical activity levels. Parents play an important role on determining children’s cycling for transport, but up to now, no studies have examined to which extend children’s psychosocial characteristics play a role in their transportation cycling. Furthermore, insights into the association between children’s independent mobility (IM) and transportation cycling is lacking in Europe. Therefore, this study examined (1) the association of children’s psychosocial characteristics with transportation cycling and its moderating effect of child’s gender, family socio-economic status and IM, and (2) the association between children’s IM and their transportation cycling.

**Methods:**
Children (n=1232, aged 10-12 yrs) completed an online questionnaire at school assessing their psychosocial characteristics related with transportation cycling. Parents reported child’s usual transportation cycling and the distance their child is allowed to cycle unsupervised (IM). Hurdle models were used to estimate associations between independent variables and odds of being a cyclist and with minutes of transportation cycling among those cycling. Data were collected during November-December 2014 across Flanders, Belgium.

**Results:**

Children’s perceived parental modeling, parental norm, peers’ co-participation, self-efficacy and IM were positively related to the odds of being a cyclist, perceived benefits were negatively associated. Parental modeling, siblings’ modeling, self-efficacy and parental norm were more strongly related to the odds of being a cyclist among children with a low IM. Friends’ modeling was significantly related with odds of being a cyclist among boys. IM and parental norm (only among boys) were positively related to the time spent cycling.

**Conclusion:** Targeting children, their friends and parents seems the most appropriate strategy when aiming to increase children’s transportation cycling. The current findings should be confirmed in other studies, preferably in an experimental study design.
The sustained impact of energy-dense food advertising on children’s dietary intake: results from a pilot study

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SIG: Children and families

Awards: Yes, for the Student Competition*

Purpose

An important reason for the failure to restrict children’s exposure to energy-dense food marketing is the lack of evidence directly linking marketing to children’s weight and energy intake. Short term studies designed to assess the effect of food advertising (in a cartoon or game) on children’s subsequent food intake show there is an immediate direct effect from advertisement exposure (children consume more snack foods). This study will explore the effect of repeated exposure to food advertising (over several days) via multiple media (TV and online) on children’s immediate snack intake and later meal consumption. This study’s main contribution will be to investigate if food advertising contributes to positive energy balance through a lack of compensation for snack intake at later eating occasions, which would, therefore, suggest a role for food marketing in childhood weight gain.

Methods

At a series of six-day holiday camps, children (aged 7-12 years, n = approx. 120) will be exposed to food and non-food advertising in a cartoon and/or an online game in a randomised within-subject, cross-over design. Children’s food consumption (grams and kilojoules) will be measured at a snack immediately after exposure and then at lunch later in the day. Linear mixed models analyses will be conducted to examine relationships between exposure and dietary intake: covariates will include age, sex and BMI.

Results

This paper presents pilot outcomes for the first 30 subjects, reporting on the impact of sustained exposure to food advertising on both immediate and later food choice and consumption, both within and between single media and multiple media platforms, compared with the control condition (non-food ad exposure). We will report within-subject differences between exposure to three days of food advertising and three days of non-food advertising for snack and lunch time dietary intake and whether increased energy intake from snack foods was compensated for at the later meal.

Conclusions

This study will contribute to understanding the effects of food advertising on children’s dietary intake and its potential influence on children’s weight. It will add to the evidence needed to continue to advocate for regulation to limit energy-dense food marketing to children.
Health Determinants and Body Bullying At The Beginning Of Adolescence: A Structural Equation Modeling Approach

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: We investigated the gender-specific causal relationship between health determinants and body bullying at the beginning of adolescence. Methods: The study is based on data from the "Adolescent Nutritional Assessment Longitudinal Study (ELANA)" conducted among elementary school students from six schools in Rio de Janeiro-Brazil in 2010, 2011, 2012 and 2013. For the present study we analyzed 810 adolescents aged between 9 and 15 years at 2010 in two times points (T1=2010 and T2=2012). Health determinants were assessed with four parameters: 1) minutes of moderate and vigorous physical activity (MVPA) per day with International Questionnaire of Physical Activity; minutes per day spent with 2) television (TV) and 3) video games/computer (VG) obtained in self-report questionnaires and 4) Body Mass Index (BMI=kg/m2) calculated based on direct measurements of height and weight. Body bullying was evaluated by The Child-Adolescent Teasing Scale-32 questionnaire. Gender-specific structural equations models were assessed, including autocorrelation for each health determinant and body bullying over time, correlations at T1 and T2, respectively, as well as the cross-lagged effect. Results: The results present significant stability coefficients for all variables over time in both genders, except for MVPA in boys and girls, and TV time among girls. The results further show positive correlations between BMI and body bullying as well as between TV and VG for males (0.32, p>0.001 and 0.24, p>0.001) and females (0.30, p<0.001 and 0.30, p<0.001), respectively, remaining significant over time (boys: 0.18, p>0.05 and 0.16, p>0.01; girls: 0.21, p<0.01 and 0.22, p<0.01). The reversed causation model provides the best fit for boys indicating that BMI at T1 had a significant effect on body bullying at T2 (0.12, p< 0.05) and body bullying at T1 had on VG at T2 (0.14, p< 0.01). Among girls the causation model from body bullying to health determinants affords the best fit demonstrating a significant effect of body bullying at T1 on VG at T2 (0.16, p<0.01). Conclusion: The patterns in the associations between health determinants and body bullying are not the same for boys and girls since different models provide the best fit suggesting some reversed causality among males.
Predictors of physical activity and sedentary behaviours among 11-16 year olds: Multilevel analysis of Health Behaviour in School-aged Children (HBSC) study in Wales

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose
The school setting provides an opportune environment for the promotion of physical activity in young people. The present study investigated associations of active travel and indicators of the availability of physical activity opportunities throughout the school day with young people's self-reported physical activity (total activity and moderate-to-vigorous activity) and sedentary behaviours.

Methods
Individual-level data provided by the 2013/14 cross-sectional survey ‘Health Behaviour in School-aged Children (HBSC) study in Wales’ were linked to school-level data within the ‘HBSC School Environment Questionnaire’. The final sample comprised 7,376 young people aged 11-16 years across 67 schools. Multilevel modelling was used to examine predictors of total physical activity, moderate-to-vigorous physical activity (MVPA) and sedentary behaviours (screen-based behaviours).

Results
Taking more physical activity (less than 5 days vs. 5 or more days per week), engaging in higher levels of MVPA (less than 4 hours vs. 4 or more hours per week) and reporting 2 or less hours of sedentary time were predicted by a range of individual level variables. Active travel to school positively predicted high levels of physical activity, however, gender stratified models revealed active travel as a predictor amongst girls only (OR:1.25 (95%CI:1.05 - 1.49)). No school-level factors were shown to predict physical activity levels, however, a lower school socio-economic status was associated with a higher level of MVPA (OR:1.02 (95%CI:1.01 - 1.03)) and a lower risk of sedentary behaviour (OR:0.97 (95%CI:0.96 - 0.99)). A shorter lunch break (OR:1.33 (95%CI:1.11 - 1.49)) and greater provision of facilities (OR:1.02 (95%CI:1.00 - 1.05)) were associated with increased sedentary activity. Gender stratified models revealed that PE lesson duration and the provision of sports facilities were predictors of boy’s sedentary behaviours.

Conclusion
Our results highlight the importance of encouraging schools to maintain or extend lunch breaks to provide sufficient time for young people to be active and in turn reduce sedentary behaviours. The findings also suggest that active travel could offer a mechanism for increasing physical activity levels particularly amongst girls. Particularly, the design and evaluation of interventions to promote physical activity during school hours should pay close attention to discouraging sedentary behaviour outside of school hours.
A family-based pilot randomised controlled trial to reduce screen time and unhealthy snacking in children and their parents: Kids FIRST

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SIG: Children and families
Awards: No

Background

The aggregation of screen viewing and unhealthy eating behaviours in children has important implications for health promotion. Evidence highlights the importance of parents and the family environment on children’s screen time and diet. However, few interventions target the family and home environment, and little is known about the most feasible and effective behaviour change strategies for reducing screen time and unhealthy snacking in a family setting. Interventions that target both screen time and snack food intake have the potential to offer greater health benefits and maximize health promotion opportunities.

Aim

To provide an overview of the development of ‘Kids FIRST’, a novel, family-based pilot intervention comprising strategies and resources aimed at reducing screen-time and unhealthy snacking in children and their parents.

Methods

Kids FIRST is a four arm cluster randomised controlled pilot trial. Schools are allocated to one of four groups: (1) Reducing unhealthy snacking at screens; (2) Reducing screen-time only; (3) Reducing unhealthy snacking only; (4) Control (usual practice). The 13-week intervention is being piloted in children aged 5-6 and 10-11 years and their parents. It is delivered through group based face-to-face sessions with parents, class lessons, and the Kids FIRST website. Kids FIRST provides parents and children with support using Informational and Cognitive, Behavioural, Environmental, and Social Support intervention components to empower families to make behavioural changes specific to them. Parents and children will participate in evaluation assessments at baseline, post-intervention (week 14), and 6-months after baseline. Primary outcomes are child and parent screen-time and energy-dense snack food consumption.

Discussion

Kids FIRST is the first pilot RCT to examine the effectiveness of behaviour change strategies for reducing children's screen-time and unhealthy snacking. The integration of consistent, evidence-based and theory informed strategies and messages to children and their parents in family and school settings are critical components. Results will provide evidence on the feasibility and effectiveness of single versus multiple behaviour intervention strategies. If shown to be feasible and effective, the Kids FIRST study may have a significant impact on the home environment and parenting practices relating to screen time and unhealthy snacking.
Clustering and correlates of screen-time and eating behaviours among young adolescents

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SIG: Children and families
Awards: No

Objective: Screen-time and eating behaviours are associated in adolescents, but few studies have examined the clustering of these health behaviours in this age group. The identification of clustered health behaviours, and influences on adolescents’ clustered health behaviours, at the time when they are more likely to become habitual, is imperative for intervention design. This study examines the prevalence and clustering of health behaviours in adolescents, and examines the individual, behavioural, and home social and physical environmental correlates of clustered health behaviours.

Methods: Adolescents aged 11-12 years (n=527, 48% boys) completed a questionnaire during class-time which assessed screen-time (ST), fruit and vegetable (FV), and energy-dense (ED) snack consumption using a Food Frequency Questionnaire. Health behaviours were categorised into high and low frequencies based on recommendations for FV and ST and median splits for ED snacks. Adolescents reported on their habits, self-efficacy, eating at the television (TV), eating and watching TV together with parents, restrictive parenting practices, and home availability and accessibility of foods. Behavioural clustering was assessed using an observed over expected ratio (O/E). Correlates of clustered behaviours were examined using multivariate multinomial logistic regression.

Results: Approximately 70% reported having two or three risk behaviours. Overall, O/E ratios were close to 1, which indicates clustering. The three risk behaviour combination of low FV, high ED, and high ST occurred more frequently than expected (O/E ratio = 1.06), as did the two risk behaviour combination of high ED and high ST (O/E ratio = 1.16). Individual, behavioural, and home social and physical environmental correlates were differentially associated with behavioural clusters. Correlates consistently associated with behavioural clusters included eating ED snacks while watching TV, eating at the TV with parents, and home availability and accessibility of ED snack foods.

Conclusion: There is a high prevalence of screen time and unhealthy eating, and screen time is coupled with unhealthy dietary behaviours. Strategies and policies are required that simultaneously address reductions in screen time and changes to habitual dietary patterns, such as eating at the TV. These may require a combination of individual, social and environmental changes alongside conscious and more automatic (nudging) strategies.
P1.055

Getting Urban Kids in Nature: An evaluation of the Kids in Parks TRACK Trail Program

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SIG: Children and families

Awards: No

Purpose

Kids in Parks TRACK Trails (KIP) is an innovative intervention that promotes not only physical activity but the benefits of learning about and experiencing nature. In 2012, KIP received the “Let’s Move! Champion of Change” award from Michelle Obama. The purpose of this evaluation is to measure the influence of KIP on the utilization of nature trails by children in an urban community.

Methods

This pre-post design measured the utilization of 3 nature trails in Charlotte, NC. In the fall of 2014, 3 county-park nature trails were identified for inclusion in the KIP program. Over a 1-month period research staff spent 300 hours observing and documenting the use of these trails. Information collected included the number of adults and children that used the trails and the demographic characteristics of the children such as age and minority (White vs. Non-White) status. Approximately 9-months later, the 3 trails were officially promoted to the public as KIP trails—this included a ‘grand opening’ event, promotion on the KIP website, and the implementation of KIP trailheads and informational brochures. In the fall of 2015, the 3 trails were observed again. The change in the number of children observed pre and post intervention using t-test analysis will be presented.

Results

In fall 2014, the research team observed 1,852 people use the 3 nature trails; 25% of the users were children (n=462). The mean age was 6.9 years and 12.2% of the children were non-white (n= 57). The average amount of time children spent on the trail was 1-hour. The fall 2015 results and how they compare to the fall 2014 results will be presented at the conference.

Conclusion

The KIP intervention is currently underway in 7 states and Washington, DC at 130 trails; approximately 19% of which are in urban areas. Further conclusions about the findings and suggestions for future research will be presented at the conference.
Towards healthy kindergartens. Developing quality with and through physical activity (QueB).

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SIG: Children and families

Awards: No

Objective

The aim of the joint research project Capital4Health - "Capabilities for active lifestyles" is to develop capabilities in different population groups and for professionals. The sub-project QueB which is funded by the German Federal Ministry of Education and Research focuses on (1) an organizational development in kindergartens, (2) a participatory process-oriented certification process and (3) the implementation of self-assessment tools (Kindergarten-Check-App).

Methods

Development: participatory planning process with nursery nurses.

Intervention: twelve kindergartens in two test regions, certification process with self-assessment, agreement on objectives, coaching and qualification.

Evaluation: pre-post comparison (pedometer, Goal Attainment Scaling - GAS), process evaluation (activity diaries, quality development with GAS).

Results

The one year certification process will lead to an organizational development in the kindergartens, which enhances their capabilities to promote physical activity and health. Self-assessment tools for a sustainable quality development will exist. The children's and nursery nurses physical activity will have increased.

Conclusions

The participatory quality development is supposed to pave the way for the permanent establishment of the certification process. Besides, networking among the kindergartens and the certification of more kindergartens are supported.
The relationship between physical activity and diet and young children’s cognitive development: A systematic review

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SIG: Early care and education

Awards: No

Objective

Given the high prevalence of suboptimal nutrition and low activity levels in children today and our limited knowledge of the effect of these behaviors on cognitive outcomes, we conducted a systematic review of the associations between physical activity, nutrition, and cognitive development in early childhood (six months to five years).

Methods

In March 2015, we conducted two different searches of MEDLINE, PsycINFO, and ERIC. Each search included either physical activity (including gross motor skills) or diet terms, and age-appropriate neurocognitive development outcome terms. Included studies were in English, published since 2005, and of any study design in which the physical activity or diet measure occurred prior to age five.

Results

Most studies were conducted in the US, Europe or Australia. For physical activity, eleven studies (5 cross-sectional, 3 longitudinal and 3 experimental) were included. Ten studies reported evidence suggesting that physical activity or gross motor skills are positively related to cognitive outcomes. Both acute bouts and longer term exposures showed benefit. For diet, eight studies were included consisting of secondary analyses from longitudinal cohort studies. A healthier dietary pattern was associated with better cognitive outcomes in all studies, although some of the reported associations were weak and the measures used varied across the studies.

Conclusions

Physical activity and healthy diets in early childhood are associated with better cognitive outcomes in young children. The paucity of literature and the variability in the type and quality of measures used highlight the need for more rigorous research. Given that the early childhood years are critical for both obesity prevention and neurocognitive development, evidence that the same healthy behaviors could promote both should inform future research. Efforts to promote healthy eating and active living from birth, important components of recommendations for obesity prevention, could be bolstered by increasing the evidence for how these health behaviors could also contribute to children’s cognition and learning.
**P1.058**

**Analysis of Fundamental Movement Skill Teaching Quality and Students’ Physical Activity Level among Hong Kong Primary Physical Education**

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**SIG:** Policies and environments  
**Awards:** Yes, for the Student Competition*

**Objective:**

The primary physical education (PE) is critical for the development and mastery of fundamental movement skills (FMS). Teachers play a key role in planning PE lessons that can provide students with quality instruction, encouragement, and opportunities for practice. Thus, this study aims to i) determine the students' moderate-to-vigorous physical activity level (MVPA), the contexts of lessons, and the teachers' behavior during PE lessons for FMS development and to ii) investigate the differences in the System for Observing Fitness Instruction Time (SOFIT) variables between the teaching loco-motor skills and the object control skills of classes.

**Methods:**
A total of 31 lessons taught by 14 PE specialists were observed using SOFIT. Independent sample t-tests were conducted to investigate the differences in each SOFIT category between PE lessons that aim to develop the loco-motor and the object control skills of students.

**Results:**
Results showed that students spent considerably more time waiting for their turn and sharing equipment during skill practice than engaging directly in movement skill activities. The actual class time for teaching FMS ranged from 15 min to 57 min (M = 31.6 ± 12 min), and the overall active time of students during FMS class was low (10 MVPA min; 30.8% of lesson). The teachers spent a considerable amount of time on giving instructions (M = 42.5%), and regular interruptions to manage the misbehaving students (M = 27.6%) prevented other pupils from remaining physically active in FMS practice. The PE classes for object control skills were significantly lower (p <.05) in terms of the time spent in teacher's demonstration and observation compared with those for loco-motor skills. These findings indicate that teachers ineffectively maximize the skill acquisition and practice opportunities of their students for them to perform a mature movement pattern.

**Conclusion:**
Quality practice time as well as sensitive observation and accurate demonstration from PE teachers are important for the development and mastery of FMS. PE teachers should undergo professional development to strengthen their FMS teaching competence, which in turn can inevitably improve their delivery of the lessons and the performance of their students.
An Assessment for Learning Intervention Emphasizing Fun, Mastery and Support (A+FMS) to Improve Fundamental Movement Skills in Hong Kong Chinese Students: Protocol for a Clustered Randomized Controlled Trial

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SIG: Children and families

Awards: Yes, for the Student Competition*

Objective:

Increasing evidence shows that school-based teacher support intervention is a promising approach to improve children’s fundamental movement skills (FMS). Through enhancement of assessment competence of in-service teachers, we aim to assess the effectiveness of an Assessment for learning intervention emphasizing Fun, Mastery and Support (A+FMS) in improving children’s FMS proficiency, perceived physical and movement skill competence, enjoyment of PE and perceived teacher support. This is the first randomized controlled trial to adopt assessment for learning (AfL) strategies into PE classrooms to help improve FMS instruction and student learning.

Methods:
The A+FMS will be evaluated using a cluster randomized controlled trial. Based on a sample size calculation, a target sample of 282 students from 10 Grade 3 classes were recruited and randomized into either an experimental group or a wait-list control group. The intervention is based on competence motivation theory to emphasize fun activities to develop basic fundamentals, improving mastery of movement, and providing support for teaching and learning skills. Primary outcome measures are the sum of scores from the six objectively measured FMS (i.e., jump, hop, skip, dribble, catch, and overhand throw). Secondary outcomes include self-reported measures: enjoyment in physical education, perceived physical competence, perceived skill competence, and social support. Teachers in the experimental group are required to attend a six-hour training workshop and integrate 550 minutes of AfL strategies that focus on sharing criteria for success, effective questioning, provision of feedback, and developing students’ ability to self- and peer assess into their PE lessons. Resources such as videos, skills checklists, and equipment will also be provided to support children to practice the related skills after school. The rate of changes in primary and secondary outcomes across the experimental and control groups will be compared to determine the effectiveness of the program.

Results:
The study is currently ongoing and the results on the effectiveness of the A+FMS intervention for improving FMS in primary aged children will be presented.

Conclusions:

This research will build an evidence base to inform school-based interventions for helping students master movement skills through teacher support and ongoing assessments.
Effectiveness and Characteristics of Schoolbased Physical Activity Interventions in Adolescents A systematic review and meta-analysis

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective

Research shows that the least physically active people are at greatest risk for adverse health effects. Especially adolescents are less physically active and therefore, the promotion of an active lifestyle aimed at adolescents seems important. The purpose of this systematic review is to gain insight into the effectiveness of school-based physical activity (PA) interventions and their characteristics.

Methods

A systematic literature review was conducted according to the PRISMA protocol. Inclusion criteria were the research design, study population, school setting, outcome measure and the year of publication. To determine the overall effect on the PA level as a measure of outcome, a meta-analysis was performed. Subgroup analyses determined the magnitude of the effect size reflecting the importance of the intervention characteristics: duration, tailoring to population, a participative approach, involvement of staff and parents, the use of technology devices, a multicomponent approach, inclusion of PA and intra or extracurricular approach. Risk ratios (RR) on an effective study were determined by the proportion of the number of effective studies with an intervention characteristic compared to the number of effective studies without this feature. A meta regression analysis was performed with PA level as dependent variable and intervention characteristics as independent variables.

Results

This review includes 25 trials of which 13 report effective results. The overall effect on increasing the PA level of adolescents is light (0.20, BI: 0.11,0.29). The most effective combinations of intervention characteristics that improve the effect size to a moderate level are inclusion of PA preferably in the curriculum (0.54 BI: 0.21,0.88) and a tailored PA program (0.49, BI: 0.17,0.81), involvement of staff and parents. RR of 2.2 confirm tailored intra curricular PA as important intervention features. multi regression analysis confirms PA as a significant positive predictor and multi-component approach as negative.

Conclusions

The overall effect of a school based PA intervention was light to moderate. The most effective interventions focus on intra curricular PA, tailored to adolescents with staff involvement. The recommendations arising from this systematic review are used in the design of interventions in prevocational schools.
Development of a randomized controlled intervention diminishing socioeconomic inequalities in energy balance-related behaviors at a preschool setting

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SIG: Early care and education

Awards: No

Purpose: Effective interventions that target socioeconomic status (SES) differences to avoid the potential widening of inequalities in health are needed. Children at preschool age is a valuable intervention target since sedentary behaviors, physical activity (PA) and dietary behaviors, jointly called the energy balance-related behaviors (EBRBs), are established in early childhood. To balance SES inequalities in preschool children’s EBRBs, the preschool setting can have significant supportive influence. The intervention can be delivered similarly to the whole target population, with the intensity adjusted according to the needs of children from low SES backgrounds. The ongoing DAGIS study aims to develop a multi-component setting-based intervention which will diminish SES inequalities in preschool children’s EBRBs.

Methods: Before implementation of a six-month lasting intervention in years 2017 and 2018, a comprehensive needs assessment including several phases is conducted between years 2014 and 2017. The needs assessment includes following stages: a) focus group interviews for parents and preschool personnel in 2014 to recognize the influential factors of EBRBs, b) several pilot studies in years 2014-2015, C) a comprehensive cross-sectional study in years 2015-2016 (N=800 children in about 70 preschools) to recognize the SES differences in EBRBs and associated factors with these differences, d) co-operation with a non-profit organization in development of practical methods throughout the stages, e) to plan the practical implementation of intervention, workshops for target groups are arranged in years 2016-2017.

Results: The first two phases of needs assessment have indicated that the combination of multiple levels of analysis and diverse methodologies (e.g. surveys, observations) is necessary in the cross-sectional study. This extensive survey enables to identify the healthfulness of several environments and the well-being of persons and groups, which will lead to an evidence-based developed intervention.

Conclusions: The several phases of the needs assessment in the DAGIS study will give the best knowledge to be able to plan an effective intervention which will be able to narrow the SES differences in preschool children's EBRBs.
Families with Preschool Children: Weight-Related Aspects of their Home Environments

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: The home environment and family lifestyle practices cultivate weight-related behaviors (diet, physical activity) during childhood and form the foundation for lifelong practices. This study benchmarked self-reported, weight-related home environment and associated behaviors of 702 parents with at least one preschool child prior to participation in the HomeStyles childhood obesity prevention randomized controlled trial.

Methods: Data were collected via an online survey comprised of valid, reliable questionnaires. All questionnaires were 5-point Likert-type scales (5=highest score), unless otherwise noted.

Results: Parents were mostly female (92%), white (58%), between 20 and 46 years. Households were food secure (5.04±1.97 on 7-point scale), and somewhat disorganized/chaotic (2.54±1.01SD) with strong family cohesion (4.01±0.76SD). The home food environment had low availability of fruits/vegetables/fiber (mean=40.65±15.82SD on 0-80 point scale), nutrient-dense breakfast foods (mean=13.06±5.83SD; 0-24 point scale), salty/fatty snacks (8.4±7.4SD; 0-32 point scale), and sugar-sweetened beverages (1.03±1.08SD; 0-5 point scale). Home media equipment (sedentary behavior proxy) availability was high (mean 2.22±2.41days/week, and parents allowed preschool children to watch TV, play video games, and use computers 4.60±6.52SD, 1.86±5.18SD, 2.92±5.71SD hours/daily, respectively. Parents tended to somewhat agree that they limited children’s exposure to TV commercials (3.22±1.24SD), discussed TV commercials with children (4.10±1.01SD), or limited children to only TV shows made for kids (4.17±0.94SD) or that were educational (3.43±1.10SD). With regard to active play, parents reported that availability of active play equipment and space inside the home, immediately outside the home (yard area), and neighborhood was moderately high (3.11±0.74SD, 4.07±0.64SD, and 4.08±1.09SD, respectively) and accessibility of active play space and equipment was modest in these three areas (i.e., 2.71±1.22SD, 1.97±1.53SD, and 3.60±0.67SD, respectively). Parents tended to agree they had easy access to a large supermarket (4.00±1.09SD) and had safe (3.68±0.75SD), clean (3.95±1.07SD) neighborhoods.

Conclusion: Study findings identify numerous opportunities to improve the home food, media, and active play environments and lifestyle choices in families with preschool children that could better support optimal child growth and development and ultimately lower obesity risk.
Motor Skill Development in at-risk Preschoolers: A Community-Based Longitudinal Intervention Study

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SIG: Early care and education
Awards: No

Purpose: The Food Friends Get Movin' with Mighty Moves (MM) is an 18-week preschool-based intervention designed to increase structured physical activity opportunities and enhance gross motor skill (GMS) development in children. A longitudinal cohort study, Colorado LEAP, examined if MM intervention effects on GMS at age 4 could be sustained through early elementary school. Study aims were to (1) determine the pre-intervention status of GMS performance in at-risk preschool children and (2) evaluate the impact of MM to improve children's GMS over time.

Methods: The LEAP study was conducted in 5 preschools (2 intervention, 3 control) serving children (n=249) at high risk for the development of childhood obesity. MM was delivered to the intervention group during preschool. The Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2) subtests for balance, running speed and agility, upper-limb coordination (ball skills) and strength were administered to children at 4 time points - baseline and post-intervention in preschool, 1-year follow-up (kindergarten) and 2-year follow-up (first grade).

Results/findings: When compared to the mean of the normative sample, the mean scaled score for all participants at baseline was significantly lower on 2 of 4 BOT-2 subtests; balance (p=.03) and ball skills (p<.0005). The mean scaled score for the strength subtest was significantly higher (p<.0005). Assessment at 2-year follow-up revealed that the means of all subtests were significantly lower than those of the normative sample (p<.0005). Thus, as the at-risk preschool children aged, their GMS advanced at a significantly slower rate than expected compared to the general population.

A significant intervention effect was found as a regression analysis for the ball skills subtest resulted in group membership being a significant predictor of performance scores at 2-year follow-up ($\beta=.198$, $t=3.28$, $p<.0005$), along with scores at baseline ($\beta=.594$, $t=9.57$, $p<.0005$). The overall model accounted for 41% of the variance in performance scores at 2-year follow-up, $F(4,160)=29.98$, $p<.0005$.

Conclusion: The MM program delivered in preschool confers a lasting impact on GMS, specifically ball skills, in at-risk elementary school children. Results suggest at-risk preschool children may already be behind in GMS development and will likely fall even further behind in elementary school.
The associations between summertime sleep and physical activity in urban minority girls.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose

Among children and adolescents, short sleep duration is associated with weight gain. Urban minority girls are at an increased risk for summertime weight gain, and may also fail to accumulate the recommended summertime sleep (9-11 hours for school-aged children). Few studies, however, have objectively measured summertime sleep in this population or examined correlates, including physical activity (PA). This study is the first to examine objectively-measured summertime sleep among urban minority girls.

Method

Data were collected at a community-based summer program that promoted PA (n = 60 low-income urban girls, ages 10-14), at two time points: prior to beginning programming (T1; unstructured context) and during the final week of programming (T2; structured context). Actigraph GT3X accelerometry was used to measure PA (e.g., moderate-to-vigorous physical activity; MVPA) and sleep measures (e.g., duration, onset time, wake time) using previously validated methodologies.

Results/Findings

Participants identified as African-American (n=38) or Latina/Hispanic (n=22); and nearly half were overweight or obese (n=32, 53%). At both time points, participants experienced shorter nighttime sleep duration than is recommended for their age. African American girls recorded significantly less sleep than Latina girls at T1, but not T2. BMI did not account for any of the sleep differences. Participants experienced significantly shorter sleep in the structured camp context than the unstructured context (T1), but accumulated more daily MVPA as a result of the summer programming.

Conclusions

We highlight racial/ethnic differences in sleep. Notably, we found that African American girls accumulate significantly less sleep compared to Latina girls when not involved in structured summertime programming. Findings also suggest that wake times may be particularly influential role in youths’ abilities to obtain adequate sleep. Overall, summertime sleep is an understudied weight gain risk factor that may be important to consider among minority youth.
Are changes in school-based friendship networks associated with physical activity in children following school-grade transition?

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SIG: Theories of motivation

Awards: Yes, for the Student Competition*

PURPOSE

Cross-sectional and limited longitudinal evidence suggests that children’s physical activity (PA) levels are positively associated with their friends’ PA; however, few studies have investigated longitudinal changes of children’s friendship networks with changes in their PA. Further, the influence of children’s friendship networks on PA may be gender-specific. Thus, the aim of this study was to estimate the associations between children’s friendship networks and PA, and to assess gender-based effect modification of these associations over transition to a new school year.

METHODS

This natural experiment included children in grades 5-8 attending a Calgary (Alberta, Canada) middle-school. Online questionnaires, administered multiple times before and after children transitioned into a higher school grade, captured changes in the behavioural and structural characteristics of children’s peer friendship networks and PA. Cross-sectional associations between average frequency of moderate-to-vigorous intensity PA (MODPA) and peer friendship network variables including average friends’ PA, count of incoming and outgoing friendship nominations, and betweenness centrality were estimated for pre-grade (n=191) and post-grade (n=255) data. Change scores (n=130) were estimated by calculating absolute differences in pre-grade and post-grade average MODPA and social network (SN) variables. Sociodemographic-adjusted multivariate linear regression (β, 95% CI) estimated the association between an individual child’s PA and the peer friendship network variables for pre-grade, post-grade, and change scores. We also tested effect modification of all SN variables by gender.

RESULTS

Pre-grade, children, on average, participated in ≥60 minutes of MODPA 4.92 (SD 1.63) days/week and 4.75 (SD 1.49) days/week post-grade. Cross-sectional analysis found positive associations (p< .05) between a child’s PA and the average PA of their friends’ (pre-grade: β=0.82, 95% CI 0.40, 1.25; post-grade: β=0.80, 95% CI 0.37, 1.22), and the number of outgoing friendships (pre-grade: β=2.18, 95% CI 1.28, 3.09; post-grade β=2.26, 95% CI 1.33, 3.20). We found no association between changes in SN variables and changes in PA following the grade transition and no effect modification by gender.

CONCLUSIONS

Our findings suggest that the PA and structural characteristics of children’s peer friendship networks are associated with an individual’s PA, and that gender does not modify these associations. Our findings may inform interventions attempting to change children’s PA by modifying their school-based friendship networks.
Calibration and validation of the ActiGraph wGT3X+ accelerometer for the estimation of physical activity intensity in children with intellectual disabilities

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose

The purpose of this study was to develop the first population-specific accelerometer cut points for the classification of physical activity intensity in children with intellectual disabilities (ID). The classification agreement of the calibrated cut points was also investigated in comparison with existing cut points developed in typically developing (TD) children.

Methods

Fifty children with ID were randomly assigned to the calibration (n=36; M=28, 9.53±1.08yrs) or validation (n=14; M=9, 9.57±1.16yrs) group. Participants wore an ActiGraph wGT3X+ accelerometer whilst taking part in a semi-structured school-based physical activity session, which included various activities ranging from sedentary to vigorous intensity. SOFIT is a validated direct observation tool and was used as the criterion measure of physical activity. Receiver Operating Characteristic curve analyses were used to determine the optimal accelerometer cut points for sedentary, moderate, and vigorous intensity activity. Classification agreement of the calibrated cut points and nine existing sets of cut points was investigated using sensitivity, specificity, total agreement, and Kappa (κ) scores against the criterion measure of SOFIT.

Results

Calibration: The optimal vertical axis cut points were ≤507 (sedentary), 1008-2300cpm (moderate), and ≥2301cpm (vigorous). Sensitivity scores ranged from 81-88%, specificity 81-85%, and area under the curve .87-.94. Validation: Substantial classification agreement was found for the sedentary (sensitivity=85.18%, specificity=92.62%) and moderate (sensitivity=74.92%, specificity=95.65%) cut points, with the vigorous cut point demonstrating almost perfect agreement (sensitivity=93.00%, specificity=94.61%). The calibrated sedentary cut point (κ = .66) provided comparable classification agreement with existing cut points (κ = .55-.67). However, the existing moderate and vigorous cut points demonstrated low sensitivity (0.33-33.33% and 1.33-53.00%, respectively) and disproportionately high specificity (75.44-.98.12% and 94.61-100.00%, respectively), indicating that cut points developed in TD children are too high to accurately classify physical activity intensity in children with ID.

Conclusions

In comparison with TD children, children with ID require lower cut points for the classification of moderate and vigorous intensity activity. Therefore, generalising existing cut points to children with ID will underestimate physical activity and introduce systematic measurement error, which could be a contributing factor to the low levels of physical activity reported for children with ID in previous research.
Changes in psychosocial factors in relation to changes in physical activity: a longitudinal study from childhood into adolescence

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SIG: Children and families

Awards: No

Objective
The transition from primary to secondary school can be seen as a critical life event and an experience that greatly influences a child’s daily routines. This transition is accompanied by declines in overall physical activity (PA). The study aim was to investigate how psychosocial factors toward PA changed when children (11-12 years) made the transition from primary school to secondary school (13-14 years) and how these changes were related to changes in different PA domains.

Methods
In total, 321 children and one of their parents filled out a questionnaire concerning PA and psychosocial factors toward PA in the last grade of elementary school and 2 years later. Children also wore an activity monitor for 7 consecutive days. Cross-classified multilevel analyses were conducted in MLwiN 2.30.

Results
In girls, parental support (self- and parental report) increased and attitude toward PA, self-efficacy (self- and parental report), perceived benefits and parental reported social norm decreased from primary to secondary school. In boys, parental modeling of PA decreased and boys’ parents reported a decrease in boys’ self-efficacy, social norm and an increase in boys’ perceived barriers toward PA when their child entered secondary school.

In girls, a more positive attitude toward PA was related to an increase in daily steps ($\beta = 832\pm 294; p=0.005$). An increase in perceived barriers ($\beta = -6.7\pm 2.7; p=0.013$) was related to a decrease in sports during leisure in girls.

In boys, an increase in parental reported parental support ($\beta = 799\pm 368; p=0.029$) and a decrease in parental ($\beta = -1277\pm 2571; p=0.025$) and boys’ ($\beta = -1526\pm 657; p=0.020$) reported barriers, were related to an increase in daily steps.

A decrease in parental perceived barriers toward sports was related to an increase in sports during leisure ($\beta = -13.3\pm 10.3; p=0.001$) in boys.

Conclusions
In general, psychosocial factors became less beneficial toward PA and sports when children made the transition from primary to secondary school. Adverse changes in psychosocial factors toward PA and sports partially explained the decreasing PA levels in boys and girls. The prevention of adverse changes in psychosocial factors toward PA may lead to a smaller decrease or an increase in PA when children make the transition from primary to secondary school.
Write, draw, show, and tell: A child-centred dual methodology to explore perceptions of out of school physical activity

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SIG: Children and families

Awards: Yes, for the Student Competition*

Purpose: Presently, little is known about children's non-school physical activity (PA) through that of the "children's voice". Research to increase children’s PA and inform intervention design, has been limited to singular qualitative methods that do not allow for children’s varied linguistic ability and interaction preference. The aim of this study was to use a combination of qualitative techniques to explore children’s current views, experiences and perceptions of out of school PA as well as offering formative opinion about future intervention design.

Methods: Write, draw, show and tell (WDST) groups were conducted with 35 children aged 10-11 years from 7 primary schools. A range of qualitative techniques referred to here as WDST were incorporated into WDST groups to further stimulate children’s thinking and facilitate discussion around PA. Data were analysed through a deductive and inductive process, firstly using the Youth Physical Activity Promotion Model [1] as a thematic framework, and then inductively to enable emergent themes to be further explored. Pen profiles were constructed to represent key emergent themes.

Results/findings: The combination of qualitative techniques generated complimentary interconnected data which both confirmed and uncovered new insights into factors relevant to children's out of school PA. These findings would have remained hidden from use of survey, adult-focussed or singular qualitative methods.

Conclusions: The findings of this study add to the understanding of mechanisms through which parents influence children’s activity related behaviour. Further these findings provide an insight into potential target areas for future out of school PA interventions for primary school aged children. Moreover, the write, draw, show, and tell method developed here is an inclusive, interactive and child-centred methodology which enhances data credibility.

1. Welk GJ. Quest. 1999; 51:5-23.
The relationship between Developmental Coordination Disorder, visual-motor integration and academic achievement in children

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SIG: Early care and education

Awards: Yes, for the Student Competition*

Objective: Children with Developmental Coordination Disorder (DCD) are characterized by a lack of motor coordination that influences performance of daily activities and academic tasks negatively. This study firstly aimed to determine the relationships between DCD, academic achievement and visual-motor integration and secondly to determine the best predictor for the relationship between DCD and academic achievement.

Methods: 221 Learners (10.05 years, ±0.41) in the Zeerust region in the North-West Province of South Africa were used, after being randomly selected in 2010, forming part of the 2013 follow-up measurements of the NW-CCHILD longitudinal study (2010-2016). Motor coordination was evaluated using the Movement Assessment Battery for Children-2 (MABC-2) while the Beery-Buktenica Developmental Test of Visual-Motor Integration 4\textsuperscript{th} ed. (VMI-4) was used to evaluate visual-motor integration. Academic achievement was determined using the Annual National Assessment results (ANA’s) and mid-year examination results of each learner. DCD was identified using the DSM-5 diagnostic criteria, only including learners that failed (<39%) two or more subjects and fell below the 15\textsuperscript{th} percentile after completing the MABC-2. A correlation analysis and a forward stepwise regression analysis were used to analyse the data.

Results: Correlations with a medium and large effect were found between the MABC-2 sub-tests, VMI-4 components and academic subjects. Visual perception correlated the highest with mathematical achievement ($r=0.46$) and showed a large correlation with the average academic mark obtained ($r=0.41$). Visual perception also largely predicted the academic achievement in six mid-year examination subjects (English, Life orientation, Mathematics, Natural Science, Setswana and Social Science) and in Mathematics and Afrikaans during the ANA’s, while motor coordination or hand control served to a lesser degree as a predictor.

Conclusions: It is concluded that a significant correlation between DCD, visual-motor integration and academic achievement exists, with visual perception being the largest predictor of academic achievement. Visual perception plays a vital role in the child’s ability to understand mathematical concepts in order to execute mathematical tasks effectively. Children should therefore, from a young age, be exposed to stimulating environments where age-appropriate development of these perceptual motor skills can be addressed in order to establish a firm foundation for later academic achievement.
Sports Participation and Quality of Life in Fourth and Fifth Grade Primary School Children: An Observational Cross Sectional Study in the Netherlands

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SIG: Children and families

Awards: Yes, for the Student Competition*

Objectives

Quality of life (QoL) expresses the wellbeing of an individual and covers almost all areas of human functioning. There are indications that QoL is associated with physical activity (PA): that is, children who are physically active, seem to have a higher QoL than less active children. However, the assumed positive relationship between PA and QoL has been studied to a limited extent. Moreover, the sporadic studies mostly focus on children with somatic disorders, such as chronic diseases or obesity, and make use of relatively crude measures of PA.

A fruitful approach to further investigate the assumed QoL benefits of PA is to focus on children’s sports activities. Sports activities are considered an important part of PA, especially for children, and can be measured in a relatively easy way. The aim of this large-scale study was to explore the associations between sports participation and QoL in fourth and fifth grade primary school children.

Methods

This study was based on a cross-sectional study with a representative sample of 2,037 children of 73 primary schools in the Netherlands.

Information about sports participation was obtained by the modified Dutch Move and Sports Monitor Questionnaire – Youth Aged 8-12 Years. QoL was determined by means of the KIDSCREEN-10. The associations between PA and QoL were assessed using multiple regression analysis, adjusting for gender, age, BMI, SES, and parents’ marital status.

Results

Being member of a sports club and frequency of sports activities proved to be positively associated with QoL. However, age was an effect modifier: the associations could only be demonstrated for children in the fifth grade. Significant associations were also found between the variables ‘team versus individual sports’, ‘outdoor versus indoor sports’, and ‘training versus both training and matches’ on the one hand and QoL on the other. Contrary to expectations, these associations disappeared when adjusted for frequency of sports activities.

Conclusion

The present study shows that QoL in children is related to membership of a sports club and to the frequency of sporting activities. It therefore seems important for children to practise sports in order to get a better QoL.
Health effects of replacing children’s sedentary time with light, moderate, and vigorous physical activity during school and non-school time: cross-sectional analysis from the CHANGE! Study

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SIG: Children and families

Awards: No

Purpose

Physical activity promotion efforts aimed at children frequently aim to reduce the time spent in sedentary behaviours and replace them with physically active alternatives. The health effects of substituting behaviours in this way though, are unclear. The purpose of this study was to examine the hypothesised effects on health outcomes, when in-school and non-school weekday sedentary time was replaced with objectively measured physical activity.

Methods

This cross-sectional study involved 278 children aged 9-10 years. Weekday sedentary time (ST), light (LPA), moderate (MPA), and vigorous (VPA) physical activity were objectively recorded for school time and non-school time. Health outcomes were body mass index (BMI), waist circumference (WC), diastolic blood pressure, systolic blood pressure, and cardiorespiratory fitness (CRF). Linear regression models examined associations between time spent in ST and in PA, and the health outcomes. Isotemporal substitution models investigated the estimated effects of substituting LPA, MPA, or VPA for sedentary time, with adjustment for wear time, sex, and maturation.

Results

In isotemporal models, replacing 1 minute of school day ST with VPA was associated with favourable effects on BMI (β = -0.15, 95% CI = -0.20, -0.11), WC (β = -0.4, 95% CI = -0.60, -0.20), and CRF (β = 0.96, 95% CI = 0.41, 1.52), but not blood pressure. Replacing 1 minute of non-school ST with VPA was associated with significant effects on BMI (β = -0.08, 95% CI = -0.14, -0.03), and WC (β = -0.2, 95% CI = -0.40, -0.004), but not CRF (β = 0.32, 95% CI = -0.001, 0.63) or blood pressure.

Conclusions

In 9-10 year old children, replacing school day and non-school ST with VPA, but not LPA or MPA was significantly associated with positive changes in BMI, waist circumference, and CRF (non-school time only). The associations with health outcomes were strongest when school time ST was replaced by school time VPA, and the largest effects were observed for CRF. Integrating regular, short, (i.e, 5-10 minute) bouts of VPA into the school day to displace ST could positively affect health outcomes, particularly those related to weight status and CRF.
The nature and levels of physical activity and sedentary behaviour of Senior Phase learners in Potchefstroom, South Africa

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SIG: Early care and education
Awards: Yes, for the Early Career Award**

Purpose: In light of the worldwide decrease in physical activity levels among adolescents, the aim of this study was to determine the nature and levels of physical activity as well as sedentary behaviour during weekdays and weekends, of a group of Senior Phase learners in South Africa.

Methods: The adapted Children’s Leisure Activities Study Survey (CLASS) questionnaire was used for determining the nature and levels of physical activity as well as sedentary behaviour of a total of 230 Grade 7 learners, from three schools in Potchefstroom. Data were analysed by means of the Statistica and SAS statistics programmes, and descriptive statistics, as well as independent t-tests and effect sizes (ES) were used.

Results/Findings: The results indicate moderate to high-intensity physical activity levels of between 334 and 361 minutes per week, and sedentary behaviour of between 3 077 and 3 410 minutes per week, which implies that between 70.7% and 71.9% of the participants do not meet the recommended guidelines for health-based physical activity and that the time spent on sedentary behaviour is high compared to that of adolescents in other countries. The participants were more active during weekends than during the week. Boys were also significantly more active than girls (p< 0.001; ES between 0.21 en 0.56), and girls more sedentary than boys (ES between 0.18 en 0.20). The physical activities with the highest participation in the participants’ free time were soccer, recreational swimming, running and dancing, while the sedentary activities with the highest participation were listening to music, riding a vehicle and being busy on the phone.

Conclusion: From the results, recommendations are made for Physical Education teachers with a view to promote learners’ physical activity levels.

Key words: Physical activity, sedentary behaviour, adolescents, genders,
Relationship between physical activity and sedentary time, and academic performance of Grade 7 learners in Potchefstroom, South Africa.

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Awards: Yes, for the Early Career Award**

Purpose: Of the study was to establish the relationship between physical activity and sedentary time, and academic performance of Grade 7 learners in Potchefstroom in South Africa.

Methods: Incorporating an once-off cross-sectional research design, the adapted Children’s Leisure Activities Study Survey (CLASS) questionnaire (Telford et al., 2004) was used to determine the physical activity levels and time spent on sedentary behaviours of 230 Grade 7 learners (114 boys and 116 girls) from three schools of different socio-economic backgrounds in Potchefstroom. Learners’ first language, Mathematics and year-end average marks were used as a measure for academic performance. Data were analysed by means of the Statistica and SAS statistics computer programmes, and descriptive statistics, Spearman correlation coefficients and effect sizes were used.

Results/Findings: The results indicate statistically and practically significant positive relationships between academic performance and the total time spent on physical activity during weekends (p<0.05; r = between 0.13 and 0.14), as well as on high-intensity physical activity during weekends (p<0.05; r = between 0.21 and 0.45). Negative relationships were also found between academic performance and sedentary behaviour during weekends (p<0.05; r = between 0.17 and 0.30), as well as between academic performance and the total time on sedentary activities per week (p<0.05; r = between 0.16 and 0.41).

Conclusion: The conclusion drawn is that learners demonstrating high levels of physical activity and lower levels of sedentary behaviour perform better academically, and that learners should be motivated and equipped to be more physically active, especially during weekdays, to promote their academic achievement.

Key words: Physical activity, sedentary time, adolescents, academic performance
P1.074

The role of negative peer experiences in the physical activity and sedentary behavior of youth

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\textbf{SIG:} Children and families

\textbf{Awards:} Yes, for the Student Competition *

\textbf{Purpose:} Negative peer experiences may lead overweight and obese youth to be less active and more sedentary. Our study is among the first to empirically test these relationships and hypothesized that (1) negative peer experiences would mediate the negative relationship between body weight status and moderate to vigorous physical activity (MVPA), and (2) negative peer experiences would mediate the positive relationship between body weight status and screen time.

\textbf{Methods:} Participants were a part of the Year 1 data (2012-2013) from the COMPASS study, a prospective cohort study of high school students in Ontario and Alberta, Canada. Complete survey data were available from 18,447 students in grades 9 to 12 from 43 Ontario secondary schools. The independent variable was weight status (non-overweight vs. overweight/obese), the mediators were peer victimization and bully-perpetration, and the dependent variables were screen time and MVPA. Gender, age, number of active friends, ethnicity, and income were included as covariates. Multilevel path analysis was conducted, controlling for clustering within schools and covariates.

\textbf{Results/findings:} Weight status was significantly related to screen time, with overweight/obese youth participating in 24 more mins/day of screen time than non-overweight youth (SE=2.58, \textit{P}<0.001). This pathway remained significant after adjusting for mediators. The total indirect effect of weight status on screen time through both mediators was significant (\textit{P}<0.01). However, only the specific indirect effect through peer victimization was significant. Specifically, 2 additional mins/day of screen time in the overweight/obese youth compared to non-overweight youth could be attributed to increased peer victimization experienced by the overweight/obese youth (SE=0.6, \textit{P}<0.01). Weight status was not significantly related to MVPA (\textit{P}>0.05). This pathway remained non-significant after adjusting for mediators. Further, the proposed mediators did not mediate this relationship in the hypothesized direction.

\textbf{Conclusions:} We found that greater peer victimization partially explained why overweight and obese youth engaged in more screen related activities than non-overweight youth. However, overall the effects are small. Future analyses should examine the longitudinal associations using additional waves of the COMPASS data.
Physical activity levels and patterns and relationships with participation in object control skills in nine- to 10-year old girls in South Africa: The NW-CHILD study

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SIG: Early care and education
Awards: No

Background: Early object control (OC) skill proficiency is found to be related to long-term physical activity. This study describes the percentage participation in moderate and high intensity physical activities and the relationship between physical activity levels and object control skills in nine to 10-year old girls in South Africa, taking into consideration ethnical differences in activity preferences. Methods: OC skills were assessed in 406 girls with the Test of Gross Motor Development-2 while the Children’s Leisure Activities Study Survey was used to assess physical activities and patterns in 406 girls (89 white, 317 black): mean age: 9.86 years (±0.42). Results: Activity choices of white and black girls differed where black girls spend a high percentage of their time (83.60%) doing household chores, walking, rope skipping and playing street soccer, while white girls engaged more in sports and non-organised activities. Significantly (p≤0.00, d=0.83, d=0.5) more white girls participated in moderate and high intensity activities. Physical activity choices showed a small relationship with object control skills. Only netball showed a small relationship with the OC standard score. Conclusion: More exposure should be given to girls to be physically active, and more emphasis should be placed on activities that can improve OC skills.

Keywords: Motor proficiency, children, socio-economic status.
**P1.076**

*Parental perceived built environment measures and active play in Washington DC metropolitan children*

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**SIG:** Children and families

**Awards:** No

**Purpose:** The relationship between the built environment and childhood active play is still unfolding. While previous research has identified associations between objective or subjective built environment measures and active play, many of these studies were comprised of samples with predominately non-minority children or those from homogenous and affluent populations. Hence, a primary purpose of the Built Environment and Active Play (BEAP) Study was to examine the relationships between children’s active play and parental perceptions of the home neighborhood built environment within the Washington, DC metropolitan area (DMV), an area with a unique and solid population of racial and ethnic diversity.

**Methods:** With this cross-sectional study, a questionnaire was administered through mail delivery in 2014 to parents of children (7-12 years old) residing in the DMV. Data were collected on children’s active play, parental perceptions of the home built environment, and demographics. Active play response data were dichotomized by whether the child did (“active group”) or did not (“non-active group”) meet the 60 minutes/day Physical Activity Guidelines for Americans (PAGA) recommendation. Perceived home neighborhood environment data were also dichotomized into “agree” and “disagree” responses. Chi-square tests determined differences in parental perceived built environment measures between active and non-active child groups. Logistic regression assessed the association of parental perceived built environment variables with active play while adjusting for demographic variables.

**Results:** The BEAP Study population (n=144) included a uniquely diverse population of children with 23.7% African Americans and 10.4% Asian Americans. The average age was 9.7 years (SD=1.6). A statistically significant greater proportion of active children’s parents agreed with the importance of neighborhood aesthetics, active play areas, walkability and safety as compared to the parents of non-active children. Fully adjusted logistic regression models demonstrated that some parental perceived built environment measures (e.g. access to play equipment) were predictors of their children meeting the 60-minutes/day PAGA recommendation.

**Conclusions:** Our findings support the important role of home neighborhood built environment perceptions on childhood active play.
Capturing the Interrelationship between Objectively Measured Physical Activity and Sedentary Behaviour in Children in the Context of Diverse Environmental Exposures

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SIGN: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose

While physical activity (PA) and (SB) are distinct behaviours that influence health outcomes independently, their interdependent relationship needs to be studied within the environmental contexts these behaviours occur. The objective of this study is to examine the influence of urban design, neighbourhood built and social environment, and household and individual factors on the interdependent relationship between objectively measured PA and SB in children in the Canadian city of Saskatoon.

Methods

Saskatoon’s built environment was assessed by two validated observation tools. Neighbourhood socioeconomic variables were derived from 2006 Statistics Canada Census and 2010 G6 Census projections. A questionnaire was administered to 10–14 year old children to collect individual and household data, followed by accelerometry to collect activity data. To represent the entire range of waking activity, accelerometer data were processed to derive the following activity intensities: moderate to vigorous PA (MVPA), light PA (LPA) and SB. MVPA and LPA represent the complete range of PA, independent of SB. Multilevel logistic regression models were developed to understand the interrelationship between all three activity intensities in the context of diverse environmental exposures.

Results

A complex set of factors including denser built environment, positive peer relationships and consistent parental support, influenced the interrelationship between the activity intensities. Specifically, children who accumulated higher LPA were more likely to accumulate higher MVPA and less likely to accumulate higher SB. Interestingly, children who accumulated higher MVPA on weekend days were more likely to accumulate higher MVPA and lower SB on weekdays.

Conclusions

Thus far, research in this area has predominantly focused on either PA or SB, and the results of this study show the importance of moving towards delineating activity intensities and studying them together. In conceptualizing active living policy interventions, it is critical to take into consideration not only the multiple environmental contexts, but also the interdependent relationship between activity intensities (MVPA, LPA and SB) that unfolds within these environmental contexts on both weekdays and weekend days.
**P1.078**

**Associations of volume and bouts of sedentary time with indicators of cardiometabolic health in adolescents: are they mediated by diet?**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Student Competition*

**Purpose:** To explore the mediating role of dietary intake on the associations of objectively-measured sedentary time (ST; total and bout length) with cardiometabolic health indicators among a large representative sample of US adolescents.

**Methods:** Analysis was based on data from adolescents (12-19 years) participating in the 2003-2006 US National Health and Nutrition Examination Survey. Cardiometabolic health indicators were BMI z-score using age- and sex-adjusted height and weight (n=1,797) and metabolic syndrome (metS) presence (n=812). Data from an ActiGraph hip-worn accelerometer (one minute epochs) was used to derive total ST and average bout length (<100 counts per minute). Dietary intake was assessed using two 24-hour recalls. A series of mediation analyses were conducted using the MacKinnon method to examine dietary mediators (total energy intake, fruit and vegetable consumption, discretionary snacks, sugar-sweetened beverages and diet quality) of the relationship between total ST (mins/day; adjusted for wear time), average ST bout length (mins) and BMI and metS. All analyses adjusted for age, gender, ethnicity, socioeconomic status, under-reporting energy intake and moderate-to-vigorous physical activity.

**Results/findings:** Approximately 36% of the sample were overweight/obese and 7.4% were classified as having the metS. Adolescents engaged in 414±83 (mean ± SD) minutes of ST per day and the mean length of a sedentary bout was 8.9±3.1 minutes. Overall, total ST was significantly related to BMI (β=-0.002, p<0.047), and remained significant after adjusting for fruit and vegetable intake and diet quality. No significant relationships were observed for total ST with metS, or for average bout length with BMI or metS (p>0.05). Total energy intake was significantly associated with BMI and metS (p<0.02), however none of the five dietary factors showed a significant mediation effect.

**Conclusions:** This study found dietary intake was not a significant mediator between objectively-measured ST with BMI or metS. This is in contrast to previous findings which have reported the associations of self-reported sedentary behaviour (e.g. television viewing) with cardiometabolic health to be partially mediated by unhealthy dietary behaviours. Exploratory studies are needed to better understand the relationship between objectively-measured sitting, particularly using postural-based measures, with cardiometabolic health indicators.
Social correlates of physical activity and health-related physical fitness among South African adolescents: the PAHL study

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: The objective of this study was to determine the relationship between social correlates of physical activity and health-related physical fitness among South African adolescents.

Methods: Cross-sectional study design was followed on a total of 284 adolescents (111 boys and 173 girls) with the mean age of 14.90±0.72, who are part of the Physical Activity and Health Longitudinal Study (PAHLS). Height, weight, triceps, subscapular and calf skinfolds, and waist circumferences (WC) were measured. Body mass index (BMI) and percentage body fat (%BF) were used as measures of body composition. Cardiorespiratory endurance, muscle strength and endurance and flexibility were tested according standard test protocols. A standardised questionnaire on the Social Support for Physical Activity was used to gather social correlates for physical activity. The Social Support for Physical Activity Scale included nine statements rated on a three-point Likert-type scale (i.e. Never; sometimes and every day).

Results: Social support by ‘friends encouragements to do physical activity or sports’ (18.9%) and family support in providing ‘transportation’ (36%) to the place of physical activity or sport are the factors which affected participation in physical activity by the total participants. The results show that 29% out of 284 of the participants are underweight and 26% are overweight. Girls were significantly (p<0.05) fatter and performed worse in standing broad jump (SBJ), bent arm hang (BAH), sit-ups (SUP), predicted, except for sit and reach (SAR) in favour of girls. BMI and %BF were negatively associated with almost all factors of social correlates of physical activity. %BF was inversely (r = -0.15; p= 0.02) associated with social support from ‘friends’ of ‘encouragement that one is doing a good job at physical activity’. Low significant positive correlations were observed between WC, SBJ, SUP, predicted and social correlates of PA.

Conclusions: From these results it can be concluded that lack of friends support and transportation affected participation in physical activity or sports. Additionally, girls were fatter and performed worse in health-related fitness as compared to their counterparts’ boys. Based on these findings, urgent strategic public health interventions on social modelling, instrumental support from adults and transportation are urgently needed.
**P1.081**

**Impact of height-adjustable desks on adolescents’ classroom sitting and examination of associated psychosocial mediators**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Early Career Award**

**Purpose:** Youth spend over half their school day sitting, with most of this occurring during class time. Recent research has examined the impact of environmental interventions on reducing classroom sitting, however this is predominantly limited to the elementary school setting and there is little understanding of the psychosocial factors that may mediate intervention effects. This study aimed to examine the impact of height-adjustable desks on classroom sitting and associated psychosocial mediators.

**Methods:**

Height-adjustable desks were installed in one secondary school classroom with stickers and posters encouraging breaks in sitting every 15 minutes. Participants were 55 students (62% male) who used the intervention classroom 3-4 times/week (intervention group) and 41 students (49% males) from the same year levels (mean age 14.34 ± 1.75 years) who used a traditional classroom for matched subjects (control group). Classroom sitting, standing, and sit-to-stand transitions were measured using the activPAL. Data were collected at baseline and 16 weeks after the desks were installed. Potential psychosocial mediators of behaviour change (e.g., self-efficacy, barriers, intention, habit etc.) were assessed via surveys (baseline and 16 weeks).

**Results/findings:**

Linear mixed regression models will be conducted to estimate the effects of the intervention on all activPAL outcomes (adjusting for wear-time, age, sex, and MVPA). Path analyses will be conducted (taking into account relevant clustering effects) with potential psychosocial mediators with (i) classroom standing and (ii) sit-to-stand transitions, and overall models including all significant mediators will be conducted for each dependent variable.

**Conclusions:**

This study is one of the first to examine the impact of height-adjustable desks on reducing/breaking up classroom sitting in a secondary school classroom setting. Identifying psychosocial mediators of intervention effects can serve as important behaviour change targets in addition to implementing height-adjustable desks. This study will help inform the development of larger school-based interventions aimed at improving adolescent health through reducing and breaking up classroom sitting.
Adiposity and cardiorespiratory fitness on resting blood pressure of South African adolescents: the PAHL Study

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: Obesity and low level of health-related fitness are associated with high blood pressure in both adolescents and adults. The objective of this study was to assess the relationship of adiposity and health-related fitness on resting blood pressure in 14-year-old male and female adolescents.

Methods: Cross-sectional data on 310 adolescents (31.8% boys) from six high schools, who are participating in the on-going Physical Activity and Health Longitudinal Study (PAHLS), was used in the analyses of this study. Height, weight, body mass index (BMI), %Body fat, waist circumference, waist to height ratio (WHtR), predicted and resting systolic and diastolic blood pressure were assessed according to standard procedures.

Results: The prevalence of elevated systolic (SBP) and diastolic (DBP) blood pressure were 4.9% and 6.5% respectively. The highest prevalence of elevated blood pressure (SBP = 10% and DBP = 15%) were measured in overweight adolescents, whom also performed poorly for predicted (M = 26.66 ml/kg/min-1 ± 6.44) compared to underweight and normal weight adolescents. Multiple regression showed that BMI was positively associated with SBP (β = 0.77, p = 0.005) and was negatively associated with DBP (β = -0.43, p = 0.001).

Conclusions: Overweight adolescents presented with a relatively high prevalence of elevated blood pressure and poor health related fitness. Fatness and poor health-related fitness were positively associated with elevated systolic and diastolic blood pressure respectively. In view of the health implications of these findings, strategic interventions are needed to promote obesity reduction programmes and physical activities in adolescents.
Objective

Inactivity is being observed globally, across all age groups (Hallal, Andersen, Bull, Guthold, & Haskell, 2012). Inactivity amongst adolescents tracks from childhood into adulthood (Telama et al., 2005). Adolescent PA levels have shown some correlation with FMS proficiency (Barnett, Morgan, van Beurden, Eric, Ball & Lubans, 2011; Okely, Booth, & Patterson, 2001). Inconclusive results have been found between FMS proficiency and psychological outcomes (Lubans et al., 2010). Due to the positive relationship between self-efficacy (SE) and PA (Dishman, 2004), SE is often targeted in PA interventions. As of yet no research has looked at the role of SE in interventions seeking to increase both PA and FMS. The purpose of this study is to examine 1) the relationship between PA levels and FMS, and 2) the potential mediating effect of SE between PA and FMS.

Measures

Participants (n = 534) supplied objectively measured PA data (Actigraph GT1M, GT3X and GT3X+), self-reported PA SE data (Marcus et al., 1992; Nigg & Courneya, 1997) and 15 fundamental movement skills data in accordance with the TGMD, TGMD-2 and the Victorian fundamental movement skills manual (Department of Education Victoria, 1996; Ulrich, 2000, 1985). Only participants meeting the accelerometer inclusion criteria and with complete data were included in further analysis (n = 196).

Results

The relationship between PA and FMS was examined. There was a significant positive relationship between PA and FMS (τ=.088, SE=.0253, p=.0006). A significant positive relationship between PA and SE was also found (γ=.0259; SE=.0081; p=.0017). There was no significant relationship between SE and FMS after controlling for PA (β=.0471; SE=.2411; p=.8452). The mediating effect and its significance were calculated. The effect of SE on the relationship between PA and FMS mediated 1.4% (95% CI - 0.011 to 0.0152) of the total effect of PA on FMS.

Conclusion

The relationship between PA and FMS is very complex. It can only be partially explained by SE. In order to develop interventions which will improve both PA and FMS levels simultaneously, this relationship needs to be better understood by looking at several mediating factors such as perceived competence, fitness, and weight.
Parental perceptions on children’s non-school physical activity and family-based physical activity interventions

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SIG: Children and families

Awards: Yes, for the Student Competition*

Purpose: Presently, little is known about children’s non-school physical activity (PA) or factors that influence parents’ decision making towards children’s outdoor play and independent mobility. Moreover, effective approaches to recruit and engage families in PA intervention strategies are limited. The aim of this study was to explore parents’ PA knowledge and perceptions of children’s non-school PA as well as offering formative opinion about family-based intervention design.

Methods: Telephone interviews were conducted with 11 parents of 10-11 year-old children that had previously taken part in two complementary studies [1]. Semi-structured interview guides were used to ensure consistency across interviews, and questions were informed by the Youth Physical Activity Promotion Model (YPAPM) [2]. Data were analysed through a deductive and inductive process, firstly using the YPAPM [2] as a thematic framework, and then inductively to enable emergent themes to be further explored. Pen profiles were constructed to represent key emergent themes.

Results/findings: Parents were largely unaware of the UK child PA guidelines and whether their child achieved the guidelines daily. PA for many parents was attributed to healthy weight status, and the neighbourhood environment was perceived as unconducive to children’s outdoor play which consequently increased the attractiveness of adult supervised organised activities. Family-based intervention engagement was considered as an important opportunity to increase PA knowledge, family time, and receive feedback on activity behaviours. Parental concerns related to intervention content, specifically the mode and intensity of activities, as well as logistic and timing barriers.

Conclusions: These theoretically grounded findings compliment previous research and provide new insights into and understanding of the mechanisms by which parents’ perceptions towards the neighbourhood environment, and their own behaviours influence children’s non-school PA. Consulting with parents in a formative sense prior to familial PA intervention enables intervention content to be tailored to family-specific perceived needs, and provides opportunities to build trust and communicate the relevance of programs to parents. This may aid subsequent intervention recruitment and engagement.


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Predictive validity of the activPAL3 METs algorithm in 5-12 year-old children

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: Accurate measurement of both sedentary behaviour (SB) and moderate-to-vigorous physical activity (MVPA) is needed to investigate whether or not SB is associated with health outcomes in children independent of MVPA. The activPAL3 is an activity monitor worn on the thigh that uses triaxial acceleration data to assess time spent sitting/lying, standing or stepping. Additionally, the activPAL3 estimates metabolic equivalents (METs) based on step rate, using a proprietary algorithm. The activPAL3 has been validated for postural allocation in children, however no studies have examined the validity of the METs equation embedded in the software. The aim of this study was to examine the predictive validity of the proprietary activPAL3 METs algorithm in 5-12 year-old children, using indirect calorimetry (IC) as the criterion measure.

Methods: Fifty-seven children (9.2±2.3y, 49.1% boys) completed a protocol involving 15 semi-structured sedentary (resting, TV viewing, handheld computer game, computer game, writing), light (slow walk, getting ready for school, standing activity, chores, dancing), and moderate-to-vigorous (brisk walk, basketball, soccer, running, obstacle course) intensity activities. A portable breath-by-breath respiratory gas analysis system (MetaMax® 3B) was used for IC. activPAL3 MET estimates were compared to IC for each activity using equivalence testing and Bland-Altman procedures.

Results: Measured METs for SB, light and moderate-to-vigorous activities were 1.2±0.1, 2.7±0.8 and 5.4±1.1, respectively. At the group level, predicted METs for activPAL3 were significantly equivalent to IC for handheld computer game, writing/colouring and standing (p<0.05). All other activities were not equivalent to IC, although TV viewing, computer game and getting ready for school were close to equivalent. METs for MVPA activities were underestimated by 34.4-47.3%. METs for the ambulatory activities slow walk and brisk walk were overestimated by 32.0% and 21.2%, respectively. Limits of agreement were wide for all activities, indicating large individual error.

Conclusions: Predicted METs by activPAL3 were equivalent to IC for handheld computer game, writing/colouring and standing. The algorithm underestimated METs for MVPA and overestimated METs for ambulatory walking activities. Considerable individual errors were found at all intensities.
Examining the fundamental movement skills, fitness levels, and physical activity participation levels among adolescent female rope-skippers, regular exercisers, and non-exercisers

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: This study is a part of a longitudinal research project aimed at investigating the influence of rope skipping on the health-related fitness, fundamental movement skills, and health indicators of Chinese adolescent girls in Hong Kong. In this study, we compared the fundamental movement skills, fitness levels, and physical activity participation levels of adolescent female rope-skippers, regular exercisers (who do not skip regularly) and non-exercisers.

Methods: A total of 146 participants aged 9 to 16 years old took part in the study. These included 54 female rope-skippers, 71 girls who took part in regular sport or exercise activities (e.g., athletics, basketball, table tennis, and volleyball), and 21 girls who do not exercise regularly. Participants' fundamental movement skills were measured using ten tests from the Test of Gross Motor Development-2. Cardiovascular fitness was measured using the Progressive Aerobic Cardiovascular Endurance Run test. Participants also self-reported their physical activity participation levels using the Physical Activity Questionnaire-Children.

Results: Group differences in the measured outcomes were examined using analysis of variance. As expected, the groups differed in physical activity levels: F(2,143) = 14.561, p < .001. Specifically, rope skippers reported the highest activity levels, while non-exercisers had the lowest scores (all difference significant at p < .05). However, there were no significant differences in fundamental movement skills (locomotor and manipulative skills) and fitness levels among the three tested groups: F(2,143) = 0.327, p = .72 and F(2,143) = 0.864, p = .42, respectively.

Conclusion: Adolescent female rope-skippers are more active than regular exercisers (who do not skip regularly) and non-exercisers. The highest physical activity participation levels of adolescent female rope-skippers may be related to the nature of the sport, which does not involve a high demand for spacious area, number of players, equipment, and gear. The same measurements will be taken for the cohort a year after the initial measurements were taken to examine whether rope skipping or exercise behaviors might affect changes in these variables.

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SIG: Early care and education
Awards: No

Objective
Few school-based interventions have been successful in reducing physical activity decline in adolescent populations. As a result, a very limited number of cost effectiveness analyses have been conducted. This study aims to report the cost and cost effectiveness of the Physical Activity 4 Everyone (PA4E1) intervention implemented in secondary schools.

Methods
The PA4E1 cluster randomised controlled trial was implemented in 10 secondary schools (5 intervention: 5 control) and consisted of intervention schools receiving seven physical activity promotion strategies and six additional strategies that supported school implementation of the physical activity intervention strategies. Costs associated with the implementation of the physical activity intervention and intervention implementation strategies within five intervention schools were compared to the costs of usual physical activity practices of schools in the control group. The total cost of implementing the intervention was estimated from a societal perspective, based on the number of enrolled students in the target grade at the start of the intervention (Grade 7, n = 837). The economic analysis outcomes were the incremental cost effectiveness ratios for the following: minute of MVPA per day gained and MET hours gained. Project records were used to estimate intervention costs.

Results:
The intervention cost AUD $329,952 over 24 months, or $394 per student in the intervention group. This resulted in a cost effectiveness ratio of $49 per additional minute of MVPA, and $0.53 per MET hour gained.

Conclusion: PA4E1 is a cost effective intervention for increasing the physical activity levels and reducing unhealthy weight gain in adolescents, a period in which physical activity typically declines.
**P1.088**

**Sedentary behavior and its association with obesity among children and adolescents in China.**

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*Peking university Health science center, Beijing, Haidian district, China*

**SIG:** Children and families  
**Awards:** Yes, for the Student Competition*

**Objective:**  
To describe the status of screen time and explore its relationship between overweight and obesity among children and adolescents in China.

**Methods:**  
A total of 4164 students were selected from 20 primary and secondary schools in Beijing, Hunan, Ningxia by random cluster sampling. Physical examination were carried out and the information of time spent on sedentary behavior were collected by self-administered questionnaire. Logistic regression were used to analyze the association of screen time with children’s overweight and obesity.

**Results:**  
The average screen time of 4164 students is 108.1±84.6 minutes per day and boys (110.8±87.9 minutes) are significant higher than girls (105.0±80.5 minutes). Screen time on weekend is 215±130.1 minutes per day, which is significantly higher than weekday (p<0.05), and screen time of watching TV and the phone screen was significantly higher than computer screen (P<0.05). Compared with children consumed 60 minutes of screen time on weekend, the multiple-adjusted odd ratio (95% confidence interval (CI)) of overweight or obesity is 1.12 (95%CI=0.86~1.45) for children consumed 60~120 minutes, 1.23 (95%CI=0.89~1.70) for children consumed 120~150 minutes, 1.26 (95%CI=0.93~1.72) for children consumed 150~180 minutes and 1.40 (95% CI = 1.12~1.74) for children consumed over 180 minutes of screen time on weekend.

**Conclusion:**  
Children and adolescent spent much time on sedentary activity on weekend in China. The screen time on weekend may closely associated with overweight and obesity among children in China.
Day-to-day variability in children’s physical activity patterns: What are the moderators?

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SIG: Children and families

Awards: No

Objective: Considerable intra-individual variability in children’s physical activity has been reported. Daily fluctuations in physical activity may be biological, where children ‘compensate’ for increased physical activity on one day by decreasing their physical activity the following day. The primary aim of this study was to determine whether children’s physical activity and/or sedentary time on one day was temporally associated with these behaviours the following day (compensatory changes). The secondary aim was to explore whether these temporal associations were moderated by children’s age, sex, fitness, and fundamental movement skills (FMS).

Methods: One hundred and thirty-eight children aged 8-11 years from 6 schools in Melbourne, Australia wore a hip-mounted GT3X+ ActiGraph accelerometer for eight consecutive days. Time spent in light (LPA) and moderate- to vigorous-intensity (MVPA) physical activity was derived using age-specific cut-points. Sedentary time was defined as 100 counts·min. Cardiorespiratory fitness was assessed using the 20m shuttle test. Locomotor and object control skills were assessed using the Test of Gross Motor Development-2 and summed to obtain total FMS. Multilevel analyses (day, child, school) were conducted using generalized mixed models.

Results: A number of significant results were observed between adjacent pairs of days. On any given day, every additional 10 minutes spent in MVPA was associated with 9.3 minutes less MVPA and 16.8 minutes less LPA the next day. Time spent in LPA was associated with less LPA and MVPA the following day. Several significant interactions were found. Follow-up analyses showed that every additional 10 minutes of sedentary time on any given day was associated with 0.4 minutes less LPA and 0.5 minutes more sedentary time the following day in children with low FMS and younger children, respectively.

Conclusions: Results are consistent with ‘activity compensation’ where children appeared to compensate their physical activity and/or sedentary time between days. Strategies may need to target physical activity every day to increase total daily physical activity. The moderator analyses suggested that younger children and those with lower FMS may not increase their activity levels to ‘compensate’ for increased sedentary time. This information is important for the design and development of future physical activity interventions.
**P1.090**

**Temporal associations between physical activity and sleep in primary school-aged children**

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**SIG:** Children and families  
**Awards:** No

**Purpose:** The directionality of the relationship between children’s physical activity and sleep is unclear. The aim of this study was to examine the temporal and bidirectional associations between objectively-measured physical activity and sleep in primary school-aged children. The secondary aim was to identify whether different associations were observed for boys and girls.

**Methods:** One hundred and two children (50% boys) aged 8-11 years from 6 schools in Melbourne, Australia wore a SenseWear Armband on their upper left arm for 8 consecutive days. Anthropometric (height, weight) and demographic (age, sex) data were also collected. Time spent in light- (LPA) and moderate- to vigorous-intensity physical activity (MVPA), and time in bed and total sleep time were determined using BodyMedia proprietary software (version 7.0). Multilevel analyses (day, child, school) were conducted using generalized mixed models to determine whether physical activity on one day was associated with sleep outcomes the following night, and whether sleep during one night was associated with physical activity the following day.

**Results:** Greater engagement in LPA on one day was temporally associated with increased total sleep time the following night in the whole sample ($b = 0.10; p=0.001$) and for boys ($b = 0.17; p<0.001$). Total sleep time was also temporally associated with increased LPA the following day for the whole sample ($b = 0.23; p<0.001$) and boys ($b = 0.41; p<0.001$). Similar associations were observed for time in bed. No significant associations were observed between time in bed, total sleep time and MVPA in either direction in the whole sample or for boys. No significant associations were observed for girls.

**Conclusions:** These results suggest that engagement in LPA influences sleep outcomes in primary school-aged children. This contrasts several findings where more active children had shorter sleep durations. Moreover, sleep outcomes on one night were associated with LPA the following day. Further research is needed to determine whether improving total sleep time may benefit children’s daily LPA, and whether increasing LPA is an appropriate intervention target to benefit children’s sleep.
Promoting Ball Skills in Preschool-aged Girls.

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SIG: Early care and education
Awards: Yes, for the Student Competition*

Purpose

Evidence supports that competency in ball skills (e.g. kicking, catching, and throwing) during childhood is an important predictor for physical activity during adolescence. However, girls demonstrate less proficient ball skills than boys. This study examined the effects of a ball skills intervention on preschool girls and the retention of these skills after 9 weeks. We hypothesized that the intervention would be effective in increasing ball skills among girls and that these increases would be maintained over time.

Methods

This randomized controlled trial took place in an accredited Head Start Center in a large urban Midwestern city in the USA. 54 preschool girls ages 3 to 5 years (mean age = 47.24 months ± 7.38). Girls were randomly assigned to a high autonomy, mastery-based 9-week motor skill intervention (CHAMP; n = 38) or a control group (free-play; n = 16). The intervention was implemented twice a week. The motor skill intervention consisted of 2-3 minutes of skill introductory activity, followed by 24-26 minutes of ball skill motor activity, and concluded with a 2-3 minute closure activity. Ball skill proficiency was assessed at pretest, posttest, and at 9-weeks follow-up using the object control subscale of the Test of Gross Motor Development - 2nd Edition. Repeated measures analysis of variance was used to analyze the data and significance were set at p < .05.

Results

In total, 54 girls completed all measurements (CHAMP n = 38; control n = 16). At pre-test, no significant differences were found in ball skill scores between intervention and control groups (t (54) = 2.18, p = 0.33). Girls in CHAMP had significantly better ball skill scores at posttest (F (1, 53) = 48.48, p < .001) and follow-up (F (1, 52) = 22.70, p < .001) compared to girls in the control group.

Conclusions

This intervention improved ball skills in preschool-aged girls and these improvements were maintained over a 9-weeks follow-up period. Findings suggest that early childhood interventions that focus on the development of ball skills in young girls might be a necessary avenue to close the proficiency gap to address physical inactivity.
Physical inactivity among sedentary adolescents: evidence from Bangladesh

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The University of Queensland, Brisbane, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: Sedentary behaviour, such as screen time, has been associated with adverse health outcomes and poor wellbeing in adolescents. The increasing access to technology in low-middle income countries, and the potential subsequent increase in sedentary behaviour and decline in physical activity, presents a combined health risk. The aim of this study was to determine the sociodemographic correlates of insufficient physical activity of adolescents with high levels of screen time in Bangladesh.

Methods: A self-administered survey was conducted during class time among secondary school students of Dhaka, the capital city of Bangladesh. A modified version of the Adolescent Sedentary Activity Questionnaire (ASAQ) was used to assess screen time; >2 hours/day was categorised as high. The Three-Day Physical Activity Recall (3DPAR) instrument was used to derive Metabolic Equivalent Task (MET) values to estimate daily physical activity levels; <60 min/day of moderate-to-vigorous physical activity was categorised as insufficient. Students were measured for height and weight, and completed questionnaire items on socio-demographics, physical and psychosocial health, eating patterns, and access to physical activity equipment and opportunities. Parents completed a self-administered questionnaire to provide household/family-level data as well as information on their child’s health and behavior.

Results: A total of 673 students completed both the ASAQ and 3DPAR, of whom 532 [49.6% female; average age 14.26, SD 1.09 years] had high screen time. Of those with high screen time, 32% (n=170) were also insufficiently active. Generalized estimating equations (GEE) modelling showed a positive association between insufficient activity and being female, skipping breakfast at least three days/week, and parental report of student stress problems. There was an inverse association between insufficient activity and student report of sports equipment at home, and parental report of support for physical activity.

Conclusions: One in every three secondary school children in Dhaka city, who had high screen time, was also insufficiently active. This study highlights the need for physical activity interventions targeting female adolescents, and promoting home environmental and parental support for physical activity.
P1.093

The current qualitative and quantitative state of 3- to 6-year-old boys and girls manipulative skills

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SIG: Early care and education

Awards: Yes, for the Student Competition*

Objectives and Purpose:
Fundamental skills, especially manipulation skills, serve as the building blocks for the development of more advanced motor skills and sports specific skills. Limited research is currently focused on the quantitative and qualitative requirements for 3- to 6-year-old children's manipulative skills, and the relevance of existing data is also questioned. The aims were to investigate the current qualitative and quantitative developmental state of 3 to 6-year-old manipulation skills and to determine potential gender differences.

Methods
A convenience sample (385 participants, 188 boys and 197 girls) whom had a chronological age of 3.0-6.11 years from selected schools in Potchefstroom (Northwest Province) and Jan-Kempdorp (Northern Cape Province) South-Africa was subjected to the testing protocol. Manipulative skills (throwing, catching and kicking) was evaluated (qualitatively and quantitatively) by means of the Kinderkinetics movement development assessment Descriptive statistics was used to determine means, minimum and maximum values as well as standard deviations. An One way ANOVA with a Tukey Post Hoc adjustment was carried out to determine the significance of differences between the age groups. Independent T-tests was used to examine the significance of gender differences.

Results and Findings:
Developmental differences with regards to manipulative skills, excluding stationary ball-kicking, show statistically significant improvements from 3-6 years of age with the biggest improvements between 3-5 years of age (p <0.05). Minor statistically significant gender differences occurred in relation to skill demands, although several statistically significant differences occurred regarding the developmental stage with boys showing better developmental progress in general.

Conclusions:
Manipulative skills seem to be on standard at a younger age (3-4 years) after which the level of development decreases slightly up to 6 years. The overhand throwing for distance skill (which requires a lot of coordination) showed the biggest backlog at the age of 6 years.
What undermines physical activity and healthy eating? - Voices of adolescents from a Swedish multicultural area

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Objective: The convention on the rights of the child suggests that every child has the right to express their opinion and to be heard in all matters affecting them. As such, it is essential to seek and listen to the young peoples’ voices concerning physical activity and healthy eating. Further, there is a lack of previous studies that has tried to listen to how adolescents from multicultural areas talk about physical activity and healthy eating. As such, the aim of the study was to explore how adolescents from a Swedish multicultural area talk about factors undermining their physical activity and healthy eating.

Methods: Adolescents (n=54, 12-13 y/o) were recruited from one school situated in a multicultural area with low socioeconomic status. Embracing an interpretive approach, ten focus-group interviews (lasting 44 to 97 minutes (M= 69)) was conducted to generate data for the study. The focus-group interviews were audio recorded, transcribed verbatim, and analyzed using qualitative content analysis.

Results: The analysis resulted in three themes. (1) ‘Navigating away from healthy habits: Other interests and preferences, and feelings influence our choices’ illustrates how the adolescents talks about how technologies, some foods being perceived as more appealing than others, comfort eating, and being bored navigates them away from healthy habits. (2) ‘When all the demands determine: It is difficult for us to prioritize’ illuminates how the adolescents’ expresses that demands (e.g., homework, household chores) make it difficult for them to prioritize physical activity and eating regularly. (3) ‘The surrounding environment and significant others create barriers we must overcome’ demonstrates how the adolescents states that lack of social support, access to ‘junk food’, the school canteen, distances to sport clubs, appearance fixation, and short school breaks makes it difficult for them to be physically active and eat healthy.

Conclusions: In order to understand the complexity related to factors that are undermining these adolescents physical activity and healthy eating, this study suggests that it is essential to listen to their voices. Further, these findings can be used in the development and implementation of a future school-based health promotion intervention.
**Objectively measured sedentary behaviour and health and development in children and adolescents: Systematic review and meta-analysis**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** No

**Purpose:**

Sedentary behaviour has emerged as a unique determinant of health in adults. Studies in children and adolescents have been less consistent. We reviewed the evidence to determine if the total volume and patterns (i.e., breaks and bouts) of objectively-measured sedentary behaviour were associated with adverse health outcomes in young people, independent of moderate-to-vigorous-intensity physical activity (MVPA).

**Methods:**

Electronic databases (EMBASE MEDLINE, Ovid EMBASE, PubMed, and Scopus) were searched (up to 30 June 2014) to retrieve studies among 2-18 year-olds, that used cross-sectional, longitudinal or experimental designs, and examined associations with health outcomes (adiposity, cardio-metabolic, fitness, respiratory, bone/musculoskeletal, psychosocial, cognition/academic achievement, gross motor development, and other outcomes).

**Results:**

Based on 88 eligible cross-sectional and longitudinal studies, the level of evidence grading and quantitative meta-analyses (adiposity: n=7,160; glucose/insulin: n=3,133; HDL cholesterol: n = 2,236; systolic blood pressure: n=2,347; diastolic blood pressure: n=2,145, cardiorespiratory fitness: n=4,499) indicated that there indicated that there is limited available evidence that the total volume or patterns of sedentary behaviour are associated with health in children and adolescents when accounting for MVPA or focusing on studies with low risk of bias.

**Conclusions:**

Quality evidence from studies with robust designs and methods, objective measures of sitting, examining associations for various health outcomes are needed to better understand if the overall volume or patterns of sedentary behaviour are independent determinants of health and development in children and adolescents.
P1.096

The status of 3-6 year old children coordination and locomotor skills and the effect of gender.

Wilmarie Du Plessis
NWU, Potchefstroom, South Africa

SIG: Children and families

Awards: Yes, for the Student Competition*

Objective: The purpose of this study was to determine the developmental status of 3-6 year old children’s locomotor and coordination skills and to determine if there are gender differences in the fundamental movement skills of three to six year-old children.

Method: A total of 386 children (198 boys and 188 girls) between the ages of three to six years participated in this study in the Vaalharts district and Potchefstroom. The pre school assessment was used to determine the qualitative and quantitative aspects of the fundamental movement skills. In this study we specifically evaluated locomotor (running, gliding left/right, skip, two legged jumping, one legged jumping left/right, standing long jump) and coordination (star jumps and caterpillar walk) skills. Data was analyzed according to means, standard deviations and minimum and maximum values. Secondly a independent t-test was done to determine gender differences.

Results: Boys performed better in the long jump, gliding left/right and the caterpillar walk than girls. The girls performed better in two legged jumping, one legged jumping and star jumps. Long jump and the two legged jumping locomotor skills performance increased linearly from 3-to-6 years, however the rest of the skills did not improve with age. The qualitative aspects of the test showed a linear increase in all the skills and ages. In the long jump boys performed statistically significant (p≤0.05) better than the girls in the quantitative evaluation. In the one legged jump the girls performed better than the boys although not statistically significant but a large practical significance (d≥0.8) in the quantitative evaluation. In the qualitative evaluation of the star jumps the girls performed statistically better than the boys (p≤0.05) and during the gliding left and right the girls performed better than the boys which had a large practical significance (d≥0.8).

Conclusion: The results indicate gender differences in fundamental movement skills. This knowledge can contribute to the development of movement programmes that cater to each child individual movement needs.
Correlates of children's activity levels during school recess

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose
Understanding correlates of children’s recess activity is important for informing intervention development in this context yet the literature remains scarce. This study examined the correlates of 10-11 year old children's physical activity and sedentary behaviour during school recess.

Methods
Objective physical activity levels (7 day accelerometry) were assessed in 783 children (409 boys; 10.6 ± 0.3 years; 1.44 ± 0.07 m; 37.6 ± 8.7 kg) across 17 schools in England. Of these, 683 children met the wear-time criteria of 8 hours per day, on at least 3 weekdays, and were included in the analyses. Percentage time spent sedentary, and engaged in light (LPA), moderate (MPA), vigorous (VPA) and moderate-to-vigorous physical activity (MVPA) during school recess (morning and afternoon recess periods and lunchtime combined) were calculated using age-specific cut-points. The influence of school level (total outside area per child, playground area per child, and number of children on roll) and child level (sex, maturation, BMI, and percentage recess accelerometer wear time) covariates on the outcome variables were examined using multilevel modelling.

Results
Few correlates were associated with recess physical activity levels or sedentary time. To negate the influence of multicollinearity, maturity offset was removed from adjusted models. BMI was significantly associated (p<0.001) with LPA (β=0.27; CI = 0.17-0.37), MVPA (β=-0.26; CI = -0.38--0.15) and VPA (β=-0.26; CI = -0.33--0.18). Sex (girls as reference group) was significantly associated (p<0.001) with all intensities, with the largest associations observed for sedentary time and MVPA (β=-9.15; CI = -10.23--8.08; β=7.52; CI = 6.75-8.28, respectively).

Conclusions
In contrast to the existing literature, the present data suggest that neither the space available during recess nor the number of children on roll impact on physical activity during recess. Whilst girls engage in significantly more sedentary behaviour and less physical activity (regardless of intensity) than boys of the same age, the significant positive correlation between sex and maturity offset suggests this could be, at least in part, attributed to maturational differences. The current results highlight the role of BMI in determining the intensity of physical activity engagement but not the time spent sedentary.
Objective measured physical activity and sedentary time of preschoolers

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SIG: Children and families

Awards: Yes, for the Student Competition *

Objective: Physical activity (PA) is a complex phenomenon and it has not been examined thoroughly, which factors are the most significantly associates with the PA. To add, there are controversial results on how active and sedentary preschoolers actually are. The aim of this study was first, to investigate how physically active and sedentary are the 5-6-year-old children. Second aim was to examine how strong is the association between the PA and gender, age, season, day care, Body Mass Index (BMI, kg/m2), attendance in organized physical activities, attendance in kindergarten, parents' education and parents' physical activity.

Methods: The study participants consist of 5-6 year old children from the STEPS study (Steps to the healthy development and well-being of children), carried out in Turku in Southwest Finland, who attended the sub study of Physical Activity and Motor Skills (n=158) and their parents. We used Actigraph accelerometers (GT3X+) during seven consecutive days and analyzed the data with pre-defined cut-off points. We used questionnaires to collect the background information. The heights and weights to obtain the BMI were measured with the Tanita scale. Linear regression models were used to investigate the association between the children’s proportion of physical activity form sedentary time and age, gender, season, kindergarten, siblings, organized sport, parents' education and parents' proportion of physical activity from sedentary time. The data included 140 children, 137 mothers and 134 fathers with valid data.

Results: The mean percentage of children's moderous-to-vigorous PA (MVPA) was 8.2 % and mean sedentary time was 50 %, from total wearing time of the device. The factors associated with the children proportion of MVPA from sedentary time were mothers' proportion of MVPA from sedentary time and kindergarten attendance.

Conclusions: Children at the age of five and six years are not sufficiently physically active compared to recommendations. Moreover, they spend half of their waking hours being sedentary. Children who attend a kindergarten are significantly more active physically than children who don't. Mother’s PA is associated with that of their children.
Systematic review and evidence appraisal of objectively assessed longitudinal changes in moderate-to-vigorous physical activity among children and adolescents (2-18 years old)

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SIG: Early care and education

Awards: Yes, for the Student Competition*

Purpose: To conduct a systematic review of literature to summarize longitudinal changes in objectively assessed moderate-to-vigorous physical activity (MVPA) in the general pediatric population, and identify evidence gaps for future research.

Methods: A comprehensive electronic literature search for longitudinal, cohort and RCT studies in the following databases: PubMed, EMBASE, MEDLINE, PsychINFO, SPORTSDiscus, Web of Science, and ProQuest was conducted through to 1st May 2015. Keywords were structured to identify studies that used accelerometry to assess physical activity among children and adolescents (ages 2 to 18 years). To be eligible for inclusion, the studies must have reported MVPA (minutes/day) at least twice, after at least 1 year intervals following the baseline measure and the sample had not received any physical activity intervention during that period. Gender stratified annual percentage change from baseline was computed in order to account for the inconsistencies in accelerometer cutoffs used for defining MVPA. The review is registered with PROSPERO 2015:CRD42015025036.

Results: The search produced 688 studies that qualified for abstract screening. Of these, 123 studies were recommended for in-depth full text review. Twenty-nine studies with a total sample of (n=13,144) were eligible in the final analysis. The declines in MVPA peaked after 13-14 years and relative declines appear to be higher among boys than girls. Unfortunately many studies (n=60) did not report MVPA results stratified by age and gender and as a result had to be excluded. Despite sufficient data, a meta-analysis was not possible because of inconsistent accelerometer cutoffs across studies.

Conclusion: The present review suggests that, age-related declines in MVPA are most marked in early teenagers, and can be higher in boys compared to girls. Future research should focus on MVPA trajectory after age 15, and among younger children where data are lacking.
Personal, social and physical environmental determinants of physical activity in underserved adolescents: a systematic review

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SIG: Socio-economic inequalities

Awards: Yes, for the Early Career Award**

Objective
The physical inactivity of adolescents is an important health risk. In particular underserved adolescents are at risk to be physically inactive. Previous studies have shown that both personal as environmental factors influence physical activity behaviour. The purpose of this review was to determine which personal, social and environmental determinants influence the physical activity behaviour of underserved adolescents.

Methods

Electronic searches were performed in seven (PubMed, Embase, Cochrane, CINAHL, Sportdiscus, PsycINFO and ERIC) databases. Inclusion criteria included the following: children aged 12-18 years; assessed the associations between personal and/or environmental factors and adolescents physical activity; published in an English language journal. Twenty-two studies met the inclusion criteria and were systematically reviewed and scored on their methodological quality to assess risk of bias.

Results

The search yielded 1935 records, of which twenty-two studies met the inclusion criteria. Quality assessment was conducted by two researchers and thirteen of the twenty-two articles (59%) were considered to be of high quality. They were categorized into personal (biological and demographical, psychosocial, behavioural, socio-cultural) and environmental variables. Findings from high quality studies focussing on personal variables suggested that, especially for girls and underserved adolescents, social support (both parents as neighbourhood support) have an important influence on their PA. In addition, environmental factors as the availability and safety of PA facilities and school PA policy seemed to influence adolescents PA behaviour.

Conclusions

There is a need for further research activity to strengthen evidence about the combined influence of both personal and environmental variables on physical activity of underserved adolescents. Special attention should be paid to multidisciplinary research, with the consideration of sex differences. More high quality research is, however warranted, preferably shifting focus from fixed single component studies to adaptive multi-component studies.
Perceptions about physical activity among overweight adolescents - attendees in Young & Active, a 12-week internet intervention to increase physical activity and quality of life  

Keywords: Adolescents, overweight, health, physical activity

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SIG: Theories of motivation

Awards: No

Background

Overweight and obesity affects approximately 14% of the Norwegian population aged 6, 9 and 15 years. Increased body mass index (BMI) in an early age is a major risk factor for developing cardiovascular diseases, respiratory diseases and diabetes. Overweight and obese adolescents are reported to be less physically active than their peers. The underlying reasons for why this happens remain unknown. This paper explores perceptions about physical activity (PA) among overweight adolescents, age 13-14 years, who have participated in a 12 week web-based intervention, Young & Active, aiming at increasing self-determined PA, fitness and quality of life. Research-based knowledge about their views may contribute to a better understanding and be of help in the development of more effective interventions.

Methods

Two semi-structured in-depth interviews, with a 9 months interval, were conducted among 21 adolescents (15 girls and 6 boys) recruited from a total of 88 participants in the Young & Active intervention. The participants were interviewed in their school setting. The interviews were taped, transcribed, and analyzed using qualitative content analysis of the interview texts.

Results

Findings show that the participants mainly associated PA with exercise, training and health, and not with everyday activities. A majority mentioned PA as important if one wants to live long and maintain good health, and expressed worries about their own health. During the data analyses facilitating and restraining factors for PA emerged. Negative or positive emotions associated with the activity affected their motivation for participating in organized sports or other PA. Mastering an activity, having fun and doing activities together with friends made them motivated. Not mastering an activity, and having poorer health and fitness than their peers made them less motivated. Increased competition and demands in sports were also seen as barriers.

Conclusion

The study highlights important views on PA among overweight and obese adolescents. It also shows some essential facilitating and restraining factors for participation in PA.
Effects on physical activity level and cardiovascular risk - a unique preventive, family intervention programme to increase physical activity and encourage a healthy lifestyle.

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SIG: Children and families

Awards: Yes, for the Student Competition*

Purpose: To evaluate the effects on physical activity and cardiovascular risk of a unique preventive, leisure-time based activity programme, carried out by the foundation A Healthy Generation. The aim is to increase physical activity and encourage a healthy lifestyle, in families with children aged 4-12 years old, in low socioeconomic status communities in Sweden.

Methods: A randomised controlled trial of in total 300 participants; 100 children and their parents, from two different schools, randomized into control- and intervention group. The foundation A Healthy Generation, runs a two-year programme to get families in low socioeconomic status communities in Sweden physically active and to lead a healthy lifestyle. The foundation arranges different physical activities, free of charge, for one hour, once-twice a week, followed by a healthy, warm meal once a week. The activities take place at the local school or in the nearby surroundings and the entire family is engaged. To evaluate the effects of the programme on the participating families’ physical activity level and cardiovascular risk, we will conduct physical examinations at baseline, after six, respectively twelve months of the programme. Cardiovascular risk will be assessed by measuring blood pressure, markers for cardiovascular risk in blood, weight, BMI and waist circumference will be measured. Cardiorespiratory fitness and muscular strength will be tested and the level of physical activity will be measured by accelerometers and questionnaires. Group differences will be analysed with ANOVA and regression analysis, adjusted for cluster, gender and baseline measurements.

Expected results and contribution: We expect this structured, family based activity programme, to increase the level of physical activity and have positive effects on the participants’ cardiovascular health. Previous studies in the field have emphasised the need of improved knowledge of the outcome of preventive activity programmes and their potential impact on physical activity level and cardiovascular health. This study offers an opportunity to quantitatively measure such effects.
Attitudes towards a unique, preventive, family-based activity programme to promote physical activity and a healthy lifestyle – interviews with parents.

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Awards: Yes, for the Student Competition*

Purpose: To explore the attitudes towards the preventive, family-based activity programme carried out by the foundation A Healthy Generation. What characterises the activity programme? What are the strengths and weaknesses of the programme? Also, what might affect compliance and persistency?

Background: The foundation A Healthy Generation, runs a two-year programme to get families in low socioeconomic status communities in Sweden physically active and to lead a healthy lifestyle. The foundation arranges different physical activities, free of charge, for one hour, once-twice a week, followed by a healthy, warm meal once a week. The activities take place at the local school or in the nearby surroundings and the entire family is engaged.

Methods: Adult participants of the programme, were randomly selected from the list of participants. In total, 26 parents from participating families, families that had dropped out and families who had chosen not to participate in the programme were interviewed. Using qualitative methods, three semi-structured group interviews and eleven in-depth interviews were conducted. Data were analysed using content analysis.

Results/Findings: The overarching terms used by the participants to describe the programme were; inspiration, movement, health, energy, generosity and fellowship, emphasising the sociability of the activities, the inspiration to move and joy of movement rather than competitiveness and feeling strengthened mentally and physically. Five main strengths of the programme were identified: variability of the activities arranged, the high competence of the instructors, the warm meal served once a week, the continuity and the availability of the programme and the reward system for each completed session as a motivator. Four main weaknesses of the programme were identified: the lack of time, the strict premises for participating, the uneven level of competence among the external instructors and the annoyance of other participants’ lack of engagement.

Conclusions: According to our findings, a preventive, family-based, physical activity programme, should offer a variety of activities and guarantee competent instructors. Furthermore, an inspiring and non-competitive attitude and a simple reward system are much appreciated motivators.
Sedentary time and physical activity among adolescents in a Swedish multicultural area: Cross-sectional data from the 'How-to-Act?' project

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Purpose: Adolescents from ethnic minority groups, as well as those with low socioeconomic status (SES), may be less physical active than their peers but there is a paucity of objective data in Sweden. The aim of this cross-sectional study is to describe and analyze accelerometer-measured sedentary time and physical activity (PA) among adolescents in a Swedish multicultural area.

Methods: The sample consists of baseline data from the empowerment-based health promotion school-intervention ‘How-to-Act?’. Three schools were recruited from a multicultural area (Angered of Gothenburg, Sweden), characterized by low SES, in August, 2014. A total of 152 adolescents in 7th grade were eligible for inclusion and 114 (n=42 boys; mean age 12.8 (±0.5) years; BMI 20.9 (±4.4)) approved participation. Sedentary time and PA were objectively measured with ActiGraph™ accelerometers (GT3X/GT3X+) during September, 2014. A total of 101 adolescents (boys n=38) provided valid data (i.e., ≥3 days with ≥8 hours–1) and mean wear-time was 6.0 (±1.3) days with 14.0 (±1.8) hours–1. Percentage of wear-time spent in sedentary and PA was calculated with three sets of cut-points. Sex differences were analyzed with MANCOVA including school (dummy), BMI and wear-time as covariates.

Results/findings: The adolescents spent 70 (±7) percent of the wear-time sedentary with inter-individual differences ranging from 53 to 86 percent, and girls were more sedentary than boys (p <0.0001). Time spent in moderate-to-vigorous PA (MVPA) varied with cut-point with a mean of 46 (±19) to 65 (±24) min per day, and inter-individual differences ranged from 15 to 106, and 24 to 131, min per day respectively. Girls spent less time in MVPA than boys (all cut-points p<0.002). Similar sedentary and PA patterns were observed across in-school and out-of-school hours (most <0.0001). Few (19 to 53 %) met the recommended 60 min per day of MVPA, with less girls fulfilling the recommended level (all cut-points p<0.05).

Conclusion: A majority of adolescents from a Swedish multicultural area spend most of their day sedentary and many are physically inactive. Girls were more sedentary and less physically active than boys across total wear-time, in-school- and out-of-school hours.
Determinants of sedentary behaviour: a concept map

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objective: Children spend a large amount of their time sedentary. Currently, evidence on effective interventions targeting to reduce sedentary time is not convincing. One explanation may be a lack of understanding about the determinants of sedentary behavior, especially the view of the children themselves – as experts of their own lives – is unknown. Therefore, the aim of this study was to examine possible determinants of children’s sedentary behaviour, by exploring children’s motives to engage in sedentary behaviour. Additionally, we explored parent’s perspectives of their children’s motives to engage in sedentary behaviour.

Methods: Concept mapping meetings with 11-13 year old children from three different primary schools in the Netherlands (8-10 children per school), and online sessions with their parents (n=7) were held. Qualitative data were collected by generating, sorting and rating ideas. Data were analyzed quantitatively, using the software program ‘Ariadne’. The analyses created a cluster map for each included school and one for the parents, with each cluster (consisting of similar ideas) representing a possible determinant of children’s sedentary behaviour.

Results: Meetings with children resulted in 19 clusters (range 5-8 per school), and sessions with parents resulted in 4 clusters. Recurring clusters indicated by both parents and children were ‘sitting because it is the norm’, ‘sitting because there is nothing to do’, ‘sitting because you can work better that way’, and ‘sitting because I’m tired, I want to relax’. However, children and parents rated the importance of these clusters differently. In addition, children indicated the clusters ‘sitting because sitting-activities are fun’ and ‘sitting because there is nobody to play with’, and rated these clusters as considerable important. Parents did, however, not indicate these clusters.

Conclusions: This study explored child- and parent-indicated potential determinants of sedentary behavior in children, of which ‘the norm’, ‘having nothing to do’, and ‘having no friends to play with’ were indicated as most important. Including these potential determinants in future interventions targeting to reduce sedentary behavior may improve its effectiveness.
Title: Gaelic4Girls: Background and methodological considerations in the development of the G4G physical activity intervention for Irish girls. Authors: Ms. Orlagh Farmer (corresponding and presenting author) & Dr. Wesley O'Brien (corresponding author)

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SIG: Theories of motivation

Awards: Yes, for the Student Competition*

Purpose:
Most recent evidence suggests that a substantial proportion of nine-year-old children (30%) in Ireland are overweight (Layte, & McCrory, 2011), with a further 81% of primary school children not meeting the recommended minimum of 60 minutes moderate to vigorous physical activity (MVPA) everyday (Woods et al., 2010). Irish female children are particularly at-risk in terms of physical inactivity, therefore, participation in community-based sport or physical activity (PA) may lead to enhanced psychosocial development and physical health outcomes (Coalter, 2007 & Gray et al., 2014). The purpose of the current research will be to gather baseline data (2015-16) on 8-12 year old Irish girls, in order to inform the development of a targeted community sport-based intervention, specifically identified as the ‘Gaelic4Girls’ (G4G) programme.

Methods:
As part of this longitudinal mixed-methods, field research design, cross-sectional data on PA levels (using self-report and accelerometry), psychological correlates of PA, anthropometric characteristics, and fundamental movement skill (FMS) proficiency amongst 300 female children, in four Irish primary schools will be collected. A subsample (n = 50) may also participate in focus group interviews to explore their perceptions of health and identify barriers/motivators to participation in community sport-based initiatives. All baseline data will be analysed using SPSS version 21.0 for Windows.

Conclusions:
Low levels of PA participation and parameters for health amongst Irish female children (Woods et al, 2010 & Layte et al., 2011) indicate the importance of early intervention. According to the Woods et al., (2010), there is a lack of balance in the opportunities provided to children and youth for participation in PA in Ireland. Evidently, there is a need for research to initiate sound knowledge on models of successful PA interventions (Ward et al., 2007). The proposed development of the ‘G4G’ programme, as guided by baseline findings, may hold promise as an innovative community sport-based intervention for increasing female participation in PA, improving FMS proficiency, and enhancing their psychosocial wellbeing.
Longitudinal relationships between types of physical activity practiced by parents and their children

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SIG: Children and families

Awards: No

Purpose: While it is known that parents can have an influence on their child's physical activity (PA) behaviors, it is unclear if parents' participation in specific types of PA has an influence on the likelihood that their children participate in and maintain the same types of PA over time. The purpose of this study was to determine if youth whose parents participated in interdependent and coactive/independent PA were more likely to sustain participation in these types of PA, respectively, than youth of parents who did not take part in these types of PA.

Methods: From 2011-2015, 802 students from New Brunswick, Canada, initially in grade 5 or 6, completed self-report questionnaires three times per year, for a total of 12 cycles over a 4 year period. The questionnaire for youth included a 36 activity checklist to collect data on type and frequency of participation in PA. A total of 190 parents completed a telephone-administered questionnaire collecting data on type and frequency of their participation in specific physical activities. Activities for both youth and parents were classified into one of two categories: interdependent or coactive/independent, on the basis of the relative amount of task interdependence required to achieve the activities' goal. Kaplan-Meier survival analyses were used to determine if youth whose parents participated in the same type of PA were more likely to sustain participation than youth whose parents did not participate in the same activities.

Results: For interdependent activities, participation was maintained longer in youth whose parents participated in interdependent activities than those whose parents did not (mean, 95% CI: 34.5, 33.7-35.3 months vs. 32.5, 31.8, 33.1 months; p < 0.001). Maintenance of participation in coactive/independent activities did not differ according to parents' participation.

Conclusions: The relationship between parents' and youth's PA behavior appears to differ across types of PA. Encouraging participation of parents in interdependent PA may contribute to promoting the maintenance of interdependent PA among youth.
Assessment of physical activity in preschoolers by accelerometry: The choice of epoch length and number of axis is crucial!

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Awards: Yes, for the Student Competition*

Background: Accurate, valid and reliable assessment of physical activity (PA) by objective methods is essential to determine current and changing PA levels and effects of PA interventions especially in preschoolers who cannot report about their PA behavior. We aimed to evaluate the contribution of epoch length and vector selection on intensity-based categories of PA.

Methods: PA was measured for 8 consecutive days using Actigraph accelerometers (wGT3x) as part of the baseline assessment of the Swiss Preschooler’s Health Study (SPLASHY). Accelerometer cut points by Pate et al. (2006) and Butte et al. (2014) were compared according to different epoch times (15s vs. 60s) and vector magnitudes (vertical axis vs. 3D summary vector). At least 3 days (1 weekend- and 2 weekdays) with 10 hours recording time were needed to be included in the statistical analysis.

Results: 397 of 476 participating preschool children (mean age 3.9 ± 0.7 years; 46% females) had valid accelerometer measurements. Comparing the 15s epoch vertical axis with the 60s epoch 3D summary vector, the time spent sedentary (SED)* was 375.2 vs. 241.3 min.day⁻¹, in light PA (LPA)* 300.8 vs. 453.6 min.day⁻¹, moderate PA (MPA) 70.3 vs. 70.3 min.day⁻¹ and vigorous PA (VPA)* 22.5 vs. 4.9 min.day⁻¹. Longer epochs (60s vs. 15s calculated) resulted in 2% less SED, 18% more LPA*, 43% less MPA*, and 77% less VPA*. The 3D summary vector compared to the vertical axis resulted in 35% less SED*, 22% more LPA*, 73% more MPA* and 2% less VPA (all differences indicated by * were highly significant).

Conclusions: The choice of accelerometer cut points has a substantial impact on PA levels in preschooler’s. The epoch length as well as the choice of analyzed axis have to be considered when comparing different studies and may explain part of the striking differences in PA behavior among preschoolers. Yet, the optimal assessment approach may vary for different health-related outcomes.
**P1.110**

*The effects of a quasi-experimental playground intervention on children’s recess and free-living physical activity levels: Do children compensate for changes in school-based physical activity?*

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**SIG:** Children and families

**Awards:** No

Whilst a wide range of studies have demonstrated the effectiveness of recess interventions in increasing children's school-based physical activity (PA), sparse research has explored their effects on children's free-living PA patterns (Ickes et al., 2013; Ridgers et al., 2007). **PURPOSE:** To investigate the effects of implementing playground modifications on children's PA patterns during recess; and to explore whether children compensate for changes in their recess PA levels during their free-time. **METHODS:** A quasi-experimental intervention study was conducted in 3 primary schools from Central England (UK), with a total of 77 children (43 M; 34 F). Children wore integrated GPS and heart-rate devices during school recess periods and pedometers during their free-time on four consecutive weekdays, on three separate occasions (pre-intervention baseline; one month after installation; 3.5 months after installation). Playground interventions were conducted in School 1 whereby a multi-use games area was installed, and in school 2 whereby a climbing wall and trim trail were installed. School 3 was the control group. Repeated measures ANOVA were used to compare the recess and free-living PA levels of children across the 3 data collection stages. **RESULTS:** Within school 1, children's moderate-to-vigorous PA (MVPA) in recess was significantly (p=0.021) lower at baseline (15.92±9.4 mins MVPA) than at stage 2 (23.73±9.42 mins MVPA), although their free-living PA was significantly (p<0.001) higher at baseline (10.486±3.448 steps) than stage 2 (5,623±2,809 steps). In school 2, the trim-trail and climbing wall installation resulted in a significant (p=0.024) long-term increase in children's recess MVPA (from 10.16±5.47mins in stage 1, to 14.98±9.74mins in stage 3), and no differences were evident in their free-living PA levels. In school 3 (control group), no significant differences in children's recess or free-living PA levels were evident across the three testing stages (p>0.05). There was no significant relationship between children's recess and free-living PA (p>0.05). **CONCLUSIONS:** The study provided a key insight into how the implementation of different playground facilities can have varying effects on children's recess and free-living PA. Future research should assess children’s PA levels across the whole day when implementing school-based interventions.
On-site and Online Girl Scout Leader Wellness Training for Physical Activity in Troop Meetings

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Purpose: Health promotion efforts in Girl Scouts have been successful in improving physical activity (PA) opportunities and snack quality during troop meetings. The present study sought to evaluate the effectiveness of on-site and online Girl Scout leader wellness training methods on troop meeting implemented physical activity and sedentary time.

Methods: Eighteen Girl Scout troops were randomized to either on-site (n=9; 93 girls) or online (n=9; 88 girls) leader training. Both groups underwent a baseline meeting assessment (January-February), where troop leaders self-reported PA and sedentary time during troop meetings (scale 0-4; 0= no PA, 4= >30min PA). Girls from troops with a leader undergoing on-site training also wore Actical accelerometers during one troop meeting. Troop leaders participated in training where they set troop-specific wellness implementation goals in five areas, including PA and sedentary behavior. Leaders were provided ongoing feedback regarding progress and resources to assist with meeting implementation goals. On-site troops attended implementation goal setting and wellness trainings in person, while online troop leaders received training through a dedicated website and emails from research staff. Following the completion of training sessions (April-May), a post-intervention assessment was conducted, and girls from on-site training troops wore accelerometers in another meeting.

Results: At baseline, troop meetings lasted an average of 60.9±12.2min. There were no differences between groups at baseline for self-reported implemented PA (p=0.81) or sedentary breaks (p=0.66). From baseline to post-intervention, on-site troops increased implemented PA more than online troops (on-site=+1.0±1.0, online=-0.17±0.75; p=0.037). Changes in implemented sedentary breaks did not differ between groups (p=0.49). Girls in on-site trained troops spent approximately 30.3±11.6min in sedentary behavior and 9.6±5.8min in PA. After training, on-site troops increased accelerometer-measured average steps per meeting (1,468±2,233steps; p=0.012), as well as moderate-to-vigorous PA (17.4±21.7min; p=0.012), while reducing their sedentary behavior (-13.2±15.1min; p=0.025).

Conclusion: Wellness goal training delivered on-site led to improvements in PA and reductions in sedentary behavior during meetings, thus improving the health-promoting aspects of the Girl Scouts setting. Additional work should assess ways to enhance online delivery, as this may represent a more cost-effective and farther-reaching method to deliver training for wellness goal implementation to troop leaders.
Correlations between chronic stress and cognitive functioning in pre-schoolers?

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SIG: Children and families

Awards: No

Objective: The beneficial effect of PA on physiological and psychological well-being is in part explained by a reduction in stress responses, resulting in reduced stress hormones levels, improved cognitive factors and improved physiological health with better fitness and less adiposity. Regular PA also leads to a health-protecting mechanism via higher parasympathetic activity. Yet, the relationship between chronic stress and cognitive functioning (CF) has rarely been studied and the few existing studies often lack objective measures or study other age groups or animals. Our aim was to test if a negative relationship between these two constructs can be found in a sample of Swiss pre-schoolers using resting heart rate variability (rHRV) during night as indicator for chronic stress.

Methods: 327 of 478 randomly selected 3-6-year-old children (median=3.9y, IQR=3.6-4.4y) had a full data set. CF was measured by four subtests of the intelligence and development scale for pre-schoolers (IDS-P). Mean rHRV parameters of spectral power analysis (heart rate, high frequency power and low to high frequency power ratio) for four consecutive 5-minute-samples during night were used to conduct correlative analyses between rHRV and CF. To minimize interference of PA, combination of automated and rating processes was used to define sleep onset time and the first phase of deep sleep. Convergent validity of rHRV has been tested with major life events, strength and difficulty questionnaire (SDQ), various health and addiction items and scores for worries and conflicts of parents.

Results: No significant correlation between any of the rHRV parameters and any of the CF scores has been found. Only very few of convergent validity tests led to a significant correlation, and correlations were low and not consistent.

Conclusion: Our hypothesis could not been confirmed within this study. The validity of the rHRV measurement for chronic stress could not be proven. However, the lack of correlations could be due to a sample that is too healthy or too young to be affected by chronic stress. Exploratory baseline comparisons with other outcomes such as PA and obesity, repeated measurements and longitudinal data are needed to further investigate this topic.
Manville Moves: Design and implementation of an exergaming-based physical activity intervention for children with social and emotional disabilities

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SIG: Children and families

Awards: No

Objective: Children with social and emotional disabilities, such as Autism Spectrum Disorders, Attentional Deficit and Hyperactivity Disorder and mood disorders, are at risk of poor diet, insufficient physical activity and obesity. Manville Moves is a physical activity intervention designed for children with social and emotional disabilities. This study outlines the process to develop Manville Moves and examines the fidelity of its implementation at the Manville School, a therapeutic day school in Boston, USA.

Methods: Manville Moves was collaboratively developed by researchers from Harvard School of Public Health and clinicians and teachers from the Manville School. Virtual reality exergaming bicycles were selected as the exercise modality to cater to gross motor deficiencies and very low fitness levels measured at baseline among the student population and because the different cycling routes and games available on the bikes enabled the curriculum to be semi-tailored to student needs. A 7-week cycling curriculum was developed and integrated into Physical Education (PE) sessions during the 2014-2015 academic year. Using a cross-over design, all classrooms at the Manville School were randomly assigned to receive the intervention during fall or spring. Classrooms in the comparison condition participated in regular PE which typically involved free choice activities. Indicators of school success, including disciplinary time-out-of-class and impulsivity, were the primary outcomes of interest and were recorded daily for each student. Implementation fidelity was evaluated using real-time longitudinal data collected by the bicycles and PE records.

Results: Participants included 105 students (99% enrollment, grades K-10). Manville Moves PE sessions were implemented as planned (93% compliance) with a total of 865 rides recorded. Minutes of cycling and calories per session, recorded by the bicycles, increased as expected over the 7-week curriculum. Few students (~1%) refused to ride the bikes. Classroom counselors recorded 6489 instances of time-out-of-class and demonstrated 84-100% compliance in recording daily student impulsivity.

Conclusion: Manville Moves was acceptable to students and staff and was implemented with fidelity. Its efficacy in promoting school success will be evaluated using more than 6000 records of time-out-of-class and over 5000 ratings of student impulsivity.
Does access to and use of TVs, computers, tablets, video games and cellphones before bedtime affect sleep, nutrition, physical activity and body weight of children?

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SIG: Children and families

Awards: Yes, for the Student Competition*

Objectives: To determine how access to electronic entertainment and communication devices (EECDs) in the bedroom; use of EECDs during the hour before sleep, and reading, as an established soothing activity during this hour, influence sleep quality, sleep duration, nutrition, physical activity and body weight status.

Methods: A population-based survey amongst 2,334 grade 5 students and parents was conducted in randomly selected elementary schools in Alberta, Canada.

Results: Compared to children without access to EECDs, those with access had reportedly lower sleep quality. For example, sleep quality was 24% less (OR=0.76, 95% CI: 0.69-0.83) and 33% less (OR=0.67, 95% CI: 0.61-0.74) for those who reported access and use of computers and cellphones, respectively. Access to and use of a TV, computer, or cellphone shortened sleep duration by 6-10 minutes. Access and use of these devices also affected nutrition and physical activity. Relative to children without access to and use of a computer or cellphone, those with access and used these devices were approximately twice as likely to be obese (OR=2.03, 95% CI: 1.72-2.41 and OR=2.60, 95% CI: 2.20-3.08 respectively). Children who reported reading during the hour before sleep also displayed better sleep quality (29%), longer sleep duration (10.8 minutes) and a lower probability of obesity compared to children who did not read.

Conclusions: Restricting access to EECDs in bedrooms and promoting reading of books before sleep are recommended potential strategies to improve sleep quality and duration, and reduce the burden of childhood obesity. These findings will inform health promotion messages and may give rise to national policies regarding sleep and EECD use.
The association between childhood asthma and metabolic risks independent of BMI

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Due to the parallel increases in asthma and diabetes in children, it is believed that these medical conditions are associated with one another with the central hub of this relationship being rising rates of childhood obesity. However, recent research has explored the possibility of a direct link between these conditions after controlling for obesity. If supported, this association may hint at a different type of asthma and/or metabolic response that has not yet been fully explored outside of the obesity context. Much research in this area is based on adult samples. Child studies have primarily focused on the obese. Our own work has supported a relationship between asthma and metabolic risks across a diverse sample of more than 17,000 pre-pubertal children. However, this work was based primarily on self-report measures. In an effort to replicate and more closely examine this asthma-metabolic risk relationships, we present findings from a study that utilized clinical assessment of asthma and obesity and fasting lipid blood drawn to assess metabolic risk based on Hemaglobin (HbA1c). Specifically, the purpose of this study was to examine the relationship between asthma and HbA1c levels and to explore whether HbA1c levels differ based on asthma severity. 179 (54.7% of male; ages 7-13) children recruited from community and clinics throughout an eastern, Appalachian state completed a 2-hour clinic visit. In our findings we found that children who have asthma tended to have higher HbA1c (p= .011) regardless of their weight or gender. Furthermore, children with uncontrolled asthma had the highest mean HbA1c (mean=5.7) levels compared to children with controlled asthma (mean=5.3). We believe these findings support an association between childhood asthma and metabolic risks that doesn't depend on obesity as the underlying factor.
Interruptions in sedentary time are associated with adiposity in a sample of free-living children

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Purpose: Sedentary behaviors are associated with cardiometabolic risk in children. Lab studies suggest that interrupting prolonged sedentary time can improve acute metabolic parameters. However, there is less consensus in the observational literature regarding associations between naturally-occurring breaks in sedentary time and obesity in children. The purpose of this analysis is to assess the association between the duration of breaks in weekday and weekend sedentary time and measures of adiposity in free-living children.

Methods: Children (N=161; 53.3% girls; ages 9-12 years; 58.2% normal weight) wore accelerometers on their right hip for up to 7 days. Those with 4 or more days of 10 hours of wear time were included in this analysis. Duration in sedentary breaks were calculated as the number of minutes that acceleration exceeded 100 cpm for over 3 consecutive minutes during sedentary time each hour. Mean duration of weekday sedentary breaks were averaged across non-school time (between 3-8pm) weekdays and weekends (7am-8pm). Linear regressions tested the association between the average duration of sedentary breaks and waist circumference and BMI z score, controlling for day of the week, age, and sex.

Results/Findings: Children were sedentary an average of 56% across weekday and weekend day windows. Children had similar durations of sedentary breaks on weekdays (mean(SD)= 15.9(13.6)) and weekends (mean(SD)= 14.9(12.9)) (p=0.749). Average duration of sedentary breaks during weekdays was inversely associated with waist circumference (β(SE)=−0.05(0.02), p=0.021). There were no significant associations with duration of sedentary breaks on weekends and adiposity.

Conclusion: Greater duration of activity breaks lasting 3 or more minutes during a sedentary window were associated with lower waist circumference but not BMI z score in healthy free-living children. Longitudinal studies are needed to understand if the duration of activity breaks within a sedentary window over time produces lower adiposity measures in free-living children. Future interventions should test whether increasing interruptions during children’s non-school time on weekday sedentary time improve weight trajectories over time.
**Impact of acute exercise on appetite hormones and ad libitum food intake during the following meal in obese adolescents.**

**Emmanuelle Rochette**, Come Tissandier, Bruno Pereira, Valerie Julian, Etienne Merlin, Pascale Duché

1 CHU Clermont, Clermont Ferrand, France, 2 INSERM CIC 1405, Clermont Ferrand, France, 3 Université Blaise Pascal, Clermont Ferrand, France

**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Objective:** Several studies have shown in adults and in obese adolescents a reduction of food intake induced by intense exercise. We aim to evaluate the anorectic effect of acute exercise without energy restriction on food intake and hormonal regulation during the next meal.

**Method:** Adolescents completed one control and one exercise experimental day, separated by one week. 13 adolescents of both sexes (female = 8) with a median age of 13.3 ± 0.5 yrs and a median body mass index of 32.2 ± 2.5 kg/m² were included.

Breakfast is calibrated individually for providing an energy input estimated expenditure during the morning till lunch. Thus, before lunch, the participants are in a balanced energy situation. During lunch, the ad libitum food intake was monitored.

The exercise test consisted of 40 min, between 08:30 am and 09:10 am, of moderate physical activity (at 70% of VO2max) performed on cycloergometer. Exercise duration and intensity were chosen to match the energy withheld from morning meal.

Blood samples were drawn at fasting and at 08:30 (after breakfast), 09:10 (after exercise), 10:40, 11:10, 12:10, 12:40, 13:10 (after meal) and 13:40. Active Amylin, Active Ghrelin, Active GLP-1, Insulin, Leptin, Pancreatic polypeptide (PP) and PYY were analyzed.

**Results:** There is no difference in the food intake during the lunch between control and exercise session, respectively 1330 ± 250 Kcal and 1271 ± 209 Kcal.

For all patients, the areas under the concentration-time curve (AUC) were significantly higher in exercise session than control for PP and PYY. In sex sub-group analyses, AUC for exercise session was significantly higher than control for GLP-1, Ghrelin and PYY in male population. While in female it's for insulin and PP. However, at the balanced energy situation, regardless hormone there is no difference in rate between sessions.

**Conclusions:** Aerobic exercise per se has not impact on food intake and appetites hormones levels, when obese adolescents are in a balanced energy situation at the time of meal. However, there are different profiles of appetite hormones depending on the sex.
Family Relationships, Weight-Status, and Health Behaviors in African American Families

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SIG: Children and families

Awards:

Objective: African American (AA) children experience a higher prevalence of obesity compared to Caucasian children. Culturally tailored research practices are needed to examine the family dynamics unique to AA families to understand the mechanisms driving obesity disparities. This pilot study describes the family dynamics, weight status, and weight-related behaviors in sample of AA families. The main research questions are: What is the correlational between parental and child weight status?, and How does family functioning associate with child and parent weight status weight-related behaviors? This is an exploratory descriptive analysis to examine how family functioning associates with weight-related behaviors and weight status in AA families.

Methods: This is a cross-sectional descriptive study where both healthy weight and overweight/obese AA parent/guardian-child dyads (ages 7-12) provided self-reported data (N=52 dyads). Participants were recruited from community centers and pediatric practices. Family Systems Theory (Bertalanffy, 1969) was used as the theoretical framework for the pilot study, where assessments were selected to describe both higher level family functioning and parent-child behaviors, including: demographics questionnaire which included family members’ weight-status, Family Assessment Device to assess family dynamics and functioning (Epstein, Balwin, & Bishop, 1983), Godin Leisure Time Questionnaire to assess parental activity level (Godin & Shephard, 1985), Fruit and Vegetable Questionnaire to assess child and parental dietary behavior (Manganiello, 2012), Social Support for Physical Activity Scale to assess family support for child activity (Sallis et al., 2012), and Parental Rules and Restrictions Scale to assess rules around children’s’ active behaviors (McMinn et al., 2009). Descriptive statistics, Pearson correlations, ANOVA, MANOVA, and logistic and multiple regression models were used.

Results: Approximately half of the sample of children (49%) and parents (63%) were overweight/obese. There was a strong correlation between child and parental weight status (r=.385, p<.01). There were no significant differences between child or parental weight status and family functioning. Parental support for physical activity was higher for children who were a healthy weight (M=3.79, SD=.86) compared to children who were overweight/obese (M=3.30, SD=.75; t(43f)=2.06, p=.05).

Conclusions: The information obtained from this pilot study will be used to discuss preliminary culturally-tailored obesity intervention development for AA families.
PREVENTING SPORTS INJURIES IN YOUNG FOOTBALLERS

Dominic Uzodimma Ikwuagwu
UNIQUE ULTIMATE SPORT & ACADEMY, Lagos, Nigeria

SIG: Early care and education
Awards:

INTRODUCTION:
1. Sports Injury in Young Athlete/ Football Player is a Common and Serious Problem. Based on my observations and concluded researches done as an experienced Soccer Coach in Training and Competitive games, I decided to shares information on preventing youth sports injuries, including training tips, over-uses of injuries and ways to keep our Youth in the games.

BACKGROUND:
2.1 Effective prevention can be achieved with training programmed originating from the field of physical therapy and medicine
2.2 These injuries are by far the most common cause of musculoskeletal injuries in children and youth treated in emergency departments. They are also the single most common cause of injury-related.

The Common Causes:
3.1 Sports injuries may be caused by: Individual risk factors (such as medical conditions) soccer girl stretching
Inadequate physical exams before participating in training and any games and lacks of pre-season conditioning
3.2 Lacks of safety equipment, or poorly fitted, improper equipment (Shin-guard and so on)
3.3 Lacks of protection in training and games by Coaches and match officials
3.4 Teaming up by age instead of size, unsafe playing fields, surfaces and environments
3.5 Improper training or coaching, or lack of instruction. Fatigue and over-stress in training and games
3.6 Not warming up, cooling down and stretching properly before any game
3.7 Playing while injured. Emotional stresses and inappropriate pressure to win
3.8 Weather Temperature or condition and Poor nutrition or hydration

SOLUTION:
4.1 The first step in preventing sports injuries is finding out why sports injuries occurred
4.2 Coaches should be trained in first aid courses, and should have a plan for responding to emergencies. Coaches should be well trained in the proper use of equipments, and should enforce rules on equipment use.
4.3 Make sure the young athletes always use proper gears for a particular sport to reduce chances of being injured.
4.4 Warm-up exercises make the body's tissues warmer, flexible and loosen muscles that have tightened
4.5 Make athletes has access to water or sports drinks while playing and encourages them to drink frequently to stay properly hydrated.

CONCLUSIONS:
5. Think about improving the general level of conditioning of the athlete and good training habits and technique as well as sports-specific skills.
A systematic review of the correlates of mobile-media use among children aged 0-8 years.

Susan Paudel, Justine Leavy, Jonine Jancey Curtin University, Perth, Western Australia, Australia

SIG: Children and families

Awards:

Objective: Children are increasingly using mobile media at a very young age. These formative years are crucial period for shaping healthy behaviours however it appears to be dominated by mobile-media use. A large proportion of young children do not meet current screen time recommendations. Existing reviews on correlates of screen time have focused on traditional devices such as television. Reviews that have specially focused on the mobile screen media are almost non-existent. This paper systematically reviews and describes the correlates of mobile screen media use among children aged 0-8.

Methods: A systematic literature search of databases was carried out between January 2009 - December 2015. A manual search of reference lists was conducted. Papers that examined correlates of screen time among children aged 0-8 were included. Studies included at least one type of mobile screen media (eg mobile phones, electronic tablets) to be eligible for inclusion. The study identified correlates of mobile screen-viewing among children in five categories: (i) child biological -demographic correlates; (ii) behavioural correlates; (iii) family biological and demographic correlates; (iv) family structure correlates; and (v) socio-cultural correlates.

Results: Eight full text articles were included in the review all from high income countries, with a sample size from n= 202 -2396. All studies were cross sectional in design. A modified version of Downs and Black checklist assessed the quality of all eight achieving a score of 7 or higher. The results including type of screen media, method of assessing screen-viewing and the association between exposure and the outcome variable will be presented.

Conclusions: This study systematically identified the correlates associated with mobile screen media use among young children. Increasingly parents use mobile media to distract, calm and entertain children as young as one and two years; a time when a child's brain develops rapidly and young children learn best by interacting with people, not screens. This review will contribute to addressing the knowledge gap in this area. The results will provide an evidence base to better understand correlates of mobile screen media use and potentially inform the update of recommendations to reduce screen time among those aged 0-8.
Determinants of physical activity and dietary choices in adolescents with intellectual disability: a feasibility study.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: The prevalence of obesity is higher in those with intellectual disabilities than the general population. Research suggests that the transitional period between adolescence and adulthood is a time of particular risk for the development of obesity in the general population. However, no research has explored the factors which influence the lifestyle behaviours of adolescents with intellectual disabilities immediately pre transition from school to adulthood. Thus, the aim of the study was to understand the determinants of physical activity and dietary patterns and choices in this population during their final year of school.

Methods: Qualitative data was generated from 10 interviews with adolescents with mild-moderate intellectual disabilities in their final year of secondary school. Participants were recruited from four additional support need (ASN) schools in the Greater Glasgow and South Lanarkshire area. Data were analysed using inductive thematic analysis.

Results: Pre-transition, adolescents’ school environment and social interactions play a pivotal role in influencing their engagement with physical activity and dietary choices. Three themes emerged from the analysis: situatedness, motivation and wider environmental influences. Themes are discussed in terms of autonomy, competence, and social relatedness, supporting Deci and Ryan’s Self Determination Theory (1985).

Conclusions: School structure and social connectedness facilitate increased physical activity, healthier diet, and increased perceived self-efficacy in adolescents with intellectual disabilities. Out-of-school/home life and a lack of social connectedness can serve as a barrier to self-determination, impacting on engagement in health-enhancing behaviours in adolescents with intellectual disabilities.
Development and feasibility testing of an intervention to support active lifestyles in youth with Type 1 diabetes. The ActivPals programme.

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1University of Strathclyde, Glasgow, UK, 2Yorkhill Hospital, Glasgow, UK

SIG: Children and families

Awards:

Background and Purpose: The global incidence of Type 1 diabetes is rising and despite significant improvements in technology for glucose management, youth with Type 1 diabetes continue to suffer from poorer health, relative to peers without diabetes. Youth with type 1 diabetes are generally less physically active than peers without diabetes. In practice health professionals find the promotion of physical activity to youth with Type 1 diabetes challenging and recommendations given towards being more physically active are often limited. Building on a platform of research in youth with Type 1 diabetes including: a systematic review/meta-analysis of physical activity interventions; an objective measurement study of physical activity behaviour and qualitative interviews exploring experience of being physically active while living with type 1 diabetes. This protocol abstract describes the next steps involving the development and feasibility testing of the ActivPals programme - an intervention to support active lifestyles in youth with Type 1 diabetes.

Methods: The intervention consists of an initial physical activity consultation incorporating behaviour change techniques followed by role modelling activities and continued support using social media/text messages, telephone or email contact. A steering group of patients and parents, health care professionals and managers will guide the intervention to patient needs, tailor delivery to current clinical practice and support broader audience dissemination. A pilot trial is providing data on recruitment pathways, intervention implementation, acceptability and feasibility. 20 youth with Type 1 diabetes are being recruited and randomised into an intervention or control group. Physical activity is being measured using the Actigraph GT3X+ monitor at baseline and one month follow-up. Qualitative interviews with young people and parents will explore contextual factors associated with intervention delivery, e.g. psychological, social and environmental factors that may influence participation in physical activity.

Results: Preliminary feasibility results will be available by early June 2016. Changes in PA will be analysed using repeated measures mixed models. The results will allow the development of a larger trial, powered to evaluate intervention effectiveness.

Conclusions: This study will contribute to the development of evidence based, user informed and pragmatic interventions leading to healthier lifestyles in youth with Type 1 diabetes.
Physical Activity Levels In Urban-Based South African Children

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SIG: Children and families

Awards:

Purpose This study investigated physical activity patterns among urban primary school children with the aim of updating the information detailing the physical activity patterns in South African youth. Methods Seven-thousand three-hundred and forty-eight (n=7348) urban-based South African children (3867 boys and 3481 girls) aged 8-14 years completed the Physical Activity Questionnaire for Older Children (PAQ-C). Participants were multiracial including: Caucasian (n=3634), African (n=2857) and other (n=857). The Mann Whitney U test was used to compare gender groups and the Chi-square tests compared additional groups formed in the study (age, race, geographical area). All significances were set at p<0.05. Results Data showed 57% (n=4224) of South African children between 8-14 years old to engage in moderate physical activities over the reported last 7 days. Thirty-one percent (n=2247) of children did not attain the recommended guidelines of PA. Overall, boys reported higher physical activity levels than girls. PA levels declined with age from 11-14 years by 14% and 20% in boys and girls respectively. Among the seven selected provinces, Gauteng province had the highest PA levels. Finally, African children reported slightly higher PA levels (M=2.8) when compared to their Caucasian counterparts (M=2.75). Conclusion The study reports the prevalence of physical activity patterns among urban-based primary school children. Results show that children aged between 8 to 14 years across seven provinces in South Africa were adequately physically active during the recorded last 7 days. This data provides awareness and contribute towards achieving the Sustainable Development Goal of Health in South African youth.

Keywords: Physical activity, Urban primary school children
Associations between physical activity, screen time, and fitness among Canadian children living in Edmonton.

Morgan Potter, John C. Spence, Normand Boule, Jodie Stearns, Valerie Carson
University of Alberta, Edmonton, Alberta, Canada

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: High fitness is associated with several positive health outcomes; however, fitness of Canadian children has declined over the past two decades. Correlates of fitness in children <10 years are relatively unexplored, and understanding these potential relationships is necessary to increase fitness levels. The purpose of this study was to examine the cross-sectional associations between subjectively and objectively measured physical activity (PA), screen time (ST), and fitness in a sample of children.

Methods: Findings are based on 649 participants (7.8±0.6 years; 52.4% female) from Edmonton, Canada. Hours/week of PA and ST were measured using parent-reported questionnaires. PA was also objectively measured with Steps Count (SC-T2) pedometers and expressed as steps/day. Fitness was measured using components of the Canadian PA, Fitness and Lifestyle Appraisal manual. Vertical jump, sit-and-reach, waist circumference, grip strength, predicted $V_{O2\text{max}}$, and overall fitness were expressed as z-scores. Push-ups and partial curl-ups were categorized into high ("gold-standard" for the Canada Fitness Award) and low groups. Linear or logistic regression was used to examine associations after adjusting for age, sex, BMI, and household income, and sex-interactions were also explored.

Results: Positive associations were observed between subjective PA and overall fitness for both the complete ($\beta=0.009, 95\%\text{CI}: 0.001, 0.017$) and the partial ($\geq 3$ fitness measures; $\beta=0.006, 95\%\text{CI}: 0.000, 0.011$) fitness scores. Objective PA was also positively associated with the partial fitness score ($\beta=0.025, 95\%\text{CI}: 0.007, 0.042$). Subjective ($\beta=0.011, 95\%\text{CI}: 0.000, 0.022$) and objective PA ($\beta=0.043, 95\%\text{CI}: 0.008, 0.078$) were positively associated with vertical jump. Children with higher objective PA were more likely to be in the high push-ups group (OR=1.156 95%CI: 1.054, 1.267). Subjective PA was positively associated with predicted $V_{O2\text{max}}$ (β = 0.040, 95%CI: 0.018, 0.063) and grip strength (β=0.025, 95%CI: 0.011, 0.040) in boys only. Similarly, boy's objective PA was positively associated with predicted $V_{O2\text{max}}$ (β=0.084, 95%CI: 0.012, 0.157). ST was negatively associated with grip strength (β=-0.016, 95%CI: -0.028, -0.004) in boys only.

Conclusions: PA was associated with several components of fitness, especially in boys. However, few associations were observed with ST. Promoting regular PA in young children is needed to address declining fitness levels.
LP1.127

Behaviour tracking and longitudinal associations between physical activity, screen time, and fitness among Canadian children living in Edmonton

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Understanding the correlates of children's fitness is extremely important given the declining levels of fitness over the past two decades. Most research to date has been cross-sectional and placed focus on older children. The purposes of this study were to: (1) examine the longitudinal associations between physical activity (PA), screen time (ST), and fitness in a sample of children and (2) explore how PA and ST track over a 3-year period.

Methods: Findings are based on 649 participants (4.5±0.5 years at baseline; 52.4% female) from Edmonton, Canada who participated in both baseline and 3-year follow-up data collection. Parent-reported questionnaires measured PA and ST in hours/week at both time points. Fitness was measured using components of the Canadian PA, Fitness and Lifestyle Appraisal manual (vertical jump, sit-and-reach, waist circumference, grip strength, and predicted VO₂ max) at follow-up and expressed as z-scores. Total fitness was calculated and expressed as z-scores. Push-ups and partial curl-ups were categorized into high ("gold-standard" for the Canada Fitness Award) and low groups. Linear or logistic regression was used to examine longitudinal associations and models adjusted for follow-up age, sex, household income and BMI. Spearman correlations were used to examine PA and ST tracking. Sex-interactions were also explored.

Results: Negative longitudinal associations were observed between baseline ST and follow-up grip strength (β= -0.010, 95%CI: -0.019, -0.001) and between baseline ST and follow-up overall fitness (β= -0.009, 95%CI: -0.016, -0.002). The associations between baseline PA and follow-up VO₂ max (β= 0.014, 95%CI: 0.000, 0.027) and overall fitness (β= 0.007, 95%CI: 0.000, 0.014) approached significance (p=0.05). However, PA or ST change scores from baseline to follow-up did not predict fitness at follow-up. No significant sex-interactions were observed. PA (r=0.30) and ST (r=0.53) tracked moderately according to Spearman's correlations.

Conclusions: Findings suggest ST in young children may predict lower fitness in later childhood; whereas, PA may predict higher fitness. However, findings were not significant when PA and SB were expressed as a change score. Findings also suggest that PA and ST in early childhood both track moderately into later childhood with ST tracking more strongly than PA.
Parent based interventions: effectiveness to improve child dietary habits and physical activity in a Hispanic population

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SIG: Children and families

Awards:

Background: Since obesity prevalence affects racial/ethnic groups at a disproportionate rate, the priority population for the systematic review focused on school-aged Hispanic children. Like other populations, obesity rates are not decreasing in Hispanics over time. Parents have an important role in providing their children with an environment conducive to a healthy lifestyle. Therefore, considering parental and cultural influences, how Hispanic parents are incorporated in interventions is important.

Methods: The inclusion criteria for this systematic review were articles that were: human studies published in peer-reviewed English language journals between 2009 and 2014; have a parent-based nutritional intervention; include the following outcomes: nutritional outcome, parental component, and potentially a physical activity outcome; and target school-age children; 50% Hispanic population. The search included Ovid Medline, PubMed, PyschINFO, and Eric databases. Parent involvement within the intervention were scored as either active or passive.

Results: The search yielded 2265 articles. After removing 953 duplicates, 1312 titles and abstracts were reviewed, and 188 full text articles were reviewed. Of the 188 full text articles reviewed, seventeen articles met all inclusion criteria and 11 articles were not available for review. Seventeen articles and sixteen studies were included in this review. Thirteen studies were classified as using active strategies regarding parental components. Only 2 studies measured parenting strategies. The most commonly used change methods included active learning, goal setting, modeling, discussion, tailoring and lay health workers.

Conclusion: A combination of change methods resulted in children increasing their fruit and vegetable consumption, decreasing their sugary beverage consumption and increasing their low-fat milk consumption. Interventions aimed at preventing childhood obesity among Hispanic children with parental components are actively involving parents. Future interventions should continue actively involving parents to strengthen intervention and successfully promote behavior changes.
**Acute exercise and nutritional response in obese adolescent girls: a one versus a two-session isoenergetic exercise**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Purpose:** An acute bout of intense exercise realized in the morning has been shown to have a positive impact on obese adolescents energy balance, by both increasing energy expenditure and decreasing energy intake at lunch and more significantly at dinner. This project explored whether to prescribe a one or a two-session exercise on the same day with a week interval, performed with same energy expenditure, would affect similarly daily energy intake and appetite feelings in obese adolescent girls.

**Population:** 29 obese adolescents aged 13.2 ± 0.1 years old, Tanner’s stages 3-4 participated in experimental sessions. Their body mass index was above the 90th percentile according to international cut-off points (Cole et al., 2000).

**Method:** Body composition was assessed using dual-energy X-ray absorptiometry (DXA). Participants had to perform three experimental days separated by at least 7 days: an exercise day (EX1) with a 40min exercise set at 70% of VO₂max; a day with split exercises (EX2) with 20 min in the morning and 20 min in the evening generating the same energy expenditure that EX1 and a control day (CON). For the three conditions, a standardized breakfast was offered to the adolescents (500 kcal) at 8:00 am. Energy intake was assessed during ad libitum lunch and dinner. At regular intervals throughout the day from 8:00 am, adolescents were asked to rate their hunger, fullness and desire to eat (prospective-consumption) using visual analog scales.

**Results:** The total energy intake and feelings of hunger during ad libitum lunch and dinner have not shown any significant difference between the three conditions: 1667±605 kcal CON, 1645±605 kcal EX1 and 1790±664 kcal EX2. The relative contribution of each macronutrient to 24h energy intake did not significantly differ between conditions.

**Conclusion:** These results mean that in the short term, the practice of acute exercise in one or two session(s) per day does not impact the energy intake of obese adolescents.

Acknowledgement: The authors gratefully acknowledge financial support from the French Fund for Food and Health (FFAS).
Association between individual or environmental factors and physical activity or sedentary behaviour in 7th graders aged 12-13 years in Berlin, Germany

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SIG: Socio-economic inequalities

Awards:

Background WHO recommends that children and adolescents aged 5-17 years should engage in at least 60 minutes total moderate to vigorous activity per day. Sedentary time should be reduced to a minimum. Our aim was to investigate physical activity and sedentary behaviour and associated factors in 12-13 year old students in Berlin, Germany.

Methods For this cross-sectional analysis, we included 7th grade students from secondary schools (high schools and integrated secondary schools) throughout Berlin. Sociodemographics, anthropometric data and health behaviour were assessed by self-report. Investigated outcomes were total physical activity and screen viewing as the measure of sedentary behaviour. Students’ characteristics are described with means or percentages. Comparisons were performed with Generalized Linear Mixed Model yielding odds ratios (OR) with 95% confidence intervals (CI).

Results We included 2586 students from 15 high schools and 32 integrated secondary schools in our analyses; mean(±SD) age was 12.5±0.5 years, 50.5% were girls, 34.1% had a migrant background. Among the students, 14.8% and 9.1% of the boys and girls were at least 60 minutes per day active, respectively (OR 1.74, 95%CI[1.34;2.26];p<0.001). Proportions of boys and girls reporting sedentary behaviour of more than 2 hours per day during leisure time were 81.4% and 68.0%, respectively (OR 2.06 [1.67;2.53];p<.001). Multivariable analysis showed that male sex, lower Body Mass Index (BMI), and attending an integrated secondary school were associated with higher levels of physical activity, whereas female sex, lower BMI, attending a high school and having a higher socioeconomic status were associated with less time spent in sedentary behaviour.

Conclusion The majority of the students did not meet physical activity and sedentary behaviour recommendations. Sex, BMI and school type were associated with both physical activity and sedentary behaviour, sedentary behaviour was additionally associated with socioeconomic status. These findings may have implications for targeted health promotion strategies.
Metabolically unhealthy obese adolescents decrease energy intake after acute exercise contrary to metabolically healthy obese adolescents

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Obesity is recognised as a heterogeneous metabolic status whereby some obese individuals present a cardio-metabolic phenotype (metabolically "unhealthy" obese, MUO), while others have a lower risk phenotype (metabolically "healthy" obese, MHO). Especially noticed in adults, this phenomenon has also been observed in young populations. The aim of the study is to compare the nutritional response of acute exercise in MHO versus MUO adolescent girls.

Population and Method:

27 Tanner’s stages 3-4 obese adolescents participated. Their body mass index was above the 90th percentile according to international cut-off points (Cole et al., 2000) and body composition was assessed with DXA. 13 adolescents were identified as MUO (12.9±0.8 years) and 14 adolescents as MHO (13.2±1.1 years). We defined MUO adolescents as having at least three of the following cardio-metabolic risk factors relative to age and sex:

- Excess adiposity: BMI >97th percentile or waist circumference (WC) ≥90th percentile
- Blood pressure: systolic and diastolic blood pressure ≥90th percentile
- Blood lipids: HDL level ≤0.4 g·L⁻¹ or triglyceride (TG) level ≥1.3 g·L⁻¹
- Blood glucose/insulin: Fasting plasma glucose ≥1.1 g·L⁻¹ ou HOMA index >75ème percentile (>2.27).

Participants had to perform two experimental days separated by at least 7 days: an exercise day (EX) with a 40min exercises set at 70% of VO₂max and a control day (CON). Energy intake was assessed during ad libitum lunch and dinner.

Results: MUO and MHO are significantly different only for diastolic blood pressure (74±12 vs 66±7 mmHg, p<0.05) and TG (0.86±0.24 vs 0.63±0.17 g·L⁻¹, p<0.01). During CON, food intake over 24 hours is not significantly different between the two groups. MUO decreased energy intake after exercise at lunch (-92,4kcal, ns) and dinner (-249,3 kcal, p<0.01). However, for MHO the energy intake at lunch and dinner were not significantly different between CON and EX.

Conclusions: In obese adolescent girls, the metabolically unhealthy profile induces a decrease of energy intake during a day with exercise compared to a day without exercise. This decrease was not observed in metabolically healthy obese adolescent.

Acknowledgement: The authors gratefully acknowledge financial support from the French Fund for Food and Health (FFAS).
Barriers and challenges encountered by physical education teachers within primary schools of Qatar: a preliminary study

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Aspetar Orthopaedic and Sports Medicine Hospital, Doha, Qatar

SIG: Policies and environments

Awards:

Purpose: Physical education (PE) teachers are the main supporters for any physical activity, sports policy, and PE curriculum incorporation in schools. However, the existing school environment may obstruct the implementation of PE. The PE teacher has a great responsibility in the implementation of PE curriculum within primary schools. The aim of this study is to investigate barriers and challenges encountered by PE teachers throughout the curriculum implementation within the primary schools of Qatar.

Methods: A cross-sectional study was conducted in primary Schools in Qatar. Multistage stratified sampling design was adopted and self-administrated questionnaire was used to obtain contextual information about the characteristics of school environment and PE classes. Descriptive analyses were used as a preliminary investigation.

Results: A total of 169 schools were included in this study. About 94 schools (55.6%) reported that they follow a formal or national curriculum for PE compared with 75 (44.4%) schools that do not follow any PE curriculum. Out of the 75 schools, 42 (56%) were public and 33 (44%) were private schools. Even though 95.9% of schools reported that students’ PE classes are graded, only 56% of schools confirmed that grades for PE carry the same weight as grades for other subjects toward academic performance. Out of the total schools, 67.5% of the schools do not have any formal method to evaluate PE performance. Whereas, 24.3% of schools apply written assessments compared with only 5.3% practical assessments. Due to the presence of extreme weather conditions in Qatar, such as heat and sand storms, 66% of the schools cancel the PE classes, 29% would substitute it by indoor PE, while only few (5%) replace it with another non-PE subject.

Conclusions: This study shows that PE teachers are facing different types of barriers and challenges based on the school type, whether governmental or private. PE teachers in private schools are more willing to implement PE curriculum due to the enforced grading system. Resource allocation by private companies should target schools that have more enabling environments. However, policies also need to be refined to incorporate PE curriculum with clear formal method within schools of both sectors.
Motor skill competence in relation to weight status and sport participation in 5- to 12-years-old children in a cross-sectional study

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose
The purpose of this study was to examine differences in motor skill competence between healthy-weight, overweight, and obese children (5- to 12-years-old). The second goal of the study was to investigate the relation between motor skill competence and sport participation.

Method
During a regular PE lesson 360 Dutch children (184 girls, 176 boys; 5-12 years) completed an age specific Athletic Skills Track (AST) to assess their motor skill competence. In addition children’s body height and body weight were measured to calculate their body mass index (BMI). Next, their weight status (i.e., under weight (UW), normal weight (NW), overweight (OW), and obesity (OB) was defined using age- and gender specific BMI cut-off points for children. Participation in organized sport was measured (number of times in the last 12 months) by using a standardized questionnaire. To explore the relation between motor skill competence (time to complete the track in seconds) and weight status a ONE WAY ANOVA was performed. The relation between motor skill competence and sport participation was explored by calculating a Pearson correlation coefficient.

Results
There was a significant difference in mean time to complete the AST between children with a different weight status (F =13.76; p<0.01). Obese children were significantly slower on the AST than children with underweight, normal weight or overweight (i.e., mean difference UW - OB: -5.94 s; 95% CI: -11.14 -0.75; NW-OB: -6.49 s; 95% CI: -9.21 -3.79; and OW-OB: -4.53 s; 95% CI: -8.00 -1.05). There was a significant, but low correlation between motor skill competence and sport participation (r = 0.262; P < 0.01).

Conclusion
Results show that children who are obese have a significant lower motor competence level than their overweight, normal weight and underweight peers. In addition, a relationship was found between motor skill competence and sport participation; the higher the participation in sports in the last twelve months the higher their motor competence level.
Sport Stacking Motor Intervention Programme For Children With Developmental Coordination Disorder

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: The objective of this study was to explore sport stacking as an alternative intervention approach with typically developing children and in addition to improve DCD. Sport stacking consists of participants stacking and unstacking 12 specially designed plastic cups in predetermined sequences in as little time as possible.

Method: Eighteen children (6 girls and 12 boys) classified with DCD, between the ages of 6 and 7 years, participated. A pre-test/post-test quasi-experimental design with a control group was applied. The Movement Assessment Battery for Children-2 (MABC-2) was used to assess the motor proficiency levels of the children and to classify DCD. The sport stacking intervention consisted of an 8-week programme of 3 sessions per week, 30 minutes per session. During the intervention the children learned the various sport stacking sequences, as well as how to apply them to a variety of physical activities.

Results: The results indicate that prior to the intervention no significant differences occurred between the 2 groups. After the intervention, manual dexterity and balance showed a significant difference, while aiming and catching, showed no significant difference. The total test score revealed a significant difference in the overall motor proficiency levels of the experimental group.

Conclusion: The results suggest that sport stacking can be used as an effective intervention programme for children with DCD.
LP1.135

Primary Care Providers' Use of Motivational Interviewing to Support Youth Nutrition and Physical Activity Behavior Change

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

BACKGROUND: Adolescent obesity has reached epidemic prevalence globally. Motivational interviewing (MI) is an emerging intervention for adolescent health risk behaviors that has promise in treating obesity. However, primary care providers tend to express reticence in learning or adopting MI practices because of concerns about it being too time consuming and demanding to use.

OBJECTIVE: We examined changes in primary care provider comfort with MI to support youth nutrition and physical activity behavior change after training, on-going coaching, and implementation in practice, with the hypothesis that comfort with MI would increase over time.

METHODS: We trained primary care providers (physician's assistant [n=1] and nurse practitioners [n=3]) working with youth in U.S. school based health centers on MI through introductory didactic sessions, reading materials, homework, role-play, and on-going coaching. The primary care providers completed MI sessions with 66, 45, 25, and 91 youth ages 14-17. MI provider self-assessment surveys were administered after the introductory MI training and after every youth MI-based discussion. Comfort with MI was categorized into three categories: low comfort (score 1-2), moderate comfort (score 3), and high comfort (score 4-5). Patients were divided into four equal groups per provider by time. ANOVA and Fisher's exact test were used to identify changes in provider comfort over time.

RESULTS: As anticipated, primary care providers became more comfortable with MI with increased use. Mean comfort scores overall were significantly higher in the fourth time period compared to the first time period for all providers (p < 0.01). However, the process was not necessarily linear for all providers, with rising and falling scores over time, and ultimately an increase in the final scores compared to the initial scores.

CONCLUSIONS: With rigorous training, on-going coaching, and practice, providers can become comfortable using MI to support youth behavior change related to nutrition and physical activity. Provider comfort with MI may facilitate more effective treatment of youth obesity.
A Latent Class Analysis of Physical Activity Correlates in Early Adolescents

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SIG: Theories of motivation

Awards:

Objective: Declines in physical activity (PA) are often observed through early adolescence. Therefore, we aimed to a) classify distinct profiles of children based on correlates of PA and b) investigate if PA behaviour was distinguishable across these groups.

Methods: 705 children (M=12.4 ± 0.3 years, 387 females), from UK schools completed baseline measures of (i) gender, (ii) multiple deprivation, (iii) predicted age at peak height velocity (indicator of biological maturation), (iv) walking distance from home to school, and (v) perceived family support for PA. Measures of self-reported PA (PAQ-C) and transportation method to school (active/inactive) were taken at baseline and follow-up (18 months later). Latent class analysis using Mplus was conducted to identify profiles among participants. ANOVA and logistic regressions were subsequently executed to investigate differences in PA behaviour and travel mode across sub-groups.

Results: Four classes were identified; class 1 (n=106) lived a relatively short distance to school and were characterised by relative biological immaturity and moderate scores on other variables; class 2 (n=498), were characterised by relatively high family support, a relatively short distance to school and moderate scores on other variables; class 3 (n=72) reported the lowest family support; and class 4 (n=29) consisted of mostly females, the furthest distance to school, relatively low multiple deprivation, and biological maturity. ANOVA revealed significant differences between the four classes in self-report PA at baseline (F(3,614)=19.31, p<0.001) and follow-up (F(3,666)=5.91, p<0.001). At both time points, class 2 reported more PA than class 1 (baseline, 3.07 ± 0.70 vs 2.65 ± 0.62, p<0.001, follow-up, 2.24 ± 0.62 vs 2.00 ± 0.53, p<0.001); and class 3 (baseline, 3.07 ± 0.70 vs 2.56 ± 0.76, p<0.001, follow-up 2.24 ± 0.62 vs 2.03 ± 0.68, p<0.001). Logistic regressions revealed class 1 were more likely to actively travel to school than class 2, 3 and 4 at baseline (OR:3.54, CI:0.98-12.86, p=0.055; OR:3.21, CI:0.93-11.12, p=0.066; OR:3.40, CI:0.91-12.69; p=0.069, respectively). No differences in travel mode were found at follow-up.

Conclusions: The identification of distinct profiles and differences in their PA behaviours are important and may assist in targeting interventions for early adolescences most at risk of inactivity.
LP1.137

Profiling the physical fitness levels of intellectually disabled children in South Africa.

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SIG: Early care and education

Awards:

Objectives: Intellectually disabled (ID) children attending special need schools in disadvantaged communities in the Eastern Cape have lacked the facilitation and opportunity to participate in structured physical education programs, resulting in a more sedentary lifestyle and associated health problems. Persons with ID generally have lower levels of physical fitness compared to their typically developed peers. Physical fitness and regular physical activity plays a key role in managing chronic health conditions, level of functioning, restrictions in daily living, and autonomy, yet there is limited research on the physical capabilities and/or fitness levels for ID children in South Africa. Therefore, profiling is vital for appropriate intervention design to prevent negative effects seen in ID people. Therefore, the aim of this study was to identify the physical fitness profiles of ID children in South Africa.

Methods: Health-related physical fitness components (cardiorespiratory endurance, muscular endurance, muscular strength, flexibility, body composition) and skill-related components (balance, agility, speed, power, coordination, reaction time) were assessed in a sample of 33 children with ID (classified as sub-average intellectual functioning of an IQ of 70 or below) from a local special needs school, and compared to the results of 28 children from a mainstream primary school. A parametric t-test was administered to determine whether the intellectually disabled children showed significant decrements in their physical fitness compared to 'typically developed' children. Significance was identified at p<0.05.

Results: The preliminary results of the health-related components show a significantly lower level of muscular endurance (p<0.001), strength (p<0.001) and sum of triceps and calf skinfolds (p=0.001) for the ID children. No significant differences were found for cardiorespiratory endurance and flexibility. Skill-related testing and analysis was on-going at the time of submission and will be reported on in the poster.

Conclusion: Preliminary results indicate significant differences in muscular endurance, muscular strength and sum of skinfolds. Poor muscular endurance and strength is a predictor for a decline in gait movements and patters, which could lead to mobility deficiencies for ID children, thus potentially restricting activity of daily living and contributing to the increased prevalence of falls resulting in injuries in this population.
Identification of risk groups in growth trajectories in Latino farmworker children aged 2-5

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Wake Forest School of Medicine, Winston-Salem, NC, USA

SIG: Children and families

Awards:

Purpose

This study investigates the disparity in the increased risk of obesity in Latino children 2-6 years old in farmworker families in the US using anthropometric, physical activity (PA), and diet measurement data in a cohort of mother-child dyads.

Methods

The Niños Sanos study provided the data used for our analysis. Niños Sanos is a 2-year prospective cohort study of young Latino children aged 2.5-3.5 years and living in North Carolina farmworker families at baseline. Follow-up interviews were conducted every three months. The maternal interview captured information on demographic, family and household characteristics. Weight was measured using a Tanita model BSB800 digital scale; height was determined twice using a portable stadiometer without shoes. PA data were collected using Actical accelerometers, and dietary data were collected by bilingual staff members with three 24-hour dietary recalls during a 7-day period using the Nutrition Data System for Research (NDS-R). Separate mixture latent growth curve models were used to delineate risk subgroups in weight gain trajectories for boys and girls. Subsequently, longitudinal data analyses were conducted to examine risk group background characteristics and the relationship of group membership with PA and dietary outcomes.

Results/findings

A total of 244 mother-child dyads contributed data. Respectively, two and three subgroups were identified for girls and boys. Using NHANES data as a reference, two subgroups in boys and one subgroup in girls were deemed to exhibit accelerated weight gain. Subgroup analyses revealed that the BMI of the accelerated weight gain subgroups did not exhibit clear adiposity rebound like the normal weight gain subgroup. There were significant differences in PA, sedentary behavior (SB) between the subgroups (e.g., SB=406, 384 min/day for accelerated weight gain and normal group, p<.05). The differences in diets, as measured by different NDS-R nutrient components and an overall diet quality index (DQI) were not conclusive.

Conclusion

Rapid weight gain in both boys and girls aged 2.5-3.5 in Latino farmworker families seems to suggest an elevated risk of obesity. Although some subgroup differences exist, PA, sedentary behavior, and diet do not consistently explain rapid weight gain.
Interventions promoting the development of adolescent health advocates: An integrative review

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SIG: Policies and environments

Awards:

Objective: Adolescents can be powerful advocates for health behavior change in their homes, schools, and communities; however, few opportunities exist to help them gain the knowledge and skills required to succeed (King et al., 2015). While interventions that aim to train and empower adolescents to become health advocates generally show positive results, there lacks consensus as to what makes an intervention effective and how advocacy is measured. The purpose of this study is to conduct a systematic, integrative review of the health-related advocacy intervention literature targeting adolescents. Specifically, this review identifies the behaviour change techniques (Michie et al., 2015), theoretical frameworks, advocacy activities, outcomes, methods of measurement, and roles of stakeholders included in such interventions.

Methods: Seven databases were searched for abstracts written in English. Eligible studies were primary research articles describing health advocacy interventions (HAIs) targeting adolescents aged 10-18 years. HAIs refer to education/training programs designed to enhance advocacy knowledge, skills, and/or behaviours with the purpose of achieving specific health goals. Data analysis included: (1) data reduction; (2) data display; (3) data comparison; and (4) conclusion drawing and verification (Whittemore & KnafI, 2005).

Results: The final sample (n = 21 studies), were predominantly American (90%). The HAIs focused primarily on nutrition/physical activity (43%), tobacco control (24%), and safe sex/teen pregnancy (24%). Preliminary analysis on the subset of studies pertaining to nutrition/physical activity (n = 9) showed that nearly all HAIs were theory-based (89%). On average HAIs included five advocacy activities. Primary advocacy activities were voter education (100%), policy research (78%), and relationship building with decision-makers (67%). The two most frequently reported outcomes of HAIs were activities/behaviours (89%) and self-efficacy (33%). All studies involved partnerships with multiple stakeholders including community-based organizations, school boards, media, and policymakers. Identification of behavior change techniques is in progress with expected completion in April 2016.

Conclusions: Health advocacy is an important skill that adolescents can use to promote healthy eating and physical activity in their environments. This review will assist in the future development, implementation, and replication of HAIs to ensure that adolescents continue to have opportunities to be successful advocates for health.
Accuracy of PE teachers to estimate the motor competence of 5- to 12-years-old children

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose
Physical education (PE) teachers play an important role in teaching children the appropriate skills to adopt an active lifestyle, including fundamental motor skills. Especially children with lower motor competences need attention, since they are at risk for adopting a sedentary lifestyle and dropping-out from participating in regular sports.

The question is whether PE teachers are able to accurately estimate children’s motor skills level just by observing the children in class day by day. Therefore, the aim of this study was to assess the accuracy of PE teacher’s estimation of children’s motor skill levels using a reliable and valid motor competence test as reference method.

Method
PE teachers were asked to estimate the general motor skill level of 632 Dutch children (300 girls, 332 boys; 5-12 years) on a five-point scale ranging from Serious Motor Disorder (1) to High Motor Giftedness (5). Thereafter, all children completed an age specific Athletic Skills Track (AST) to assess their motor competence level. To explore the relationship between the general motor skill level as estimated by the PE teacher and the motor skill competence measured by the AST a ONE WAY ANOVA was conducted.

Results
There was a significant difference in mean time to complete the AST between children with a different estimated general motor skill level (F =79.61; p<0.00). All the observed groups (HMG, GMG, NMG, MMD and SMD) scored significantly different on the AST (i.e., mean difference SMD-MMD: 7.53; 95% CI: 2.49 12.56; MMD-NMG: 6.47; 95% CI: 4.38 8.56; NMG-GMG: 2.85; 95% CI: 1.28 4.41 and GMG-HMG: 2.95; 95% CI: 0.98 4.92).

Conclusion
Results show that PE teachers are able to distinguish children with different motor skill levels on a group level. However, given the wide range in confidence intervals, on an individual level the PE teacher’s estimation is not always accurate.
Novel analytics to provide quantity and quality characteristics of running in children of different body-mass index groups

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Introduction

Obese children move less and with greater difficulty than their normal-weight counterparts. Whilst the effect of high BMI on cardiovascular fitness is well-known (Stratton et al, 2007), the effect on movement quality characteristics, in-field, has not been investigated. The aims of this study were first, to apply automated, novel analyses used in Nano-health, to characterise the movement quality of children during the multi-stage fitness test (MSFT), and second, to report how movement quality characteristics cluster according to BMI.

Methods

One hundred and three children (10.3±0.6y, 1.42±0.08m, 37.8±9.3kg, BMI; 18.5±3.3 kg m⁻²) took part and performed the MSFT whilst wearing an ankle mounted accelerometer. BMI groups were used to classify children as underweight, normal weight overweight or obese. The raw accelerometer signal was uploaded into MatLab and signal processed to derive characteristics of movement. All characteristics were profiled using a hierarchical clustering algorithm, Spearman’s rho was used to assess the relationship with BMI group, and a Mann-Whitney U test was used to assess differences between BMI groups for each characteristic.

Results

Children from the OB group had significantly lower spectral purity than every other group (P<0.05) and significantly lower TTE than UW and NW children (P<0.05). Following application of a clustergram, BMI was clustered with stride profile and TTE was clustered with spectral purity. Further, significant negative correlations (P<0.05) were found between BMI and TTE (R=-0.25), spectral purity (R=-0.24), maximal radial velocity (R=-0.22), stride angle (R=-0.23) and stride variability (R=-0.22).

Discussion

This was the first study to report the spectral purity of children’s gait. Moreover, gait analysis unveiled key performance characteristics that differed between BMI groups. Significantly, these were also (i) representative of children’s performance during the MSFT and, (ii) significantly negatively correlated with BMI. Obese children were not able to alter stride angle or stride profile to meet the running demands of the MSFT. These results demonstrate that novel analytics of ankle accelerometry data identified movement quality characteristics specific to BMI groups whilst performing the MSFT. Additionally, not only does high BMI impact gait and cardiovascular fitness, it also impacts the fundamental frequency and harmonic content of movement.
Sedentary behaviour pattern among adolescent school children aged 13-14 years in a district of Sri Lanka

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SIG: Children and families

Awards:

Introduction
Epidemiological studies conducted in both developed and developing countries have shown consistent results on health risks of physical inactivity leading to non-communicable diseases. Very little research has been done on physical activity and inactivity among children and adolescents of Sri Lanka.

Objectives
The present study was carried to assess the sedentary behaviour pattern among adolescent school children aged 13-14 years in the Rathnapura district and for identifying selected correlates of sedentary behaviour.

Methods
A cross-sectional study was conducted among 1041 grade 9 students and students were randomly selected from 30 schools stratified by the type of school. Data were collected using a pre-tested self-administered questionnaire.

Results
The mean age of the sample was 13.8 ± 0.39 years. Forty nine percent were boys. Forty three percent of adolescents usually spend 1-2 hours per day in sedentary activities while 16.1% of adolescents spend in sedentary activities for more than 4 hours. Fourteen point six percent males and 17.4% of girls were participating sedentary activities for more than 4 hours per day (more sedentary). This difference was not statistically significant (p>0.05). Time spent on watching TV/Video, doing home work, using computers and attending tuition classes on week days and weekend days was significantly different (P<0.01). Sector by place of residence, income level of family and Body Mass Index (BMI) of the adolescents were not significantly associated with level of sedentary activities.

Conclusion
Sedentary behaviour of adolescents must be given due consideration and physical activity interventions should be carried out to promote physical activity.
Validity and reliability of a physical activity questionnaire for Sri Lankan adolescents

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Background
Few research studies have been done on physical activity among children and adolescents in Sri Lanka and there is paucity of information on physical activity level of Sri Lankan adolescents. Physical activity assessment questionnaires have been validated for adults. However, no validated physical activity assessment instruments are available for Sri Lankan adolescents.

OBJECTIVE
This study aims to assess the reliability and validity of a Physical Activity Questionnaire for Sri Lankan adolescents.

METHODS
A total of 55 adolescents (24 males and 31 females) aged 13-14 years from two Sinhala medium Government schools participated in the study in 2008. The physical activity questionnaire used in this study comprised of 16 questions on habitual physical activity and sedentary behaviour. Out of 16 questions two questions were based on PACE 2 item measure of Procheska et al (2001) and these two questions asked students to report their past week and usual week physical activity. For validity analysis the scores of usual week and past week were averaged to form a composite summary measure. The outcome measure used was participation in moderate to vigorous physical activity for at least 60 minutes per day for 5 days or more per week. Based on this cut off value adolescents were categorized as sufficiently active or insufficiently active. Yamex digi Walker CW 701 pedometer was used as the objective measure in validating the physical activity questionnaire. Construct validity was assessed by step count data for 7-days, following the completion of the two physical activity assessment questions. Reliability was assessed by test-retest (1 week apart) and measured the interclass correlation coefficient (ICC).

Results
Mean age of participants were 13.8 years. Average pedometer step count was 10658(4221). Composite summary measure of Physical activity questionnaire showed a moderate correlation (r=0.49) with pedometer average step counts. Test-retest reliability showed a weighted Kappa of 0.55 and the intra-class correlation coefficient for MVPA composite measure was 0.78

CONCLUSIONS:
The reliability and validity of the physical activity assessment questions were moderate, but are comparable to other self-report physical activity questionnaires used among adolescents in other countries. This will be useful the evaluation of physical activity of adolescents in Sri Lanka.
Obesity and Eating Disorders prevention among adolescent girls: A cluster randomized trial comparing the 'New Moves' program against observation.

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Federal University of São Paulo, São Paulo, São Paulo, Brazil

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Prevalence of obesity and eating disorders (ED) is still rampant across developed and developing countries. The New Moves program (NMP) demonstrated effects on behavioral factors associated with obesity and ED in studies but, to our knowledge, has not been validated in Latin America. Aims: To conduct a cluster randomized controlled trial comparing the NMP against observation among girls of 10 public schools of São Paulo. Methods: Study participants included girls aged 12 to 14 years old. Schools were randomized in clusters: five of them were allocated to the NMP whereas other five were allocated to the observation arm. The NMP protocol was translated and cross-culturally validated by a joint task force comprising the original program developers and the Brazilian research team. It was implemented over a 9-week period, and followed for an addition four-month period (2014-2015). The program included sports activities, nutritional and social support, motivational interviewing, collective lunch, and parent-related activities. Outcome variables included body mass index (BMI), the Body Shape Questionnaire (BSQ), the Rosenberg Self-Esteem Scale (RSES), and the Unhealthy Weight-Control Methods (UWCB) index. Study results were evaluated through generalized estimating equations, thus accounting for the final endpoints as well as intermediate measures.

Results: Two hundred and seventy adolescents participated in the study (n = 132 New Moves, 138 observation). Participants mean age was 13.4 (SD=0.64) years old, with an average 53.3 (12.3) kilograms and mean BMI of 21.4 (4.4), being 34.7% (n=93) classified as overweight or obese, 37.4% have some level of body dissatisfaction and 96.7% has middle to high self-esteem. All measured baseline variables were balanced between randomization arms at baseline. The NMP did not result in statistically significant differences in relation to observation arm, including overall BMI (means of respectively 22.3 vs. 21.6), BSQ (64.3 vs 62.0), RSES (20.1 vs 20.5), and UWCB (16.8 vs 16.7). Conclusion: The NMP did not lead to significant changes in either BSQ or other measured outcomes. Future studies should investigate cross-cultural differences and longer duration interventions.
Family weight talk and dieting: is there any association with body dissatisfaction and disordered eating behaviors in adolescent girls from the Brazilian New Moves version?

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SIG: Children and families

Awards:

Purpose: The home and family environment has been identified as an important influence on children’s weight-related outcomes. Studies in developed countries have generally found that weigh-related comments by family members and encouraging of dieting behaviors may have adverse effects for adolescents. Studies with adolescent girls from low-income of developing countries, like Brazil, that explore these issues are unknown. Aim: Goals of this study include the investigation of potential associations between family weight talk and dieting with the participant’s (girls) weight status, body satisfaction, self-esteem and unhealthy weight control behaviors (UWCB). Methods: Baseline data of a clinical trial testing the Brazilian New Moves version was used. A general questionnaire applied to the girls included questions that examined: 1) if parents (mother and father) engage in dieting behavior; 2) make comments about their own weight, and 3) encourage girls to diet. Other questions included the presence/absence of any unhealthy weight control method) to lose weight last month by the girls. Nutritional status was determined by Body Mass Index (BMI). Body dissatisfaction and self-esteem were evaluated with the Body Shape Questionnaire (BSQ) and the Rosenberg Self-Esteem Scale (RSES), respectively. Spearman’s correlations between variables were conducted. Results: Adolescent girls (n=264) from 10 public schools from São Paulo, Brazil, were included. Girls’ mean age was 13.4 years, 34.8% were overweight or obese, most of them (86.4%) are from families of middle-low income and 27.6% (n=73) has used at least one UWCB last month to lose or control weight. It was noticed a significant correlation (p<0.01) between mother and father weight talk and dieting (r =0.389), and particularly by mothers, with girls UWCB (r = 0.371), weight status (r = 0.409) and body dissatisfaction (r=0.405). A negative, poor correlation was found in self-esteem (r=-0.055). The strongest correlation found with fathers was with UWCB (r=0.349). Conclusion: Parent weight-related comments and dieting behaviors may contribute to disordered eating behaviors in adolescent girls. Health care providers can help parents provide a supportive home environment by discouraging weight-based comments, which may be intended to be helpful but can have unintentional harmful consequences.
Perceived effectiveness of national and provincial tax credits for children’s physical activity: The charade continues

John Spence, Tara-Leigh McHugh, Chris Sprysak, Paul Veugelers

University of Alberta, Edmonton, Alberta, Canada

SIG: Policies and environments

Awards:

Purpose: To examine the perceived effectiveness of tax credit programs on the physical activity (PA) of Canadian children. Tax credits have been a popular tool for promoting PA of children by Canadian governments (both federal and provincial) through the reduction in taxes paid and the apparent subsidizing of the cost of programs (e.g., registration fees). Though, the effectiveness and equitability of these credits have been questioned by previous studies, less is known about the role of provincial tax credits.

Methods: Parents or care givers of children between the ages of 2 and 18 years residing in Alberta, Saskatchewan, and Manitoba were recruited from an online panel to complete a survey (N = 1801). Among other things, respondents were asked about their perceptions of the effectiveness of the Children’s Fitness tax Credit (CFTC) which is a federal credit, and any provincial tax credits, in promoting PA for their children. Analyses consisted of an examination of frequencies along with logistic regressions. The final data was statistically weighted to reflect the actual age, gender and education of the region.

Results: The majority of parents did not believe the CFTC (70%) or the provincial program (65%) increased their child’s participation in organized PA. Similarly, no more than 30% rated the CFTC (30%) or the provincial tax credit (25%) as being either very important or absolutely necessary to the child’s participation in organized PA. Approximately 15% of children were rated as being less active than other children and 32% were seen as being more active than their peers. Parents who rated their children as being more active than their peers were less likely to believe the CFTC (OR = 1.40, 95% CI: 1.10-1.80), or the provincial credit (OR = 2.1, 95% CI: 1.13-3.93), were effective tools for increasing their child’s PA.

Conclusion: Similar to what has been observed in previous research, the majority of Canadian parents do not believe the presence of federal or provincial tax credit programs influence the physical activity of their children. Basically, tax credits are less than effective for addressing inactivity among Canadian children.
Sport Leadership Program (SLP) as an intervention to improve adolescents' outcomes and well-being.

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SIG: Early care and education

Awards:

Purpose: The aim of the SLP is to prepare and educate students at secondary schools to become sport leaders, who deliver sporting activities to primary schools, in order to promote participation in sports and physical activities. The aim of this study was to identify the impact the program had on the psychological well-being on secondary students as well as to evaluate program's broader impact on the schools.

Methods: Six secondary schools involved in SLP during the years 2011 to 2013 participated in the study. The sample of 36 participants consisted of three school principals, five teachers, 25 students and three parents. Data were collected through semi-structured interviews and focus groups.

Results: The findings revealed that students attained a number of skills and abilities by participating in the program, with a key theme ‘Students’ Transformation’. Participants reported an increase in self-confidence, leadership, communication and organisational skills among students, as well as some improvements in their social and academic self-efficacy. This noticeable transformation in students consequentially influenced the school environment, whether it was through teachers' rewarding experiences, students' positive interactions with their peers and family members or schools' improved partnerships with primary schools and sporting organisations/clubs. Some of the additional themes which emerged from the data were: 'State school's struggle', 'Program requiring support' and 'Potential of systemic change'. In addition, principals and teachers outlined their perspective on how to ensure sustainability of the school program.

Conclusion: The SLP can provide a range of benefits for students' development, their school environment and communities. The delivery mode as well as student selection criteria employed by each school appears to have an influence on the level of benefits the school attains. To maximise opportunities for the schools to reach the positive outcomes, it is recommended to integrate the SLP as part of the school's curriculum, as well as to allow for equal opportunities with regards to the student recruitment for this program.

In collaboration with: School Sport Victoria, Melbourne, Australia.
Neighbourhood socioeconomic inequalities in physical activity opportunities and food choices.

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¹University of Coimbra, Coimbra, Portugal, ²CIAS, University of Coimbra, Coimbra, Portugal, ³University of Lisbon, Lisboa, Portugal, ⁴University of Trás-os-Montes, Vila real, Portugal

SIG: Socio-economic inequalities

Awards:

Purpose: Chronic diseases has been linked to physical inactivity and inappropriate nutrition. Research on these health-related behaviours has expanded to analyse environmental influences that create opportunities or constrains to people daily choices. Food and physical activity (PA) landscapes vary with socioeconomic (SE) levels and SE deprivation has emerged as a factor of neighbourhood vulnerability. This study investigated whether the availability and accessibility of food and PA facilities varied in SE contrasting areas of Lisbon city.

Methods: Between March and July 2009 a national study on childhood obesity has collected data on 944 children (50.1% males) aged 3-10 years of private and public schools of Lisbon. Children were geocoded at the address level using a Geographic Information System (GIS). Number of food and PA facilities (e.g. supermarkets, groceries, fruit stores, convenience stores, restaurants, fast food places, pastry and coffee places, parks, green areas, swimming pools, sport centres, playgrounds) within a 0.5 km buffer zone around each geocoded participants’ address were collected and mapped. A neighbourhood deprivation index was created by selecting and standardizing three 2011 census variables - unemployed people; unskilled employed; overcrowding - and assigned to each children address. Availability of food and PA facilities on terciles and deciles of area deprivation was compared and tested using qui-squared test.

Results: Considering three categories of neighbourhood SE position, PA facilities, including green spaces and playgrounds, showed low availability in the most deprived areas. Generally, food retails exhibited a similar pattern, and residents of the SE advantaged neighbourhoods had a greater number of both healthy (e.g. supermarkets, fruit stores) and unhealthy (fast food and convenience stores) food facilities. To some of the food retails facilities, mid-SE neighbourhoods showed the fewest availability.

Conclusions: all the analyses resources were more prevalent in the advantaged neighbourhoods, including those usually associated with poor nutrition. Increasing the opportunities for healthy food choices and physical activity in the most deprived areas is not just a matter of environmental justice but also a possible way to improve their residents’ health.
Physical Activity Levels among Children with Physical Disabilities in Home and School Settings: A Pilot Study

Ru Li\textsuperscript{1}, Cindy Hui Ping Sit\textsuperscript{1}, Jie Yu\textsuperscript{1}, Thomas L. McKenzie\textsuperscript{2}, Ester Cerin\textsuperscript{3}, Amy Sau Ching Ha\textsuperscript{1}

\textsuperscript{1}The Chinese University of Hong Kong, Hong Kong, Hong Kong, \textsuperscript{2}San Diego State University, San Diego, California, USA, \textsuperscript{3}Australian Catholic University, Sydney, Australia

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Children with physical disabilities (PD) are much less physically active than both their able-bodied counterparts and their peers with other types of disabilities. Homes and schools are both important settings where children can accrue enough physical activity (PA) during the day. However, little is known about their PA in school and home settings. The purpose of the study was to examine PA levels in children with PD in different settings.

Methods: Participants were 50 children with PD (Mean age = 15.74 ± 4.13; 37 boys) in a special school in Hong Kong. BEACHES (Behaviors of Eating and Activity for Children’s Health: Evaluation System) was used to document children's PA levels at school (before school, recess, lunch break, after class) and at home (before dinner) during four normal school days. Independent variables were gender and mobility (walk without assistance or not). Dependent variables were moderate-to-vigorous physical activity (MVPA), Energy Expenditure Rate (EER) and Total Energy Expenditure (TEE) using standard formula validated in previous studies. ANCOVA was used to determine PA levels in five settings after controlling for age and BMI.

Results: Overall children were more active at school than at home (%MVPA: 29.83% ± 3.08 vs. 17.86% ± 2.67; TEE: 500.65 ± 64.45 kcal/kg vs. 206.81 ± 13.39 kcal/kg). Compared to children who need walking assistance, those who walked independently had significantly higher MVPA during recess, lunch break, and after class (all p < 0.01). They also had significantly higher EER and TEE during recess and lunch break (both p < 0.05).

Conclusion: Children with physical disabilities have generally low levels of PA at school and home settings, especially for children who need assistance. An individual-oriented approach considering gender and activity limitation is important for designing effective interventions in this special population.
Is television the worse behavior that children can have at home? Yes

Cristina Padez1,2, Augusta Gama2, Aristides Machado-Rodrigues3, Isabel Mourão4, Nogueira Helena2,3, Vitor Marques3

1Department of Life Sciences, University of Coimbra, Portugal, 2Department of Geography and Tourism, University of Coimbra, Portugal, 3Research Center for Anthropology and Health, University of Coimbra, Portugal, 4Universidade Tras-os-Montes e Alto Douro, Universidade Tras-os-Montes e Alto Douro, Portugal

SIG: Children and families

Awards:

Sedentary behaviors, such as screen-viewing play a significant role in childhood obesity
The aims of this work are the study the association of sedentary behaviors and childhood obesity in Portuguese children aged 6.0-10.0 years

Methods A cross sectional study was carried out in 2009-2010 and healthy children from basic schools, 11554 boys and girls, were examined. Weight and height were measured and the cut-off points from IOTF were used to classified weight status in normal or obesity (including overweight). A questionnaire was fill out by parents concerning Television viewing (< 2h/day vs > 2h/day); computer use (< 1 h vs > 1h); Electronic games (< 1h vs > 1h); passive play inside house (< 1 h vs > 1h)

Results Children who watch more than 2h/day of Television and spend more than 1h/day of using the computer have greatest values of obesity, respectively 31.2%, p<0.001 and 31.5%, p<0.03 comparing to those who watch less television or those who used less time the computer. On the other hand, those children that spent more time even in passive play inside house had less percentage of obesity, 29.7%, p<0.001, than those who did not play passive games at home.

Conclusions Sedentary behaviors are an important contribute to the actual values of childhood obesity. Our results show that, even passive games that children can use inside house are better than television viewing or the use of the computer.
Research into social environmental influences associated with health behaviour in overweight children in The Netherlands

Gitte Kloek, Chantal Soeters, Silvana de Vogel, Sanne de Vries, Tinaus Jongert
The Hague University of Applied Sciences, The Hague, The Netherlands

SIG: Children and families

Awards:

Introduction: In deprived neighbourhoods there is often more childhood obesity compared to non-deprived neighbourhoods. The "WIJS" programme (Dutch for "What is Your Style") was developed to address childhood obesity in deprived neighbourhoods. The programme is a multidisciplinary after-school group-based intervention aimed at improvement of health behaviours and weight status in overweight children aged 8-12 years. Research showed that the "WIJS" programme improves weight status of participants. However six months after the end of the programme participants were not able to maintain their improved weight status and relapsed. Individual, physical environmental and social environmental influences may have an impact on health behaviours in the long run and therefore on weight maintenance after the end of the programme.

Objective: This study attempts to identify social environmental influences associated with health behaviours in participants of the "WIJS" programme. The focus is on social environmental influences on exercise and healthy eating within the context of the family, peers and school.

Methods: Semi-structured qualitative interviews were undertaken with ten participants of the "WIJS" programme, ten parents and three school professionals. In the interviews participant motivation, peer support, parental support, and school support were explored. The audio-recorded interview transcripts were analysed using open coding and identification of emergent themes.

Results: The preliminary study results showed that participants thought that they would be able to sustain their improved behaviours without any extra effort and that they expect to receive support of their family. Parents indicated to pay attention to their child's exercise and dietary behaviours but on the other hand have no strict rules for unhealthy dietary behaviours such as snacking or sweet drinks. School professionals mentioned that they can play a role in the improvement of health behaviours but that parents remain responsible.

Conclusions: The study findings, although preliminary, demonstrate the importance of the role of parents in the maintenance of their child's health behaviours. An implication could be to extend the "WIJS" programme with a health education component for parents that pays attention to their decisive role in their child's health behaviours and the effect of unhealthy behaviours on their child's weight status.
Are daytime naps and physical activity associated with nighttime sleep in preschoolers?

Allison Parsons, Nicholas Ollberding, Laurie Bishop, Kristen Copeland

Cincinnati Children's Hospital, Cincinnati, OH, USA

SIG: Early care and education

Awards:

Objective: Sleep is related to better physical and mental health outcomes in both adults and children. It has been hypothesized that preschool children sleep better nighttime if they are able to be physically active during the day. Some parents suspect that their child will sleep better at night if they do not take a nap during the day. We aimed to examine the relationship between (1) time allotted for physical activity in childcare, (2) actual physical activity accumulated and (3) nap duration in childcare on nighttime sleep duration in preschoolers aged 3 to 5 years.

Methods: Participants (n=378) in this cross-sectional study attended 30 randomly selected, full-day childcare centers in Cincinnati, OH, U.S.A. Nighttime sleep was assessed using parent report of child’s bedtime, rise time, and number of awakenings. Study staff recorded the time children spent outdoors on the playground, in a gym, and napping at childcare. Hierarchical linear regression with childcare as a random effect was used to test for associations between nighttime sleep duration and daytime nap and activity.

Results: Participants slept a mean (s.d.) of 1.5 (0.8) hours at childcare and 9.6 (1.0) hours at bedtime. 16% did not nap at childcare. Participants received 75 (40) minutes of total active time at childcare, with 38 (42) minutes outdoors and 35 (38) in the gym. Minutes of active time provided in the gym was associated with increased nighttime sleep duration minutes (β= 0.20, p<0.011) while outdoor time provided during the day was not significantly related to sleep that night. Napping in childcare was inversely associated with nighttime sleep duration (β= -0.034, p<0.001). Light activity was also inversely associated with nighttime sleep duration (minutes) (β= -3.74, p<0.001). Accumulated time spent in moderate and vigorous physical activity was not associated with nighttime sleep.

Conclusions: Nighttime sleep duration was inversely correlated with nap duration and accumulated time spent in light physical activity, while minutes provided for activity in the gym was associated with longer nighttime sleep. The association between gym time and nighttime sleep may be related to longer sleep duration during the winter, when colder temperatures precluded outdoor play.
LP1.153

Tackling the Blues: Using Sport and Physical Activity to Address the Mental Health of Children and Young People

Jon Jones, Andy Smith

Edge Hill University, Ormskirk, UK

SIG: E- & m-health

Awards:

Objective:

To explore the impact of a sport, physical activity and education-based project - known as Tackling the Blues (TtB) - on the mental health of 8-14-year-olds in north-west England, which was delivered by Edge Hill University and Everton in the Community (the official charity of Everton Football Club).

Methods:

8-14-year-olds in north-west England who were identified by schools and carer groups as either being diagnosed, or at risk of being diagnosed, with a mental illness participated in the study. Head teachers, teachers, carers and volunteers were also engaged in the project. Semi-structured interviews were held with head teachers and focus group discussions were held with young people, teachers, carers and volunteers. Data from the interviews and focus groups were subject to thematic analysis. In addition, validated questionnaires (KIDSCREEN-27) were completed over a 12-school week period with the young people, and Emotional Intelligence Scale and Trait Emotional Intelligence questionnaires were completed with volunteers pre-project and at 6 months.

Results:

Findings suggested that TtB improved young people's mental health in the short- and long-term. Supportive, engaging and non-authoritarian relationships between mentors and young people were essential in developing trust, confidence and increased awareness of physical and mental health. Bespoke sport, physical activity, and educational activities that were co-produced with the young people, and which focused on understandings of their mental health via peer mentoring approaches, enhanced the effectiveness of the programme within which a theory of change was embedded.

Conclusion:

The relationships developed between mentors and participants on health awareness programmes such as TtB help improve the mental health of young people and manage their experience of mental illness. Suggestions for why this was the case will be examined.
The relationship between motor skill competence and kindergarten readiness during early childhood

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University of British Columbia, Vancouver, BC, Canada

SIG: Early care and education
Awards:

Objective:

Pre-school age (3-5 years) is considered an important time period for developing physical competence in motor skills, particularly as proficiency is linked with lifelong physical activity participation and improved physical fitness outcomes. During this time period, Canadian children are prepared for entrance into formal education (i.e., Kindergarten). To date, little is known about the relationship between a child’s perception of motor skill competence, kindergarten readiness, and actual motor skill proficiency. Therefore, this research examined the relationship between motor skill competence and kindergarten readiness, as well as between perceived and actual motor skill competence.

Methods:

Twenty-six children (n = 12 f, 14 m) were recruited from three university-based childcare centres (mean age = 4.1 ± 0.5). Children’s motor skill performance was assessed on four skills (run, hop, jump, ball roll) via the Test of Gross Motor Development 2 and scores were summed. These skills were examined because proficiency is assessed as a performance outcome within the Kindergarten physical education curriculum in British Columbia, Canada. Kindergarten readiness was assessed using the Head-Toes-Knees-Shoulders (HTKS), while perceptions of physical competence were measured using the physical competence subscore from the Pictorial Scale of Perceived Competence and Acceptance for Young Children.

Results:

Findings showed that motor performance was low (mean score = 15.3/34.0 ± 5.6), but perceived competence was high (3.3/4.0 ± 0.5). HTKS scores were 16.4/60 ± 15.2. Using a partial correlation controlling for age, a significant relationship between HTKS and motor performance, was found (r=0.55, p<0.01). However, no relationship emerged between perceived physical competence and motor performance.

Discussion:

The relationship between physical performance and readiness for formal education demonstrates the importance of physical activity and skill development opportunities during preschool years, particularly in an era where cognitive educational outcomes are prioritized. These findings also suggest that perceived physical competence may not relate to motor skill performance during preschool years, which highlights the importance of providing developmentally appropriate movement opportunities during this age period. Continued efforts to improve the motor skill learning environment for 3-5 year old children are critical for optimal childhood development and lifelong physical activity participation.
Accelerometer Bluetooth proximity validation in parents and early years children

Nicholas Kuzik, Glenda Garrido, Valerie Carson
University of Alberta, Edmonton, Canada

SIG: Children and families

Awards:

Purpose: Parental influences on children's physical activity (PA) and sedentary behaviour (SB) are paramount in the early years (0-5 years), due to children's limited autonomy. Associations between parental and children's objectively measured PA and SB have been found. However, the mechanisms explaining this association, such as role modeling and co-participation, have not been adequately explored. Bluetooth-enabled accelerometers, which can determine the presence/proximity of other Bluetooth-enabled accelerometers (i.e., a parent and child), can provide insight into these mechanisms. However, this proximity tagging technique has not been validated to date. Therefore, the purpose of this study was to determine the validity of accelerometer proximity tagging in parent-child dyads.

Methods: Eighteen parent-child dyads, aged 27-44 years and 18-60 months respectively, wore Bluetooth-enabled Actigraph accelerometers 24 hours/day for 7 consecutive days. Parental accelerometers were set as beacons, and emitted Bluetooth signals once per minute. The signal should only have been recorded by the children's accelerometers if the parent and child were in close proximity. Time-use diaries were completed in 5-minute intervals on Sundays and Mondays, and parents reported whether they were away/with their child. To compare 1-minute Bluetooth signals with 5-minute diary intervals, the presence of a Bluetooth signal (1 = Yes; 0 = No) recorded on children's accelerometers were averaged over the 5-minute time frame, producing Bluetooth signal values of 0.00, 0.20, 0.40, 0.60, 0.80, and 1.00. Accelerometer and parent-reported proximity were compared using a ROC curve analysis.

Results: When accelerometer and time-use diary proximity values were merged there were a total of 8,098 comparative observations. Area under the curve (AUC) for the ROC curve was 0.83 (95% confidence interval: 0.82-0.84), and the optimal cut-point was 0.00. More specifically, sensitivity (0.80) and specificity (0.81) were maximized when classifying all positive proximity tags (0.20-1.00) as true-positives and all negative proximity tags (0.0) as true-negatives.

Conclusions: Proximity measured by Bluetooth-enabled accelerometers showed good validity when compared to detailed parental time-use diaries. Future use of this technology should examine whether role modeling or co-participation is explaining the relationship between parental and children's PA and SB to inform intervention targets for increasing PA and decreasing SB in early years children.
Examining the physical activity experiences of at-risk adolescent girls upon completion of an integrated physical activity and psycho-social intervention aimed at improving body image

Kaitlyn Carlson, Marianne Clark, Cristina Caperchione
University of British Columbia, Kelowna, BC, Canada

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Body image dissatisfaction is highly prevalent among at-risk adolescent girls (i.e., those exposed to sexual exploitation, poor family support); yet there are no specific considerations relating to body image, self-concept and physical activity (PA) for this demographic. PA participation in adolescent girls is vital for overall health and well-being, and positive improvements in PA contribute to a positive body image in adolescent girls. The overarching purpose of this study was to examine the feasibility of an integrated PA and psycho-social program aimed at improving the body image of at-risk adolescent girls, as well, evaluate perceptions concerning the girl's PA experiences, preferences and self-concept. This presentation focuses on the qualitative findings of this study, specifically regarding the girl's PA experiences upon completion of the integrated program.

Methods: This study was based on a quasi-experimental design and utilized a mixed-methodology that included survey research and interviews. In person, semi-structured interviews were used to collect qualitative data from at-risk adolescent girls (N=17) between the ages of 11-13 years, concerning their PA experiences upon completing the intervention. The interviews were led by the female researcher who facilitated the integrated intervention and ranged in duration from 20-40 minutes. Thematic analysis was used to analyze the qualitative data.

Results: Our findings indicated that adolescent girls today consider being healthy as: eating properly and exercising, yet are not meeting the recommended PA guidelines. The participants reported positive experiences from the PA portion of the intervention, indicating that they felt happy, relaxed and energized, and described the activities as stress relieving. The participants highlighted the importance of the context of PA, with small group participation of only girls being described as a key component of enjoyment. The small group participation helped the girls with confidence and bolstered their overall positive experiences.

Conclusions: An integrated PA and psycho-social intervention shows promise as a strategy for reaching and engaging at risk adolescent girls, particularly when it is delivered in the supportive, small group environment.
Tailoring obesity prevention efforts: What makes an obesogenic environment in high and low income communities?

Claudia Nau1, Daniel Taber2, Hugh Ellis1, Jamie Chriqui3, Christopher Quinn3, Frank Chaloupka3

1Johns Hopkins University, Baltimore, MD, USA, 2University of Texas Health Science Center at Houston, Austin, TX, USA, 3University of Illinois at Chicago, Chicago, IL, USA

SIG: Socio-economic inequalities

Awards:

The concept of obesogenic environments has been coined to describe the spatial clustering of obesity risk factors. It is unknown whether obesogenic risk factors are the same in high and low income communities. We used Random Forest, a machine learning algorithm, to identify the combination of risk factors that are most important in differentiating obesogenic and obesoprotective environments in both high and low income communities. Data were obtained from the Bridging the Gap Community Obesity Measures Project, a national sample of 457 communities that served secondary school students in the United States in 2010-12. Analyses included 57 obesity-related community features including social, food and physical activity characteristics. Specific measures included density of retail food outlets and fast food restaurants; density of parks, playgrounds, and other physical activity facilities; food/beverage advertising; food/beverage products sold in stores; and restaurant menu labels. Obesogenic (N=115) and obesoprotective (N=114) communities were defined as communities whose average BMI percentile fell into the highest and lowest quartile of the community BMI percentile distribution. Communities were divided into two groups based on median community level income ($54,453/ year). Of all high income communities, 34% were obesogenic environments; 65% of low income communities were obesogenic. We adjust for unbalanced samples of obesogenic and obesoprotective environments in the analyses. Overall, 63% and 79% of low and high income communities could be correctly identified as obesoprotective and obesogenic environments. In low income communities only three risk factors contributed to the classification success. All three were socioeconomic features (proportion of high school graduates, median home value, proportion of children living in single parent households). In high-income communities, a more diverse set of 12 community features (7 socioeconomic, 5 food-related features) contributed to the classification success. We conclude that socioeconomic community features dominate the risk profile of obesoprotective and obesogenic environments in both high- and low-income communities. While our results suggest that while the food environment may have protective effects in high income communities, obesity risk in low income communities appears to be dominated by the accumulation of socioeconomic risk, with food and physical activity features contributing little.
Mobilizing Barbershops and Beauty Salons for Health Promotion and Disease Prevention: Two Decades of Challenge and Opportunity

Stephen Thomas, Laura Linnan
1University of Maryland, College Park, MD, USA, 2University of North Carolina, Chapel Hill, NC, USA

SIG: Socio-economic inequalities

OBJECTIVE: Beauty salons and barbershops are located in all communities, large and small, rural, suburban and urban. People visit these places on a regular basis, developing trusted relationships with their stylist/barber. The potential for reaching large numbers of individuals, including targeting by gender, race/ethnicity and intergenerational ages, provide opportunities to promote health within these settings. Evidence from several recent reviews (Linnan et al, 2014; Luque et al, 2013) suggest that a growing number of beauty salon and barbershop interventions have demonstrated positive health outcomes. The speakers are pioneers in this research with almost two decades of experience. METHODS: They will provide a brief review of the literature and introduce two separate teams, each with more than a decade experience, working in collaboration with shop owners, barbers/stylists and their customers to promote health in beauty salons and barbershops. They will share examples of their work, and then, describe lessons learned about how to best plan, deliver and evaluate interventions that occur in beauty salons and barbershops. Specifically, they will describe 15 years of collaborative research that includes studies focused on addressing health disparities by improving informed decision making about cancer screening (prostate, colorectal, cervical, breast); as well as primary prevention (e.g. healthy eating, weight loss, tobacco use, physical activity and reducing falls) among customers who visit North Carolina beauty salons and barbershops. They will also share insights gained from over 15 years with the Health Advocates in Reach and Research (HAIR) initiative first developed in Pittsburgh and now established in Washington, DC metro area. Founded on the principles of social justice and building upon the long history of barbers and stylists as leaders in the black community, the HAIR initiative has been home to a range of projects. CONCLUSIONS The presenters will share brief videos and selected results of their work, and, will offer lessons learned to assist researchers and practitioners who may be interested in working within beauty salons and/or barbershops to promote health.
Associations between obesity, the food and physical activity environment: a cross sectional study of UK adults.

Matthew Hobbs¹, Claire Griffiths¹, Mark Green², Hannah Jordan², Jim McKenna¹
¹Leeds Beckett University, Leeds, UK, ²University of Sheffield, Sheffield, UK

SIG: Policies and environments

Awards: Yes, for the Student Competition*

Objective: To investigate associations between obesity and the local food and physical activity (PA) environments.

Methods: Cross-sectional data (n=22,889) from the Yorkshire Health Study. Body mass index (BMI) was calculated using self-reported height and weight; obesity was defined as BMI ≥30. Waist circumference (WC) was also self-reported; ‘at risk’ was defined as ≥94cm and ≥80cm for males and females respectively. Food outlets (FO) and PA facility locations were mapped using the Ordnance Survey Points of Interest database. Park locations were obtained separately from Open Street Map. Home neighbourhoods were defined using 2km buffers radiating from each participant’s home postcode. FO or PA opportunities within that buffer were then summed to indicate availability. FO were categorised as ‘takeaway’, ‘supermarket’ and ‘other’. PA facilities and parks were considered as two separate categories. Multi-level (random intercept) logistic models were used to estimate associations between the food and PA environment and obesity in separate models for each environmental variable. To account for the skewed environment data we modelled availability in quartiles (Q1 least exposed, Q4 most exposed). Age, gender, ethnicity, deprivation and rural/urban classification were included as covariates in all models.

Results: Of participants 14.1% were obese. For the food environment, 89.1% had immediate access to at least one takeaway and 69.9% to a supermarket. Similarly, 97.6% and 77.7% of individuals had one PA facility and park available within their local environment. Availability did vary by deprivation. Separate multi-level models showed no evidence of an association neither between (i) the number of FO, nor (ii) PA factors and obesity in those most exposed (Q4) compared to those least exposed (Q1). There was evidence of an association between PA facilities and obesity in the most exposed quartile (Q4 OR=0.88 [95% CI 0.78-0.98]) compared to those least exposed (Q1). Findings were substantively the same for BMI and WC.

Conclusion: There is little evidence to suggest that availability within the food or PA environment is associated with obesity. The evidence presented here provides little support for policy interventions aiming to modify the local food or PA environment.
Demographic Associated with Enrollment of A Community Based Intervention

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SIG: Children and families

Awards: No

Background. Mothers In Motion (MIM) was a community based lifestyle intervention study. MIM was designed to help overweight and obese mothers aged 18-39 year old reduce stress, eat healthier and be physically active, thus ultimately prevent further weight gain.

Objective. This study explored whether demographic characteristics influenced enrollment among low-income overweight and obese young mothers who consented to participate in the study.

Methods. Women 6 weeks to 5 years postpartum were recruited from the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in Michigan in 2012-2015. Eligible participants signed a consent form to participate in the study. They were enrolled only if they completed both phone interview and returned to WIC office to be randomized within 2 weeks of signing consent form. Demographic characteristics influencing enrollment were explored via logistic regression analyses.

Results. Of 956 women signed a consent form, 612 (64%) were enrolled. Breastfeeding, education, smoking, employment, postpartum, or body mass index (BMI) were not independently associated with enrollment. However, older women (OR 1.36, 95% CI 0.10 - 0.59), women with a higher education and at late postpartum (OR 1.22, 95% CI 0.04-0.36), women with a higher BMI and at late postpartum (OR 1.03, 95% CI 0.00-0.06) were more likely to enroll than younger women, women with a lower education and at earlier postpartum and women with a lower BMI and at earlier postpartum. African Americans (OR 0.04, 95% CI -6.37 - -0.16), older women with a higher education (OR 0.95, 95% CI -0.09 - -0.02), breastfeeding women at late postpartum (OR 0.34, 95% CI -1.90 - - 0.28) were less likely to enroll than their counter parts.

Conclusion. Age and race were independently associated with enrollment. Future research may need to explore why low-income overweight and obese with some characteristics initiate interest in participating in a lifestyle intervention but decide not to enroll.
Effects of behaviour change techniques on physical activity and healthy eating in obese adults; a systematic review and meta-analysis

Gro Beate Samdal¹,², Geir Egil Eide¹,², Tom Barth³, Eivind Meland²
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SIG: Theories of motivation

Awards: Yes, for the Student Competition*

Purpose
Behaviour change interventions are complex and it is difficult to identify the active ingredients. The study will identifying behaviour change techniques associated with effectiveness in randomised controlled trials of interventions to promote physical activity and healthy eating in obese adults. The study aims to explain the heterogeneity in results by examining differential effects of behaviour change techniques and other intervention characteristics across studies. In order to identify the techniques we will use the Behaviour Change Techniques Taxonomy version 1 (BCTv1), a cross-behaviour, hierarchically organised taxonomy developed by an international expert consensus.

Methods
Relevant databases, reviews and journals are searched. Inclusion criteria; RCTs of interventions with ≥12 weeks duration, published from 2007 to the end of 2014, for obese adults (mean age in groups ≥40 years, BMI≥30). Primary outcome: objective and/or self-report measures of changes in diet and/or physical activity. Two reviewers have independently rated study quality (the Cochrane risk of bias tool). Three reviewers coded the behaviour change techniques, and outcome results (short- and long-term). The researchers completed the online BCTv1 training programme before start.

Where results from studies can be quantitatively combined, a statistical meta-analysis of the data will be undertaken. For dichotomous data odds ratio will be derived, and for continuous data a standardized mean difference will be calculated (weighted by the inverse of the variance). Analyses will use a fixed or random effects approach. Evidence for heterogeneity across studies will be explored and meta-regression models used to examine the behaviour change technique’s impact on intervention effectiveness.

Results/findings
We have included 58 studies and results will be presented in a "late-breaking abstracts".

Conclusion
To our knowledge this is the first review to use the newly developed The Behaviour Change Techniques Taxonomy version 1 to synthesise evidence from randomised controlled trials of interventions promoting physical activity and/or healthy eating and the first review to study behaviour change techniques associated with behavioural maintenance. The results may guide the choice for effective behaviour change technique in future health intervention programs for obese adults.

Trial registration PROSPERO CRD42015020624
**Purpose:** High parental self-efficacy (PSE) may be a prerequisite for favorable behaviour changes towards healthful diets and physical activity in young children. Previous studies have suggested that a higher PSE is related to a healthier diet and to increased physical activity in their children, which may have implications for body composition and physical fitness. However, it is not known whether a higher PSE is associated to a more favourable body composition profile and/or to higher physical fitness in young children. Thus, the purpose of the study was to examine the association of PSE evaluated using a novel tool, with measures of body composition and physical fitness in 4-year-old children.

**Methods:** MINISTOP is a randomized controlled trial enrolling parents of healthy 4-year (4.48 ± 0.15) old children to participate in a 6-month mHealth intervention to prevent childhood obesity. This study includes baseline data on self-reported PSE by the Parental Self-Efficacy for Promoting Healthy Physical Activity and Dietary Behaviors in Children Scale (PSEPAD) questionnaire, body composition using the pediatric option for BodPod and physical fitness (cardiorespiratory, muscular and motor fitness) measured using the PREFIT battery among 301 Swedish children. Multiple linear regression analyses were conducted to evaluate cross-sectional associations of the outcomes in relation to total PSE factor scores and scores computed for each of the three PSE factors, namely: 1) diet 2) limit setting of unhealthful behaviors and 3) physical activity.

**Results:** No statistically significant associations were observed between total PSE factor scores and % fat mass, body mass index, fat mass index or fat-free mass index in children (p-values=0.11-0.90) after adjusting for parental BMI and education, respondent, and child's sex and age. Further, there were no associations between total PSE factor scores and physical fitness levels (p-values=0.18-0.81). Finally, no associations were observed for the individual PSE factors and body composition/physical fitness.

**Conclusions:** Although a higher PSE has previously in the literature been related to to healthier diet and physical activity behaviors in children, a higher PSE was not related to a healthier body composition or physical fitness of children in this study.

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Memorial Sloan Kettering Cancer Center, New York, USA

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective
To develop a novel culturally and linguistically tailored intervention, and evaluation framework, COMIDA [Consumo de Opciones Más Ideales De Alimentos (Consumption of More Ideal Food Options)], to address obesity/overweight and physical inactivity among a large, growing, high risk group, Mexican immigrants in New York.

Methods
We conducted a quantitative survey to assess Mexican immigrants' dietary and physical activity habits and needs. We also conducted a review of the literature, incorporated community-based participatory methods, and piloted the intervention. Results were used to develop a novel nutrition and physical activity intervention and evaluation framework to be implemented at the Mexican Consulate's Ventanilla de Salud (VDS) (Health Window) program in New York City.

Results
108 individuals visiting the VDS were surveyed. Only 45% reported eating fruit 1 or more times a day, 56% reported eating vegetables 1 or more times a day, 41% reported drinking sugar sweetened beverages 1 or more times a day, 45% reported eating fast food at least once in the past week, and 41% reported eating red meat 1 or more times a day. 38% reported exercising less than 150 minutes a week. 17% used government issued food vouchers. 88% wanted to learn more about nutrition, diet, or how to eat healthier. 76% wanted to lose weight. 86% wanted to exercise more. Review of the literature and input from our community partners supported a diet and exercise counseling approach, combined with healthy behavior text messages, and use of the RE-AIM evaluation framework (Reach, Effectiveness, Adoption, Implementation, and Maintenance). Survey results were used to tailor the intervention components to participants' needs and preferences. Intervention components include a nutrition and physical activity educational session, Spanish-language low literacy written healthy eating materials, neighborhood food resources, and weekly healthy behavior text messages. Follow-up to assess changes in BMI and diet will be conducted 3 months after the initial intake. Initial piloting of the intervention demonstrated it to be feasible and acceptable to participants.

Conclusions
COMIDA was tailored to the unique needs and preferences of the Mexican immigrant community, and has great potential to significantly impact obesity and inactivity in this underserved group.
Weight Loss Surgery Candidates’ Romantic and Peer Relationships

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: The high prevalence of obesity in the U.S. has promoted investigation into effective treatment options for weight loss, including weight loss surgery (WLS). Evidence on WLS patients’ peer and romantic relationships is limited and fails to determine whether interventions should target peers, partners, or both. The purpose of this study is to provide descriptive evidence on the romantic and peer relationships of WLS candidates, and association between these relationships and candidates’ presenting health behaviors. We also describe differences between married/partnered and single/divorced WLS candidates.

Methods: A convenience sample of obese individuals seeking WLS were recruited at information sessions. Adult WLS candidates completed (N=120) a battery of assessments including the Relationship Structures Questionnaire (Fraley et al., 2006) about peer and romantic relationship anxiety and avoidance. The majority of participants were female, Caucasian, and severely obese; half were married/partnered (48%). We used published data on the Relationship Structures Questionnaire (Fraley et al., 2011) to compare our sample with a diverse representative sample of English-speaking participants (N=12,000). Analyses included descriptive statistics, independent t-test, Pearson correlations, and regression.

Results/Findings: Our sample reported higher avoidance in peer and romantic relationships compared to the reference sample. Men in our sample had higher avoidance and anxiety scores for all relationships compared to the reference sample and women in our sample. Men (M=3.03, SD=1.50) had higher avoidance in their peer relationships than women (M=2.39, SD=1.50; t(118)=-2.14, p=.035). Participants who were single (M=2.90, SD=2.22) reported higher anxiety in their romantic relationships than partnered participants (M=2.18, SD=1.86, t(105.52)=-1.87, p=.060). Similarly, single participants also reported higher anxiety in their peer relationships than partnered participants. Specific associations highlighting areas of relationship strengths and vulnerabilities were further identified, and implications for future couple and peer interventions are discussed.

Conclusions: In our sample men and single participants tended report higher anxiety and avoidance in their relationships than women. This finding is not consistent with previously findings (Schmidt et al., 2003) where women tend to have higher anxiety and avoidance scores. This could imply that men seeking WLS may benefit from specific interventions targeting their romantic and peer relationships pre and/or post WLS.
Patient Accounts of Barriers to Wellbeing and Resilience during a Lifestyle Intervention Programme for Non-Communicable Diseases

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose

Behaviour modification is complex, and requires a collaborative, patient-centred approach in the research and management of non-communicable diseases (NCDs). These include lifestyle intervention programmes for NCDs, an effective tool for changing behaviours relating to diet and physical activity. Potential barriers and benefits of such interventions can be explored in detail using individual interviews. The study investigated patients’ experiences of a lifestyle intervention programme for NCDs and the influence of psychosocial and programme-related factors on patients’ ability to improve their physical and psychosocial wellbeing.

Methods

A qualitative design was employed, consisting of semi-structured interviews of patients with NCDs before and at completion of a twelve week programme. Fourteen participants between 49 and 76 years were recruited and interviewed at baseline and 13 were interviewed at completion. The study was conducted at a Sport and Exercise Medicine Clinic in Cape Town, South Africa. Thematic analysis was used for analysing participant responses.

Findings

Nearly all participants experienced trauma at initial diagnosis, despite varying severity of NCDs, premorbid health, or degree of self-reported resilience. Despite this, resilient responses were common in all participants, as demonstrated by the degree of perceived control over their condition; the constructive manner they responded to their diagnosis; as well as the positive lifestyle changes they were able to initiate during, and maintain subsequent to the programme. Benefit finding was evident in patients’ perceptions of NCDs as well as in their ability to play an active role in their own recovery. Finally, the degree of support and care experienced by participants highlighted the positive impact of lifestyle intervention programmes on psychosocial and physical health progress. This was especially evident in participants identified as more vulnerable to psychosocial problems.

Conclusions

Providing a flexible and individualised approach enabled the study to yield clinically relevant psychosocial insights with respect to patients with NCDs. Several patients were identified as more vulnerable to psychosocial and programme-related barriers to behaviour change and recovery. Conversely, resilient individuals were characterised by their ability to find benefit in adversity, to access support, and to initiate and maintain necessary health behaviours.
Phone app development: Promoting healthy behaviors in a rural obese population

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SIG: E- & m-health

Awards: No

Purpose: The use of technology to monitor dietary and physical activity habits for weight loss has grown exponentially in the past 10 years. Most commercially produced technologies for weight loss, such as apps and trackers are not theory or evidence-based. Moreover, little is known about the impact of such technologies on residents of rural areas, who may be disadvantaged in terms of access. Our goal is to develop a theory and evidence-driven, user-centered phone app to address obesity related behaviors in rural Kentuckians.

Methods: A mixed-methods approach was used with 6 counties recruited to participate in an obesity prevention, community-based, program. A random digit dial 30 minute phone interview was conducted among residents (n=334) and focused on technology access and usage. Focus groups were conducted in 3 counties to assess desired phone app features. The focus group responses were then considered in light of what would support the three tenets of the COM-B model of behavior change (Capability, Motivation, and Opportunity) using evidence-based behavior change techniques.

Results: Almost half (46%) of survey respondents indicated access to the Internet via a smart phone. Of those respondents, 84% had downloaded a phone application. Over half (54%) of respondents indicated accessing health information via the internet. The majority of respondents were unaware of community efforts to support healthy eating (51%) and physical activity (53%). Themes from the focus groups included the need for a central place for community health information, prompts and reminders, the desire for the ability to self-monitor behaviors, inter-community challenges using health related goals, and demonstrations of cooking skills and exercises.

Conclusions: To support the COM-B tenets of capability and opportunity, the phone app will include diet, exercise and weight tracking, videos demonstrating cooking skills and exercises, a calendar of local health events and a message board. Motivation will be addressed through nutrition and physical activity challenges via a gaming feature, alerts to encourage healthy behaviors, and rewards. The development and testing of this theory-based phone app will serve as a model for tailoring technology driven interventions for rural populations.
A systematic review of dietary, nutritional, and physical activity interventions for the prevention of prostate cancer progression and mortality.

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SIG: Cancer prevention and management

Awards: No

Purpose. Given the long-term, although potentially fatal, nature of prostate cancer, there is increasing observational evidence for the reduction in disease progression and mortality through changes in lifestyle factors. Previous systematic reviews of Randomised Controlled Trials examining a range of dietary, nutritional and physical activity interventions, with outcomes focused on disease progression or mortality, are scarce and do not assess risk of bias or methodological quality.

Methods. We systematically reviewed RCTs of dietary, nutritional, and physical activity at modifying prostate cancer progression and disease-specific mortality, including a detailed assessment of risk of bias and methodological quality. Primary outcomes included post-intervention effects on recognised surrogate measures of prostate cancer progression (e.g. Gleason score) and clinical measures of prostate cancer progression (e.g. metastases).

Results. Forty-four randomised controlled trials of lifestyle interventions, with prostate cancer progression or mortality outcomes, were identified. Substantial heterogeneity of the data prevented a meta-analysis. The included trials involved 3,418 prostate cancer patients, median 64 men per trial, from 13 countries. A trial of a nutritional supplement of pomegranate seed, green tea, broccoli, and turmeric; a trial comparing flaxseed, low-fat diet, flaxseed, and low-fat diet versus usual diet; and a trial supplementing soy, lycopene, selenium, and coenzyme Q10, all demonstrated beneficial effects. These trials were also assessed as having low risk of bias and high methodological quality (as were seven other trials with no evidence of benefit). The remaining trials were either underpowered, at high or unclear risk of bias, inadequately reported, of short duration or measured surrogate outcomes of unproven relationship to mortality or disease progression, which precluded any benefits reported being reliable.

Conclusion. This is the first systematic review to our knowledge which has combined interventions of modifiable lifestyle factors, with a primary outcome of prostate cancer progression or mortality. The complex nature of dietary, nutritional and physical activity interventions, along with the slow-growing nature of prostate cancer that causes difficulties in measuring long-term clinically relevant change, makes research in this area difficult. Large, well-designed randomised trials with clinical endpoints are recommended for lifestyle modification interventions.
Participant-reported barriers to participation in a community-based health promotion program: Grand Family Challenge


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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Background

The presence of nationwide health status disparities among racial/ethnic minorities and low-income populations suggests the need and importance of community-based health intervention programs in addressing such disparities. Low enrollment and retention rates pose an issue to program utilization and effectiveness. Identifying and addressing barriers to participation has the potential to increase enrollment, retention, and program success, thereby improving health outcomes in minority and underprivileged populations and reducing associated health disparities.

Methods

A cross-sectional survey was conducted among families participating in the Grand Family Challenge (GFC), a grant-funded community-based intervention program composed of physical and nutritional assessments, cooking and fitness workshops, and weekly lifestyle coaching, with the aim of promoting healthy lifestyles within the family. Families were recruited from within Maywood Fine Arts, a community organization located in Maywood, IL serving the surrounding racial minority and low-income population.

Results

Seventeen families were recruited into and participated in the program over a one-year period, of which, thirteen responded to the survey. The survey consisted of standardized questions composed into four sections: 1) barriers and attitudes to lifestyle coaching, 2) physical activities, 3) healthy eating, and 4) family demographic information. Family characteristics and survey responses were analyzed using descriptive statistics. Participants reported a lack of time or scheduling conflicts (46.1%), inadequate communication with lifestyle coaches (15.3%), and language barriers (7.6%) to be impediments in maintaining contact with the lifestyle coaching team. A majority of participants identified a lack of time to cook (76.9%), in addition to dietary restrictions (7.6%), financial restrictions (7.6%), and a lack of culinary knowledge (7.6%) to be challenges in healthy food preparation and consumption. Barriers associated with physical activity participation included a lack of time or scheduling conflicts (76.9%), financial restrictions (15.3%), inconvenient exercise location (15.3%), a lack of exercise knowledge (15.3%), and a lack of motivation (7.6%).

Conclusion

The findings of this study suggest that offering more scheduling options in coaching and workshops, information on efficient food preparation and exercise, and instruction in eating healthy and exercising on a budget may diminish time and financial barriers to program participation, thus increasing enrollment, retention, and overall program success.
How is the practice of yoga related to weight status, eating behaviors, and body image in a population-based sample of young adults?

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SIG: No, this does not fit in any of the above mentioned special interest groups
Awards: No

Purpose: Yoga is a practice that involves physical movement, breathwork, mindfulness, and meditation. This study examines different aspects of yoga (e.g., frequency, type), perceptions of the impact of yoga (e.g., on weight status), and associations between yoga and weight status, eating behaviors, and body image in a population-based sample of young adults.

Methods: Yoga practices are being assessed as part of the fourth wave of Project EAT (Eating and Activity in Adolescents and Young Adults), a 15-year longitudinal study following adolescents through young adulthood. The Project EAT-IV survey also includes a comprehensive assessment of eating behaviors (e.g., dietary intake, intuitive eating, eating to cope), physical activity, weight control practices, body image, and weight status. At the time of writing this abstract, data have been collected from 1,647 young adults (mean age: 31; range: 24-36); data collection will be completed in January 2016. Results from the full sample, weighted to account for attrition since baseline, and adjusted for covariates, will be presented at the conference.

Results:

Preliminary results indicate that approximately half (51%, n=839) of participants have ever engaged in yoga (women: 63%; men 35%). Practicing yoga on a regular basis (>30 minutes per week in the past year) was reported by 30% (n=217) of women and 8% (n=57) of men. Vinyassa (flow) yoga was the most commonly practiced yoga, but hatha, yin/restorative, and hot yoga were also popular. Many participants practicing yoga perceived that yoga had influenced their weight (35%), eating behaviors (29%), and/or body image (56%). Further analyses will estimate associations between yoga and these variables as assessed on the survey.

Conclusions: Yoga is a popular practice and may have implications for eating behaviors, body image, and weight status. The suitability, acceptability, and potential benefits of yoga for young adults with various eating and weight-related problems will be discussed.
Men’s attitudes to body weight, barriers to weight loss and desired elements of a weight management programme: a survey of Police Scotland officers and staff

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: The prevention and treatment of obesity is now a public health priority. However men are under-represented in weight loss interventions and research is needed to shed light on the reasons for this. The police force, a large employer of men, has received negative media attention in recent years regarding obesity and provided an ideal setting for this research. The present survey aimed to elicit men's views on overweight/obesity; reasons for not engaging in weight management; preference regarding the content of weight management programmes (WMP), and explore if these differed from the views of women.

Methods: Four hundred and sixty five Police Scotland staff members completed an anonymised online survey (SurveyMonkey®).

Results: The majority of respondents (422; 91%), were police officers, 62% (287) were male. Mean body mass index (BMI) was 27kg/m² in men (range 19-60 kg/m²), and 26kg/m² in women (range 17-66 kg/m²). A higher proportion of men were obese 23% (58) vs. 11% (15) women. The majority of respondents (90%) viewed overweight/obesity as an important health issue, 83% felt it could impede job performance. A quarter of those who provided additional comments (n=43) 26% indicated that weight management was a personal responsibility not their employers. Twenty-seven percent (124) reported actively trying to manage their weight; the majority were men (60%). Fifty-five percent of men would join a WMP and the majority (86%) would prefer a mixed gender programme. Shift work and getting time off work were the most frequently reported barriers to joining a WMP. The WMP elements most frequently desired by men was subsidised gym membership, followed by one-to-one exercise/guidance then nutritionist led sessions. Views and preferences of female respondents were similar.

Conclusion: Men in the present survey were aware of the negative impact of obesity on both health and work performance, with some actively trying to manage their weight. Opportunities to access varying formats of weight management programmes would be welcomed.
Obesity And Associated Factors In Young Adults Attending Tertiary Institutions In South-Eastern Nigeria

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SIG: Socio-economic inequalities

Awards: Yes, for the Early Career Award**

Purpose: This study assessed the prevalence of overweight/obesity and associated factors in a group of young adults in tertiary institutions in South-Eastern, Nigeria.

Methods: A sample of 1610 undergraduates (53.9% females and 46.1% males) was selected using multistage sampling from 5 tertiary institutions in the zone. A validated questionnaire was used to assess socio-demographic, dietary and lifestyle factors. Anthropometric measurements (height, weight, triceps skinfold thickness, waist and hip circumference ratio) and blood pressure were assessed using standard methods, while body mass index (BMI) and waist hip ratio (WHR) were calculated. Differences between relevant data were tested for significance using the T-test (for continuous variables) and associations tested with the Chi square test.

Results: The prevalence of general obesity was 6.5% [4.2% males; 8.4% females (p < 0.05)]; while for overweight, it was 13.4% [8.4% males; 17.7% females (p<0.05)]. Females were significantly (p < 0.05) more at risk of central and abdominal obesity (15.7% and 27.2% respectively) compared to males (1.1% and 2.4%, respectively). Consumption of junk foods (X² = 13.39; p = 0.037), being a female (X² = 47.91; p < 0.001) and a first year student (X² = 41.82; p < 0.001) were associated with obesity. High systolic and diastolic blood pressures were also associated with being obese (p < 0.05).

Conclusion: The prevalence of general and central obesity is high in this population. Nutrition education programs at the tertiary education level, aimed at encouraging healthy weight are warranted.
Relationship between dietary habits, lifestyle and nutritional status of staff in a Tertiary institution, South Eastern Nigeria

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Michael Okpara University of Agriculture, Umudike, Umuahia, Abia State, Nigeria

SIG: Socio-economic inequalities

Awards: Yes, for the Early Career Award**

Purpose: The study assessed dietary habits, lifestyle and nutritional status of staff in Michael Okpara University of Agriculture, Umudike.

Methods: A total of 520 staff comprising of academic and non-academic staff of the institution was selected using multi-stage sampling technique. A validated questionnaire was used to collect information on dietary and lifestyle habits. Anthropometric measurements of height and weight were taken using standard procedures. Descriptives and Chi square analysis were performed using SPSS version 20.0.

Results: Dietary habits revealed 62.0% eat twice a day, 25.8% skip meals, while 72.9% and 60% consume alcohol and carbonated drinks thrice a week, respectively. Lifestyle pattern at work showed that 50.2% spend 5-6 hours sitting in the office and 43.5% spend more than 3 hours working on the computer. Leisure time for 55.7% was observed only on weekends. Less than 20% did not engage in daily physical activity. The prevalence of obesity and overweight were 24.7% and 15.7%, respectively. A significant relationship was observed between high BMI and physical inactivity.

Conclusion: Although, most of the respondents have normal BMI, the study however underscores the need to emphasize regular physical exercise among this population group.
A Healthy Life Centre (HLC) is an interdisciplinary primary health care service which offers effective, knowledge-based programmes for health behavior change, and coping with health problems and chronic diseases. The HLC addresses people with disease, or in high risk of disease, who need support for behavior change. The Norwegian directorate of health has published a guide for the establishment, management and quality of the HLC.

**Basic services**

The HLC is part of the public health care service. HLC programs have a patient-oriented approach and aim at strengthening the individual's control of his or her own health (empowerment). HLCs offer various exercise groups, and individually or group based counselling or courses for increased physical activity, healthy diet and tobacco cessation. Many HLCs also offer counselling, support and education on issues related to mental health, sleep and alcohol. Counselling is based on Motivational Interviewing (MI). The participants get a consultation to examine their needs and motivations, and is then enrolled in a 12 week program. The duration of the program may be prolonged if needed.

Cooperation with other health care services, NGOs, private and public organizations and local authorities is of vital importance in order to provide continuous and integrated health care and help people to establish independent and lasting health enhancing habits. A key task for the HLC is to guide the participants into suitable and feasible local activities that they can continue with on their own after participation in the HLC. The HLCs should provide a good overview of such programs.

**Results**

Evaluations have shown that HLCs recruit people who do not on their own seek or participate in other services. The HCLs therefore play an important role in reducing social differences in health behavior and health. Participants need help to find appropriate services, build motivation and to create strategies for maintaining sustainable coping and behavior change. Studies of HLCs in Norway indicate that participation in the programs can lead to improved physical fitness, weight loss and improved self-perceived health and quality of life, as well as maintaining health behavior change one year after the follow-up.
Exploration of the most effective way of implementing mandatory menu calorie posting in Ireland: Attitudes of Irish food service businesses that do and do not display menu calorie posting

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Objective: Implementing calorie posting on all Irish food service menus could support healthy food choices and potentially have a positive effect on the Irish obesity crisis. The aim of this research was to explore the attitudes of Irish food service businesses that do and do not display calories on their menus and to inform policy makers of the most effective and efficient way of implementing mandatory menu calorie posting in Ireland.

Methods: Semi-structured interviews were conducted with a sample of food service business owners/head chefs (n=13) who participated in a national telephone survey. Semi-structured topic guides were used to explore participants’ perceptions and experiences, identify potential barriers and facilitators surrounding calorie posting implementation and moreover, identify methods to overcome recognised issues. Data were imported into NVivo software and analysed using a thematic framework approach.

Results: Three major themes emerged; 1) uncertainty, 2) impact on business, and 3) consumer nutrition knowledge. All three themes were found to have both a positive and negative impact on the implementation of calorie posting. Those displaying calories had a desire to improve company image and stimulate customer loyalty and perceived displaying calories as a positive. While those not displaying calories highlighted hesitation to do so over concerns regarding the negative impact on the dining experience and portrayal of product. Participants expressed varying degrees of apprehension regarding calorie posting in their business. Ambiguity in relation to the accuracy of calorie information, cost implications, time commitments, a lack of trust in the food service industry and lack of consumer nutrition knowledge were central to these concerns. Training and advice from professionals, financial support, easier methods of calorie calculation and the provision of comprehensive nutrition information were perceived as facilitating factors which would encourage calorie labelling implementation among businesses.

Conclusions: Providing guidance and support (e.g. training workshop and/or tax incentives) and practical assistance (e.g. easy to use, standardised calorie calculation software technologies) to food service businesses is key to ensuring that mandatory calorie posting is implemented successfully. Furthermore, engaging a collaborative approach between policy makers, academics and food service business owners would ease implementation greatly.
P2.020

Advising overweight persons to control weight by Lithuanian health care professionals in 2000-2014

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SIG: Socio-economic inequalities

Awards: No

Purpose:

To assess changes in advising overweight persons to lose weight by health care professionals over fourteen years and to determine whether reported attempts to lose weight were associated with the advices.

Methods:

The data were obtained from eight biennial cross-sectional postal surveys of Lithuanian health behaviours carried out between 2000 and 2014 using the same methodology. For every survey, a nationally representative random sample of 3000 individuals aged 20-64 was drawn from the National Population Register. In total, 8738 men and 11822 women participated in these surveys. Self-reported body weight and height were used to calculate BMI. Information on whether health professionals advised overweight or obese persons to increase physical activity or to change dietary habits was obtained. The odds of receiving advices were calculated using multiple logistic regression analyses.

Results:

During fourteen years the proportion of overweight increased only in men from 50.6% to 58.6%, the prevalence of overweight in women showed decreasing trends. The prevalence of obesity in men increased from 11.3% to 19.5% and has not changed among women remaining 17.3% in 2014.

During study period proportion of obese persons being advised by health care professionals to control their weight increased from 25.9% in 2004 to 49.6% in 2014 in men and from 32.3% to 43.8% in women. In 2014, 46.7% of obese respondents reported that their health care professionals advised them to lose weight, 48.2% were advised to change their diet and 20.7% were advised to increase physical activity. Only small part of overweight persons were advised to change their weight or lifestyle habits. Older, better educated, having higher BMI were more likely to receive advices to lose weight. Obese men and women who reported receiving advices were more likely to report attempts to lose weight than those who were not advised (OR 4.1; 95% CI 2.42-6.79 and OR 2.8; 95% CI 1.85-4.34 respectively).

Conclusions:

Although health care professionals became more active in giving advices for controlling weight of obese persons, still existing barriers to counselling need to be identified and strategies put in place to overcome them.
Health risk factors in Australian first year university students: Prevalence and cluster analysis

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SIG: Policies and environments

Awards: Yes, for the Early Career Award

Objective: There is evidence of a high prevalence of health risk factors among university students in the US and Europe. The objective of this study was to describe the prevalence of health risk factors and to examine clustering of these factors in Australian university students.

Methods: A sample of 203 first year university students (66% female; mean ± SD 17.4 ± 0.6 years of age) were recruited from a metropolitan and rural campus of a major Australian university. Body mass index (BMI) was calculated from directly measured height and weight. Questionnaires were used to assess moderate to vigorous physical activity (MVPA), fruit and vegetable intake, sedentary behaviour, alcohol intake and cigarette smoking. Risk was determined as BMI >25 kg/m², MVPA <150 min/day, <3 serves of fruit and <5 serves of vegetables/day, >7 hours/day sitting, >4 standard drinks on one occasion < once/week, and current or ex-smoker. Prevalence of risk factors was determined using descriptive statistics. Clustering was determined by comparing the observed (O) and expected (E) prevalence of all possible combinations of risk factor pairs with a sub-group analysis by gender.

Results: Over two thirds of the sample (72.5%) had 2 or more risk factors. The most prevalent was inadequate daily intake of fruit and vegetables (59.3%), followed by high-risk alcohol intake (57.8%), high sedentary behaviour (49.5%), insufficient physical activity (26.3%) high BMI (15.8%), and smoking (4.4%). In females, there were two significant clusters, inadequate daily fruit and vegetable intake and low alcohol intake [O/E: 0.79 (95% confidence interval 0.63-0.99)], and high alcohol intake and high physical activity [0.65 (0.46-0.93)]. In males, high sedentary behaviour and high BMI [1.65 (1.0-2.69)] and physical inactivity and high BMI [2.49 (1.16-5.33) were significantly clustered.

Conclusion: There was a high prevalence of several health risk factors in this sample of Australian first year university students and many students had multiple risk factors. The clustering of these factors differed by gender and sometimes combined healthy and unhealthy behaviours. These findings suggest that healthy lifestyle interventions could be tailored to gender, focusing on fruit, vegetable and alcohol intake among females, and sedentariness, inactivity and BMI among males.
**P2.022**

**Precision behavioral intervention technology to improve physical activity, nutrition, glucose management, and treatment adherence: Promising pilot clinical trial results**

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**SIG:** E- & m-health

**Awards:** Yes, for the Student Competition *

**Objective**

Diabetes is one of the most prevalent and costly chronic diseases, but also one of the most preventable and manageable with lifestyle adjustments. A new class of precision behavioral intervention technologies (PBIT) that dynamically adapt based on patient’s individual differences including clinical condition, motivations, social engagement preferences, personality, and behaviors using sensor-generated and patient-reported data offer promising opportunities to foster behavior change and health outcomes. This pilot study tests a PBIT, “DiaSocial”, designed for older adults with type 2 diabetes, that applies game mechanics and social engagement to foster physical activity, nutrition, glucose management and treatment adherence, the key elements of managing diabetes. The pilot study aims to help answer questions surrounding PBIT efficacy on type 2 diabetes self-care, the role of individual differences in adapting interventions with social engagement, and optimal PBIT design.

**Methods**

A pilot randomized 90-day control trial of DiaSocial was conducted including 29 adults (>=60 years old) with poorly controlled diabetes (A1C > 7.9%) assigned to 4 intervention groups with varied social engagement types and a control group. Participants were provided cellular-connected digital tablets, the DiaSocial app and an integrated wearable activity tracker (fitbit). Providers continuously interacted with 2 groups. In 2 groups, participants teamed. Psychometric questionnaires and A1C testing were completed at baseline and 3-months. A1C was the primary dependent variable with additional measures of app usage, behaviors and attitudes. The major analyses were conducted using analysis of variance techniques. All patients and providers were interviewed at trial conclusion.

**Results**

70% of patients used the app > 60 days and more than 40% used it almost every day. The full treatment group had a 0.98 point average drop in A1C. Assessment and prevention personality attributes were suggestive of successful outcomes. App use and score reduced A1C significantly. Patients mostly voiced improved perceived self-efficacy in managing diabetes. Gaming aspects had mixed perceptions.

**Conclusions**

This study suggests a PBIT supportive of diabetes self-efficacy can be effective for some patients. Usability and improvements were identified regarding visualization, communication features, and scoring clarity. The interaction between personality, social engagement and intervention design offers applied research targets for PBIT solutions.
A 12-month study of the patterns of weight change among Australian first year university students living on vs off campus

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Objective: Almost two thirds (60%) of students in the US and Europe gain weight during the first year of university. The objective of this study was to investigate changes in weight and energy balance behaviours in Australian first year university students and to compare findings between students living on and those living off campus.

Methods: A sample of 102 first year university students (66% female; mean ± SD 17.4 ± 0.6 years of age; 62.9 ± 13.01 kg; n=40 living on campus, n=62 living off campus;) were recruited from a metropolitan and rural campus of a major university at the beginning of first year and assessed at baseline, 6- and 12-months. Height and weight were directly measured and physical activity, sedentary behaviour, dietary patterns, alcohol intake, smoking status and stress were self-reported via questionnaire. Random effects mixed-modelling was used to evaluate changes in weight over time within and between groups. The odds of gaining vs not gaining weight by place of residence and energy balance behaviours was calculated using logistic regression.

Results: At 12-month follow up, students had gained an average of 1.6 ± 3.7 kg (p<0.001), with greater weight gain from baseline to 6-months (1.8 ± 3.1 kg) than 6- to 12-months (-0.13 ± 2.7 kg). Over two thirds of the sample (70%) had gained weight at 12-month follow up; the average gain among these students was 3.3 ± 2.93 kg. Students living on-campus gained significantly more weight (2.7 ± 4.0 kg) than those off campus (0.87 ± 3.4 kg; p<0.014) and a greater proportion had gained weight at 12-months (83%, 3.7 ± 3.64 kg; 61%, 2.9 ± 2.10 kg). The only significant predictor of 12-month weight gain was place of residence, with students living on campus almost three times more likely to gain weight than students off campus (odds ratio 2.97; 95% confidence interval 1.14-7.80).

Conclusion: Patterns of weight gain in this sample of Australian first year students were similar to those in the US and Europe. Interventions to prevent weight gain in university students should be conducted early in the first year and prioritise students living on-campus.
The Association between Health-related Quality of Life and Body Composition Indicators among Chinese Adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: To examine the association between health-related quality of life (HRQL) and obesity, central obesity, and body composition indicators among Chinese adults.

Methods: A total of 3,173 adults were recruited in an urban area in China in 2015. Body composition was measured with Dual-energy X-ray absorptiometry (DXA), and HRQL was measured by the Chinese Short-Form 36-item questionnaire (SF-36). Body composition indicators included percent body fat (%BF), percent lean mass (%LM), and central obesity was evaluated by android/gynoid fat ratio (AOI), percent trunk fat (%TF) and percent android fat (%AF). Linear regression models were used to examine the relationship between HRQL dimensions and body composition indicators.

Results: Both underweight and obese adults experienced poorer physical component summary (PCS) compared to normal adults, while BMI was positively associated with mental component summary (MCS) (β=0.170, 95% Confidence Interval (CI) 0.014 to 0.326, p<0.05). A negative effect of %BF was observed on PCS (β=-0.150, 95%CI -0.287 to -0.014, p<0.05), whereas a positive effect of %LM was found on both PCS (β=0.155, 95%CI 0.021 to 0.288, p<0.05) and MCS (β=0.134, 95%CI 0.008 to 0.260, p<0.05). The central obesity indicators including AOI, %TF and %AF were all positively associated with both PCS and MCS, and the associations were stronger among overweight adults.

Conclusion: HRQL was associated with obesity, central obesity, fat and lean mass indicators among Chinese adults. Central obesity was positively associated with HRQL especially for overweight adults. Further research was warranted to understand the positive effect of central obesity on HRQL.
Who participates in Norwegian Healthy Life Centres (HLC) and does participation leads to changes in behavior change and health? An overview of results from studies on Norwegian HLC.

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Background
A Healthy Life Centre (HLC) is a municipal preventive health service that provides support for behavioral change, individually and group-based, primarily physical activity, diet and tobacco-cessation. The target group is those in increased risk for, or who have a disease and are in need of support for sustainable behavior change. "Guideline for municipal healthy life centers" describes recommendations for establishment, organization and content of the HLCs. There are no systematic reviews of studies on Norwegian HLC. This article provides an overview of results from studies on Norwegian HLC: Who are the users/participants of the HLC in Norway, what kind of results do they achieve and what are their experiences related to participation?

Method
The findings are based on searches in 14 Norwegian and international databases. Inclusion criteria were: Clear description of HLC in the summary as defined in the "Guidelines for municipal HLC", clear description of the study design and research question that answers any of our research questions. Twentyone Norwegian studies were included; seven prospective intervention studies, one cross-sectional study, one review, and eight qualitative studies.

Results
The average age of participants in HLC is 51 years. 61-80% are women. The most common reasons for referral are musculoskeletal disorders, obesity, physical inactivity and psychological distress. Mean BMI is 30 kg/m². Many of the participants (49-78%) are on sick leave or unemployed. The proportion of participants with low education corresponds with the normal distribution in the population. The participants achieve significantly increased physical activity, improved physical fitness, reduced weight and improved HRQOL after three months, and are followed up 1-3 years after participation. The social support they receive through the HLC is perceived to be of great importance to motivation for behavior change.

Conclusion
HLCs are used by the target group as described in "Guidelines for municipal HLC". The service seems to result in significantly increased physical activity, physical fitness and health related quality of life. Participants experience the social support they receive as an important motivator for behavior change. More research on the effects of participation in Norwegian HLCs is needed.
**P2.026**

**Improved insulin sensitivity and reduced insulin secretion in successful weight loss maintainers**

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**SIG:** Theories of motivation

**Awards:** Yes, for the Student Competition*

**Objective:** The aim of the study is to determine differences in the metabolic markers among successful weight loss maintainers and weight loss relapse individuals. Possible differences between these two groups, compared to phenotypically similar individuals with no weight loss history, may highlight specific physiological pathways responsible for weight loss relapse that may be attenuated by lifestyle or pharmacological interventions to prevent relapse. **Methods:** Women were recruited into 4 groups: reduced-overweight/obese subjects (RED, n=15) or BMI matched low-weight controls (LSW, n=19), and relapsed-overweight/obese subjects (REL, n=11) or BMI matched high-weight controls (OSW, n=11). A 2 hour oral glucose tolerance test was carried out. Dietary intake data was collected along with objective measures of components of energy expenditure including resting metabolic rate (RMR), sedentary, moderate and vigorous physical activity. **Results:** RED were significantly more insulin sensitive than all other groups (p < 0.000) while LSW were not significantly different to the overweight groups. Comparisons between the LSW and RED groups showed that RED had significantly lower fasting (p=0.001) and 2 hour insulin (p=0.003) levels. No differences were found in average total daily EI among the 4 groups. RED, OSW and REL ingested significantly less carbohydrates (% of total daily intake) (P<0.02) and ingested significantly more protein per kilogram compared to LSW. RED and were significantly less sedentary and did more moderate intensity exercise compared to controls. **Conclusion:** Successful weight reduced individuals demonstrate greater insulin sensitivity and reduced insulin secretion at 2 hours compared to all other groups. Weight loss itself appears to be a significant factor in improvements seen in insulin sensitivity. This may be due to behavioural differences which included differences in dietary intake as well as increased physical activity. The improved insulin sensitivity that accompanies weight loss may increase the risk for weight regain, highlighting the need for appropriate dietary and physical activity guidelines in the weight maintenance period following weight loss.
A Calling for Standardised Completion Criteria in Weight Management

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SIG: Policies and environments
Awards: Yes, for the Student Competition*

PURPOSE: The criteria for participant completion of a weight management programme (WMP) is arbitrary. Programme commissioners (WMP purchasers) will frequently establish the percentage of attendance that classifies programme completion (e.g. 70% attendance). Differential criteria for WMP completion make it impossible for researchers, practitioners and policy makers to conclude what constitutes an effective programme and what factors predict WMP completion. This study exemplifies the impact of variable completion status on 1) BMI reduction, 2) volume of completers and 3) predictors of completion.

METHODS: Secondary data was obtained from MoreLife - a UK-based, community WMP for children (aged 4-17 years). 2948 children attended between 2009-2014 (Age 10.4±2.8 years, BMI 26.0±5.7kg/m², Standardised BMI (BMI SDS) 2.48±0.87 units, White 70.3%). Separate analyses were conducted for research aims 1-2, and aim 3. Programme completion was adjusted incrementally by 10% (i.e. 10%, 20% attendance etc...) for research aims 1-2. The volume of programme completers and change in BMI SDS was calculated at each increment of the completion criteria (0-100%). For aim 3, programme completion was defined using five classifications from previous WMP studies (e.g. 50% sessions attended). Multivariable logistic regression determined participant and programme variables predictive of programme completion. Percentage difference between the odds ratio of the original model (completion = 70% attendance) and the four subsequent models was calculated.

RESULTS: The volume of participants completing the programme decreased in a linear manner (r = -0.99, p = 0.00) when completion classification became more stringent (i.e. 70-100% attendance). Conversely, the change in BMI SDS became incrementally greater (r = 0.98, p = 0.00). Predictors of completion varied by up to 24.2% in certain variables (e.g. Programme Intake Period) when using five different completion classifications. Statistical significance of the predictor variables were reliant on completion classification (e.g. WMP Group Size was significant in two of five models).

CONCLUSIONS: The volume of completers and change in BMI SDS were strongly associated with programme completion classification. Poor programme outcomes (e.g. minimal change in BMI SDS) can be masked by (un)demanding completion criteria. Moreover, completion criteria mediates participant and programme characteristics predictive of programme completion. Standardised completion criteria are called for.
Does exposure to food advertising in the media promote overconsumption? The moderating role of parental guidance and regulatory focus on food restraint

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SIG: Theories of motivation

Awards: Yes, for the Early Career Award**

Purpose: As populations are constantly exposed to food advertising in the media, more research is needed to understand how individuals can be motivated to exercise food restraint and resist overconsumption which leads to weight gain. Inoculation Theory (Pfau, 1992) suggests that parental guidance of child media exposure may boost immunity against future exposure to food advertisements. However, there remains a lack of understanding of how parental guidance can influence children's food consumption patterns in a longitudinally manner as they grow into adulthood especially when interacting with the individuals' self-regulation and motivation to attain their goals. Applying the regulatory focus theory (Higgins, 1997) which proposes that individuals are motivated to pursue goals in a manner that sustains their regulatory orientation (promotion-focus or prevention-focus), this study examines the role of parental guidance and regulatory focus in moderating the effects of media exposure on food restraint.

Method: A total of 638 students from a pre-university institution in Singapore completed the survey which measured regulatory focus, media consumption per week, parental guidance and food restraint. Two moderation analyses using IBM SPSS with PROCESS macro were conducted to test two three-way interaction models.

Results: Results revealed that retroactive parental guiding strategies influence adult food restraint that is dependent on an individual’s regulatory focus. Significant three-way interaction effects (b = .004, p = .011) were found for the first model (promotion-focus) but not for the second model (prevention-focus) indicating that the effects of media consumption on food restraint were moderated by parental guidance and promotion-focus orientation. Further probing of the interaction revealed that the conditional effects of media consumption on food restraint were significant at the mean (b = .006, p = .001) and one standard deviation above the mean (b = .011, p = .001) but non-significant at one standard deviation below the mean (b = .002, p = .444) indicating that higher levels of parental guidance were positively associated with greater food restraint.

Conclusion: Findings suggest that parental guidance is important for young adults with moderate or high promotion-focus orientation. Implications on the importance of guiding children's early food consumption patterns are discussed.
A single-blind, pilot randomised controlled trial of a multi-component weight management intervention for adults with intellectual disabilities and obesity.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: The prevalence of obesity in adults with intellectual disabilities (ID) is consistently reported to be higher than the general population. However, there is little evidence of the effectiveness of weight management interventions for adults with ID and obesity. TAKE 5 is a multi-component weight management intervention (MCWMI) that satisfies clinical guidelines for weight management interventions: an energy deficit diet of 2510 kJ (600 kcal) per day, and behaviour change techniques to support dietary change and increase physical activity levels. TAKE 5 was specifically designed for adults with ID and obesity for use with support from carers wherever possible. The purpose of this study was to determine the feasibility of conducting a full-scale clinical trial of the TAKE 5 MCWMI in comparison with an active comparator intervention.

Methods: This study was designed as a pilot randomised control trial. Adults with ID and obesity were randomly allocated to TAKE 5 or usual care (a health education intervention, Waist Winners Too). Both interventions were manualised, equal in intensity and contact time and delivered by two trained researchers. Patient centred outcomes; body weight, BMI, waist circumference and levels of physical activity, sedentary behaviour and well-being were measured at three time points: baseline, six months (after a weight loss phase) and twelve months (after a six month weight maintenance phase). The researcher collecting outcome measures was blind to the group allocation.

Results: Fifty adults with ID and obesity (Mean BMI: 40.7 SD 7.4 kg/m²) were recruited to the study through a multi-point recruitment strategy, which involved primary health care services, specialist ID services, and care provider organisations. This strategy was shown to be feasible and effective. Retention rates were high across both interventions, with 45 participants (90%) completing the study. The patient centred outcomes measures were also reported to be acceptable to adults with ID.

Conclusion: This study demonstrated the feasibility of conducting a randomised trial of a MCWMI and adds to the limited evidence base of weight management interventions for this population group. The study provides a framework for the development of a full-scale trial to determine the efficacy of the intervention.
Psychosocial Interventions in the Management of Severe Adolescent Obesity

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SIG: Children and families

Awards: No

PURPOSE: Psychosocial Interventions (PSI) are commonly utilised in mental health management, and to our knowledge, have not been explicitly used in weight management. PSI are characterised by three distinct phases: 1) an initial in-depth assessment; 2) an intensive group intervention to stabilise the condition (in this instance weight gain); and 3) an intensive group maintenance programme. PSI focus on the psychosocial elements of obesity, including: stress management, body dysmorphia and self-esteem. As such, the PSI approach is more holistic than traditional weight management approaches. This paper evaluated the outcomes of a PSI when delivered under service level conditions.

METHODS: SHINE (Self-Help, Independence, Nutrition, and Exercise) is a community-based weight management programme that implements a PSI approach. The programme is located in Sheffield, UK. Adolescents (n = 393) with severe obesity signed onto the programme between 2011 and 2013. The programme spans 12-15 months and participants attend three phases of the PSI. Phase One is undertaken before the programme, Phase Two is a 12-week intervention and Phase Three is split into three 12-week maintenance interventions. Anthropometric measurements (BMI and WC) were collected at baseline, 3-, 6-, 9- and 12-months. Psychosocial measures (self-esteem, anxiety and depression) were collected at baseline and 3-months. Participant retention was also assessed.

RESULTS: 304 participants started the programme and 289 were retained at 3 months. At 3 months BMI z-score reduced by 0.21 (95% CI: 0.19, 0.24) and WC by 7.8cm (95% CI: 7.2, 8.5). Almost 25% of participants reduced their BMI classification (e.g. severely obese to obese). Anxiety and self-esteem improved by 63% and 50% respectively. 89 participants continued to attend the programme after 12 months, obtaining a BMI z-score reduction of 0.46 (95% CI: 0.35, 0.58) and a WC reduction of 10.5cm (95% CI: 7.8, 13.1).

CONCLUSIONS: Obesity is a highly complex condition to manage and requires intensive and prolonged support to produce meaningful and lasting behavioural and anthropometric changes. The SHINE PSI approach has shown promise and demonstrated encouraging results - suggesting that it may be beneficial for interventions to consider wider determinants of health and wellbeing beyond simply diet and physical activity.
Impact of 12 weeks supervised exercise on post meal satiety and within meal satiation

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose The effect of prolonged exercise on body weight is variable; some people lose weight but others do not. Exercise exerts a number of physiological and psychological effects on the appetite control system which could influence eating behaviour. This study examined the impact of 12 weeks supervised exercise on two aspects of appetite control; postprandial effects of food (hunger and satiety) and meal size (satiation).

Methods Forty-five overweight/obese males (n=15, BMI=31.4±5.2kg·m², age=42.1±7.9years) and pre-menopausal females (n=30, 31.2±3.5kg·m², age=41.2±10.0years) were recruited onto the study. 30 individuals completed a 12 week exercise program and 15 individuals completed 12 weeks of no exercise (NEx). The exercisers were classified as Responders (N=15) or Non-Responders (N=14) depending on observed compared to expected body composition changes from measured energy expenditure from exercise. All measurements were taken at week 0 and week 12. Appetite control was examined using separate validated procedures to assess satiety and satiation using a test meal paradigm. A fixed energy breakfast was provided and satiety was measured using appetite ratings adjusted for energy intake to calculate the satiety quotient (SQ). Satiation was assessed from ad libitum energy intake at the dinner meal.

Results The satiating effect of the fixed energy and weight breakfast was significantly increased over the 12 week exercise period, for both R and NR whereas there was no significant change in NEx. The exercise also significantly improved satiation demonstrated by a reduction in meal size over the 12 weeks \( (F_{(1, 41)}=5.0, p=0.031) \). There was no week*group interaction however, post hoc t-tests demonstrated that there was a trend for R to decrease their meal size over the 12 week period \( (F_{(1, 14)}=4.5, p=0.053) \), that was not seen in NR \( (F_{(1, 14)}=2.2, p=0.163) \) or NEx \( (F_{(1, 14)}=0.075, p=0.788) \).

Conclusions These data indicate the exercise exerts effects on different processes of appetite control; orexigenic drive to eat, satiety and satiation. These processes do not operate at the same strength in all individuals. The strength of these effects may determine the body composition response to exercise.
Energy-balance related behaviors, nutrition and obesity prevention in Chinese schoolchildren

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SIG: Policies and environments

Awards: No

Background: Energy-balance related behaviors in Chinese children are not well-defined and intervention model is yet established.

Purpose: to identify modifiable risk factors of energy-balance related behaviors in Chinese schoolchildren, and to test the effects of a school-based 5-1-1-0 behavior change intervention model for weight control.

Study/Intervention Design: we used a cross-sectional study and a six-month school-based parallel controlled trial in the study during 2012 and 2013.

Methods:

1) a cross-sectional study: we designed a structured questionnaire for collecting information relating energy-balance related behaviors and their underlying personal, psychosocial and environmental factors, children's confidence and readiness for behavior change in 7200 Chinese 6-18-year children in three provinces.

2) a parallel controlled trial: we designed and tested a set of 5-1-1-0 intervention message in a six-month parallel controlled trial. The average age of the 193 recruited overweight children (62.2% were boys, BMI (kg/m²): 24.2 ±3.7) were 11.1 (±2.2) years. Nutrition and physical activity intervention components with a 5-1-1-0 message (take five servings of fruits and vegetables, take at least one hour of intensive PA, decrease screen time to one hour or less, and limiting sugar drinks per day) were combined with behavior change theories. A handout was provided for behavior monitoring, and school teachers implemented intervention activities to children (3.0 hrs) and parents (1.0-2.0 hrs) in the intervention schools. The control schools were provided intervention components six-month later.

Results: Risk factors for healthy eating (big portion size, inadequate intake of fruits, vegetables, milk, and nuts, as well as breakfast skipping and eating out), insufficient physical activity (23.8% met the recommendation), and longer sedentary time were identified as main risks for child overweight and obesity. Most overweight and obese children were with positive attitudes towards weight control (61%-92%), whereas they were with less knowledge (20.1%-46.6%) and behaviors (11.3%-33.7%) relating healthy lifestyles. The intervention reduced BMI increase by 0.8kg/m² in overweight children, and increased knowledge, attitude, and behaviors towards healthy eating and physical activity six months later.

Conclusion: 5-1-1-0 message is effective in weight control in Chinese overweight children. Professional direction and supportive environment regarding healthy weight are urgently needed.
**P2.033**

**Evaluation of a multidisciplinary after-school group-based intervention to improve weight status in overweight children living in deprived neighbourhoods**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** No

**Objective:** The intervention, called "WIJS" (Dutch for "What is Your Style"), is an after-school group-based programme aimed at overweight children aged 8-12 years, living in deprived neighbourhoods. During the school year, participants follow group sessions of 90-minutes including activity-based exercise, dietary education, and lifestyle counselling. This study evaluated the outcome of the programme on weight status in participants during the 2011-2012 and 2014-2015 school year.

**Methods:** In 2011-2012 body height and weight were measured with standardized protocols at baseline (T0), at the end of the programme (T1) and at follow-up (T2), 6 months later. BMI standard deviation scores (BMI-SDS) were calculated using age- and sex-specific criteria. Two intervention groups were enrolled in the programme: group I at the start (n=72) and group II (n=98) halfway through the 2011-2012 school year. Measurements were also conducted in 61 matched controls (with group II). Measurements (T0 and T1) were repeated in the 2014-2015 school year in a new group of participants (n=65) and controls (n=70).

**Results:** BMI-SDS in group I at T0, T1 and T2 were 1.91, 1.82, and 1.92, respectively. BMI-SDS in group II at T0, T1 and T2 were 1.72, 1.64, and 1.66. BMI-SDS in the control group at T0, T1 and T2 were 1.44, 1.50, and 1.54. Within group analysis showed that participants in group I and group II achieved a BMI-SDS reduction at T1 (p<0.05). The weight status in group I relapsed at T2 (p<0.001). For the intervention group II compared to controls, participants showed improved weight status at T1 (p<0.05) and T2 (p<0.05). The evaluation study in 2014-2015 showed similar results on weight status. Participants had an improved weight status compared to controls at T1.

**Conclusions:** Weight status in overweight children can be improved following a multidisciplinary after-school group-based intervention. However, this improvement does not seem to be sustainable because at follow-up participants were not able to maintain their weight and relapsed. The WIJS programme may focus on including extra programme activities concerning weight management in order to prolong the short-term effects of the intervention.
**P2.034**

The cross-sectional and longitudinal associations of well-being with sleep duration and sleep quality in European children and adolescents

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** No

**Purpose**

Poor well-being and poor sleep (short sleep duration, poor sleep quality) have both been linked to obesity. The aim of this study was to explore the cross-sectional and bi-directional associations of well-being with sleep in order to gain more insight in pathways potentially leading to obesity.

**Methods**

We analysed parent- and self-reported data of 3.0- to 15.9-year-old children from 8 European countries participating in the first (T1) and second (T3) follow-up examinations of the IDEFICS/I.Family cohort. The cross-sectional analysis included 6,137 children participating at T3 (2013/14). The longitudinal analysis included 3,316 children who also participated at T1 (2009/10). A well-being score was calculated using 16 items of the KINDL questionnaire covering emotional well-being, self-esteem and family/friends (range: 0-48 points). Nocturnal sleep duration was age-standardised. Sleep quality parameters included perceived sleep quality, difficulties falling asleep and trouble getting up in the morning. Mixed-effects models were estimated to assess the associations between well-being and sleep accounting for the clustered study design. All models were adjusted for relevant confounders.

**Results**

Cross-sectionally, well-being was positively associated with sleep duration. For every five-point-increase in well-being score there was a 0.051 (95%CI 0.027-0.074) unit increase in sleep duration z-score; e.g. a child with a well-being score of 45 slept on average 10 to 15 minutes longer than a child with a score of 20. Higher well-being was also associated with a lower odds of perceived bad sleep quality (OR=0.55, 95%CI 0.50-0.61), having trouble getting up in the morning (0.69, 0.65-0.73) and having difficulties falling asleep (0.65, 0.61-0.70).

Longitudinally, positive changes in well-being score between T1 and T3 were associated with increased sleep duration at T3 and vice versa (positive changes in sleep duration z-score were associated with increased well-being). However, well-being status (good vs. poor) at T1 did not predict sleep duration status (normal/long vs. short) at T3 and vice versa.

**Conclusions**

Our results indicate that sleep and well-being are associated and that positive changes in one factor over time are associated with a more favourable outcome in the other factor later on.
P2.036

The implementation of a community-based lifestyle intervention program for adults with type 2 diabetes mellitus in a low socio-economic community.

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SIG: Socio-economic inequalities
Awards: Yes, for the Student Competition*

Objective: The prevalence of type 2 diabetes mellitus (T2DM) in South African communities with low socio-economic status (SES) is alarmingly high, and a need for a comprehensive and sustainable intervention is evident. The purpose of this study was to examine whether a 10-week comprehensive lifestyle intervention program, which included exercise, dietary advice and psychological support could affect changes in health-related outcome measures in a low SES community.

Methods: Forty-three participants completed the study (age 59.5 ± 12.2 years, 25 women; 18 men); 23 comprised the experimental group (EXP) and 20 comprised the control group (CON). The CON participated in two pre-testing (PreT) and one post-testing session (Post), while EXP participated in an additional retention testing session. Outcome measures were body fat percentage (BF%), random blood glucose (BGlc), total serum cholesterol (TSC), glycated haemoglobin (HbA1c), systolic blood pressure (SBP) diastolic blood pressure (DBP) and the distance walked during the six-minute walk test (6MWT). A repeated measures ANOVA, with Bonferroni post-hoc test, was used in the statistical analyses.

Results: While there was no change in BF% in CON, the EXP decreased their BF% by 3.4 % (p < 0.001). The difference in BGlc between CON and EXP was statistically significant (20.0 %; p = 0.03), although the decrease in BGlc seen in EXP was not (p > 0.05), despite being clinically significant (14.21 mmol.L⁻¹ vs 12.39 mmol.L⁻¹). TSC did not change significantly over time in either of the two groups, although the differences between CON and EXP at PreT and Post were statistically significant (p = 0.02; p < 0.001). HbA1c decreased significantly in EXP (0.53 %; p = 0.01) and the 1.38 % difference between the two groups at Post was statistically significant (p = 0.03) There were no statistically significant changes in SBP or DBP within the groups over time, however, there was a statistically significant difference between CON and EXP at post-testing (4.2 mmHg; p = 0.04). 6MWT distance improved significantly in EXP (54.4 m; p < 0.001).

Conclusions: A 10-week comprehensive lifestyle intervention is sufficient to cause favourable changes in T2DM related parameters in a low SES community.
P2.037

To explore the relationship between Eating Behaviours and Diet Quality (DQ) and to examine if this relationship is modified by Physical Activity (PA).

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Objective: Poor diet quality (DQ) and a lack of physical activity (PA) increase the prevalence of diet related diseases like obesity, type II diabetes, and hypertension. Ambiguity exists regarding the relationship between eating behaviours and DQ and as to whether the relationship between eating behaviours and DQ is modified by physical activity. Therefore the aim of this research was to investigate the relationship between eating behaviours and DQ and to measure if this relationship is modified by physical activity.

Method: Cross-sectional baseline data were obtained from the Food Choice at Work Study, a complex workplace dietary intervention trial. Participants included 657 randomly selected employees (18-64 years) from four multinational manufacturing workplaces in Ireland, 2013. Food Frequency Questionnaires (FFQ) measured diet quality from which a DASH (Dietary Approaches to Stop Hypertension) score was constructed. The International Physical Activity Questionnaire (IPAQ) measured physical activity. The Dutch Eating Behaviour Questionnaire (DEBQ) was used to define restrained and un-restrained eaters. Univariate analysis were conducted to investigate the relationship between eating behaviours and PA, and measure if physical activity modified this relationship.

Results: Restrained eaters had a better DQ than un-restrained eaters (p=0.043). Restrained eaters were also more compliant with recommendations for low fat dairy products (0.000) than unrestrained eaters when adjusting for age, gender and energy intake. The relationship between eating behaviours and DQ was not modified by physical activity.

Conclusion: Restrained eaters had a better diet quality than unrestrained eaters and physical activity did not modify this relationship. However more research is required to explore what potential factors may modify the relationship between eating behaviours and DQ, using larger populations.
Eating rate is positively related to adiposity in adults and children independently of birth order, sibling number, reward sensitivity and FTO rs9939609 polymorphism

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose:

Eating rate has been linked to adiposity in adults and children, but its determinants are not clear. Possible factors may include reward sensitive traits, genetic predispositions and sibling competition. Using data from a large sample of visitors to the Science Museum, London, we tested the hypotheses that faster eating rate would be associated with greater adiposity as well as higher birth order and sibling number in adults and children, and explored whether this was influenced by reward sensitivity or FTO genotype.

Methods:

Adult (18–85; max. n: 324 women, 241 men) and child ((7–17 years old: max. n: 144 girls, 112 boys) visitors to the Science Museum, London, volunteered to take part in a brief study entitled “How much do you like to eat?”. Participants measured their height, weight and waist (WHO method) under supervision, gave buccal cell swab samples for genotyping (FTO rs9939609), and completed computer-based surveys and tasks. The surveys included self-reported eating rate (5-point scale: very slow to very fast), the Behavioural Activation Scale measuring reward sensitivity (subscales: drive, fun seeking, reward responsiveness), number of siblings and birth order. For children, BMI was converted to zBMI scores adjusted for age and sex (LMS Growth v2.77).

Results:

Higher eating rate was associated with higher BMI and larger waist in adults (age adjusted waist r=0.09, p<0.05; BMI r=0.11, p<0.01) and children (age adjusted waist r=0.20, p=0.001; zBMI r=0.19, p<0.01). Mean (SD) BMI was 25.6 (5.1) for adults, and 0.41 (1.04) for zBMI in children. Having the obesity-linked FTO ‘A’ allele was associated with greater BMI (p<0.01) and waist (p<0.05) in adults but not in children, but was unrelated to eating rate. Males reported faster eating than females (3.45 vs. 3.13, p<0.001). Children with siblings reported faster eating than those without (3.32 vs. 2.87, p<0.001), but did not differ in adiposity. Reward sensitivity measures and birth order were unrelated to eating rate or adiposity.

Conclusions:

We replicated the finding that eating rate is linked to adiposity; moreover, our findings exclude several possible explanations because this association was not influenced by having siblings, FTO genotype or reward sensitivity in our sample.
Comparisons of dietary intakes of Canadian Armed Forces field rations in simulated hot, cold, and temperate temperatures with strenuous physical activities.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objective: Dietary Reference Intakes (DRIs) designed for the healthy Canadian adult population, are used to guide the energy content of Canadian Armed Forces (CAF) field rations. High-energy expenditures are expected during field operations, particularly those involving ambient temperatures extremes, but there is no related empirical basis for an increase to the energy content of rations under such conditions. The objective of this study was to assess energy and nutrient intakes of CAF field rations during simulations of standardized strenuous military activities in varying environmental temperatures.

Methods: Dietary intake of 18 participants, all CAF members (mean age 33 y) was assessed with a 3-day weighed food record under six different conditions: 1) at home consuming usual diets, 2) at home consuming field rations, 3) and ration consumption during a sedentary lab trial (21°C) and during 8h of range of operational-like physical activities (light to strenuous) in a chamber controlled at 4) hot (+30°C), 5) cold (-10°C), and 6) temperate (21°C). The DRI cut-point method was used to determine nutrient adequacy. Repeated measures ANOVA were used to analyze the differences in intakes.

Results: Average energy intake with total energy from carbohydrates, fat and protein were as follows: 1) at home diet --- 2657+580kcal/day, 45% 34%, 19%; 2) field rations at home --- 2674+788kcal/day, 60%, 27%, 14% and; 3) ration intake during simulated treatments --- 1970+640kcal/8hours, 59%, 28%, 13%. Nutrient intake did not differ among temperatures or activity level. Water intake was significantly different: sedentary< cold< temperate< hot (p<0.05). Participants consumed 50% of energy content of rations (total 2800kcal) during the lab trials. From ration consumption, the mean sodium intake was 3145+1388mg/d (higher than DRI upper limit (2300mg/d)) and potassium intake was 212+167mg/d (lower than DRI recommendation (4700mg/d)).

Conclusions: The participants' energy consumption from field rations was similar to the energy content consumed from their home diet, even with the challenge of increased energy expenditure and temperature stress in the simulated field conditions. These participants’ sodium and potassium intake from rations consumption differs from DRI recommendations, which may warrant further investigation in light of the established links to a variety of health outcomes.
Higher BMI, Less Exercise, but Healthier Eating in Married Adults: Evidence from Nine Representative Surveys Across Europe

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SIG: Children and families

Awards: No

Numerous studies show that married individuals enjoy better health than those who were never married. This representative survey examines whether they also have a healthier body mass index (BMI) and weight-related behaviors, and tests four independent explanations. Face-to-face interviews were conducted with representative samples (N = 4,555) from nine European countries (Austria, France, Germany, Italy, the Netherlands, Poland, Russia, Spain, UK). On average, never married respondents had a lower BMI than married respondents (p = .001). The latter paid more attention to dietary fat and body weight, and less attention to dietary convenience. However, they also exercised less (all ps < .001). Despite these behavioral differences, only attention to dietary fat and body weight (p = .003) and preference for regional/unprocessed foods (p = .018) predicted BMI differently for married versus never married respondents. There were few country differences in the relationship between marital status and BMI. All analyses were controlled for age and socio-economic status. In conclusion, despite more favorable eating-related cognitions and behaviors, married respondents had a higher BMI than never married respondents. The link between marital status and BMI cannot be fully described by one single explanation. Obesity interventions may benefit from considering specific weight-related behaviors in married versus never married individuals.
The beliefs of primary school educators in the Cape Metropole regarding physical activity, fruit, vegetable, sugar and fat intake

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SIG: Theories of motivation

Awards: No

PURPOSE: To investigate the most common beliefs (behavioural, normative and control) which influence physical activity as well as fruit, vegetables, fat and sugar intake amongst educators in the Cape Metropole. A secondary aim was to determine any associations between common beliefs and the sociodemographic characteristics of the educators.

METHODS: The study was cross-sectional in design. Primary schools were included by convenience sampling. The theory of planned behaviour determined the common beliefs. A questionnaire determined the beliefs of educators regarding fat, sugar, fruit, vegetables, and physical activity. The questionnaire comprised of socio-demographic questions (age, race and standard of living(SL)). The SL was defined using the Living Standards Measure (LSM) with a scale 1-10 (highest). The belief section of the questionnaire included statements related to fruits & vegetables, fat, sugar and physical activity. The beliefs addressed behavioural (“Eating fruits and vegetables every day will make me feel better physically.”), normative (“Most people who are important to me eat fruits and vegetables every day.”) and control (“Fruits and vegetables are easy to find in stores nearby.”) beliefs for each category. A likert scale scored the beliefs, into three categories (agree, disagree & neutral). Frequencies determined the most common beliefs scored 1-5.

RESULTS: Six schools and 79 participants were included in the study. The majority of the sample were obese (55%), female (81%) had a tertiary education (88%) and were of black or coloured ethnicity (93%). LSM index and fat were significantly associated (p=0.00; I have no choice about / control over the fat content in the foods I eat) as well as the physical activity belief statement (p=0.01; I am confident that I can increase my levels of physical activity). The strongest and weakest scoring items were all positive beliefs e.g. “being physically fit is important to me”, most educators agreed with this statement (mean = 4.256).

CONCLUSION:

The beliefs of educators regarding physical activity and fruit, vegetable, fat and sugar intake were identified and associations between beliefs were significantly linked to sociodemographic factors, the results cannot be generalized and warrants further investigation with a more diverse and larger sample.
Effectiveness of culturally tailored lifestyle interventions for prevention of type 2 diabetes in Hispanics: A systematic review.

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition *

Objective. Prevalence of type 2 diabetes has risen markedly in recent decades. Hispanics in the U.S. exhibit higher prevalence of diabetes compared to their non-minority counterparts and have poorer glucose control, more diabetes complications, and increased mortality once diagnosed. Cultural adaptations to traditional lifestyle interventions (e.g., interventions that target diet/nutrition and physical activity levels) have been recommended to better reach this high-risk population. This systematic review examines the hypothesis that tailored diabetes prevention programs for Hispanics have been effective in lowering risk for type 2 diabetes, as evidenced by reduction in weight or hemoglobin A1c (HbA1c), an indicator of glucose regulation.

Methods. We searched PubMed/Medline, CENTRAL, Web of Science, and PsychInfo for all studies from database inception to October 2015 that evaluated lifestyle change based diabetes prevention trials tailored for Hispanic populations. The review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines.

Results. Twelve publications met criteria for inclusion in the review. Interventions varied greatly in structure, rigor, approach, and tailoring strategies. Six out of twelve studies were randomized controlled trials, seven targeted low-income participants, and four recruited women only. Eleven studies (91.7%) reported significant reductions in weight and/or HbA1c post-intervention. Common tailoring strategies employed in at least nine studies were Spanish language delivery, inclusion of Hispanic food/recipe recommendations, peer-educator or promotora-led intervention, community input in content or design, and delivery in a community setting. A smaller number of studies addressed culturally based diabetes beliefs or knowledge (four studies) and modified intervention materials for appropriate literacy level (six studies). Interventions utilizing a community-based participatory research (CBPR) approach and those with more tailored components overall resulted in greater reductions in weight and HbA1c. Intervention effect sizes were small to moderate, quality of evidence was moderate, and attrition was high in most studies.

Conclusions. Culturally tailored lifestyle interventions for diabetes prevention appear to be moderately effective in reducing risk for diabetes in Hispanics. More rigorous studies are needed which utilize randomized controlled designs, report intervention content and tailoring strategies systematically, and publish participant evaluation and feedback.
Evaluation of Teen Cuisine- a cooking based program for teens

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SIG: Children and families

Awards: Yes, for the Student Competition*

Over the past 10 years, Virginia Cooperative Extension has developed and delivered numerous childhood obesity prevention programs across the state of Virginia, including Food Friends TM and Healthy Weights for Healthy Kids, focusing on early childhood ages. However, 4-H and Family and Consumer Science (FCS) Extension Agents expressed a need for a program targeting tweens and teens that also focused on cooking skills and healthy eating. A national search was conducted to identify possible evidence-based curriculum for use in Cooperative Extension, however none were found. As a result, Teen Cuisine was created. It is a skilled and cooking-based curriculum that focuses on obesity prevention, food preparation, and kitchen safety. The program contains six 90-minute lessons, which can be incorporated into middle and high school classes. To examine the impacts of the program on participants’ behaviors, a retrospective pre/post-test was administered to students who completed the program. The evaluation was based upon the 4-H Common Measures Evaluation Instrument for healthy eating programs and assessed food, dietary, and physical activity behaviors. Additional questions were added to assess gains in food preparation, and cooking skills, and food safety. Seventy-two percent of students reported consuming more fruits and vegetables, 73.0% drank fewer soft drinks, and 76.4% made food choices based on what their body needs. Fifty-three percent agreed they watched less television, and 74.2% spent less time playing video games, and used the computer less in their free time. Ninety-one percent washed their hands before cooking to prevent the spread of cross contamination, and food-borne illnesses. Overall, Teen Cuisine was found to be effective in promoting curriculum specific healthy behaviors among teens.
P2.066

Nagging for Fresh Fruits and Vegetables: Leveraging a school fruit and vegetable snack program to increase demand for fruits and vegetables at home and at the store

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SIG: Early care and education

Awards: No

Purpose: Despite strong evidence supporting the benefits of fruits and vegetables (FV), consumption among elementary school age children remains low. Several school-based programs are underway to remedy this situation. While these programs are associated with increased preference for, and consumption of, FV at school, their impact on home and retail food environments is not known. We assessed if students' participation in the Fresh Fruit and Vegetable Program (FFVP), a federal FV snack program targeting US elementary schools with the highest proportions of low-income students, was associated with students asking parents for more FV at home and at grocery stores.

Methods: Using a cross-sectional study design, data were collected from 4th graders (n=296) attending matched FFVP (n=3) and non-FFVP (n=3) schools in early 2015. Validated survey questions were used to measure student FV preferences, self-efficacy, consumption, and requests for purchasing FV at the grocery stores. Poisson mixed effects regression models were used to model associations between FFVP participation and count outcomes, controlling for child's age and gender, yielding adjusted group means for children from FFVP and non-FFVP schools.

Results: Almost all students in the sample (90-100%) were eligible for free and reduced price school meals; 82-97% were non-white; and girls and boys were equally represented. Compared to students in non-FFVP schools, FFVP students reported requests for more fruits (2.94 vs 2.30, p<.01) and vegetables (2.01 vs 0.78, p<.001) at the store during last visit; no differences were observed for non-healthy snacks (2.06 vs 1.90, p=0.512). FFVP students reported higher self-efficacy to ask for FV at home and during shopping (p<.05), as well as a higher preference for FV (p<.01). No differences were observed for non-healthy snacks. Students in FFVP schools reported consuming vegetables 1 time more and fruit a half time more on the previous day than non-FFVP students.

Conclusion: This study is the first to show that school food programs can increase student demand for FV at home and at the store, thus creating a "nag factor" often associated with unhealthy food purchases. These findings support interventions that leverage increased demand to improve sales and consumption of FV in low-income communities.
P2.067

**Associations of Parental Self-Efficacy with Dietary Intakes in Swedish Preschoolers: Results from the MINISTOP Trial (2014-2015)**

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**SIG:** Children and families

**Awards:** No

**Purpose:** High parental self-efficacy (PSE) is a prerequisite for changing behaviours including consumption of healthy diets in children. The current study uniquely utilizes a newly developed, smartphone technology-assisted methodology to assess dietary attributes during early childhood, an opportune period of intervention for future excess adiposity. The main objective of the study is to investigate the associations of PSE with measures of dietary intakes in preschoolers.

**Methods:** MINISTOP is a randomized controlled trial enrolling parents of 301 healthy Swedish children, with a mean age of 4.48±0.15 to participate in a 6-month mHealth intervention to prevent childhood obesity. This study includes baseline data on self-reported PSE using the Parental Self-Efficacy for Promoting Healthy Physical Activity and Dietary Behaviors in Children Scale (PSEPAD) questionnaire, and diet data using the newly developed Tool for Energy balance in Children (TECH). Multiple linear regression analyses were conducted to evaluate cross-sectional associations of the outcomes in relation to total PSE factor scores and scores computed for the three PSE factors, namely: 1) diet 2) limit setting of unhealthful behaviors and 3) physical activity.

**Results:** The average intake of fruits and vegetables was 110±78 g/d and 59±43 g/d. Increased PSE was significantly and positively associated with fruit, but not vegetable, consumption for total PSE factor score in the unadjusted (standardized β=0.18, p=0.002) model and after adjusting for parental BMI and education, respondent, and child’s sex and age (β=0.15, p=0.010). When evaluated separately by the three PSE factors, the associations were particularly pronounced for PSE factor 1 before adjustment (β=0.19, p=0.001) and after adjustment of covariates (β=0.17, p=0.006) and the PSE factor 2 (unadjusted: β=0.13, p=0.023; adjusted: β=0.11, p=0.065).

**Conclusions:** We observed significant associations between PSE and fruit intake, a marker of healthy eating in children. Consistent with previous literature, our study confirms that high PSE is an important factor for promoting healthy behaviors, particularly diet. The current study has implications about potential strategies to empower parents to make diet modifications for their children, which could serve as a component of a multi-faceted approach to modify risk of obesity and future chronic diseases.
Does Weight Status Make a Difference in Child Feeding Practices and Child Eating Styles?

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Objective: This study examined maternal feeding practices and mother and child eating style difference by maternal BMI and child BMI percentile for age categories.

Methods: A nationally representative sample of 550 mothers of preschoolers completed an online survey assessing maternal feeding practices and maternal and child eating style. All questionnaires were 5-point Likert scales (5=highest score), adapted from valid, reliable instruments. One-way ANOVA and Tukey post-hoc procedures assessed differences in practices and styles across BMI categories. Pearson correlations assessed associations among variables.

Results: Mothers (n=550) were 72% white and 37% had a baccalaureate degree or higher. Categorizing mothers by weight status indicated that 26%, 23%, 21%, and 30%, were underweight/low-normal weight (BMI<22.5), high-normal weight (BMI>22.5 to <25), overweight (BMI >25 to <30), or obese (BMI>30), respectively. Children (n=467) were aged 3.47±1.09SD years. A total of 9%, 11%, 32%, 11%, 13%, 32% children’s weights were underweight (<5th BMI percentile for age), low-normal (>5th and 25th), middle-normal (>25th to 74th), high-normal (>75th to 84th), overweight (>85th to 94th), or obese (>95th), respectively. No differences occurred across maternal weight categories and use of these child feeding practices: restriction, pressure to eat, or bribing to eat with food rewards. Obese mothers tended to be less likely to model healthy eating and less accepting of food waste than other mothers. However, mothers whose children were obese were more accepting of food waste and their children tended to have the highest eating self-regulation score. Children of obese mothers had the highest mean food neophobia score. Higher maternal BMI category was significantly correlated with more disinhibited, emotional eating, dietary restraint, and having children with more food neophobia. Maternal BMI was negatively correlated with more healthy eating modeling, lower acceptance of food waste, and bribing to eat with food rewards. Child BMI was positively correlated with maternal use of restriction and higher acceptance of food waste. Child BMI categories were negatively correlated with more maternal disinhibited eating and emotional eating.

Conclusion: Both mother's intrapersonal and interpersonal characteristics significantly affect their child's eating styles and BMI. Children's characteristics also reciprocally are associated with their mother's feeding practices.
Maternal and infant correlates of maternal feeding beliefs and practices in a multi-ethnic Asian population: The GUSTO study

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SIG: Early care and education

Awards: Yes, for the Early Career Award**

Purpose: Little is known about the influences of maternal and infant correlates on maternal feeding beliefs and practices in the first two years of life, despite its important role in early obesogenic eating behaviors and weight gain.

Methods: Demographic data of 1237 mothers and infants from the Singapore GUSTO mother-offspring birth cohort was obtained at 26 to 28 weeks gestation, and postnatally from birth to 15 months respectively. The Infant Feeding Questionnaire was administered at 15 months postpartum. The associations between maternal and infant correlates with seven maternal feeding beliefs and practices subscales were evaluated using multivariate linear regression analysis.

Results: Amongst other maternal correlates such as age, education, BMI, income and infant milk feeding practices, ethnicity was a key consistent factor associated with 6 subscales, including concern about infant overeating/undereating and weight status, concern and awareness about infants’ hunger and satiety cues social interaction during feeding and feeding an infant on schedule. Similarly, amongst other infant correlates such a gender and parity, infant body size gain (reflected by BMI z-score change from 0 to 15 months) was significantly associated with all subscales except for feeding an infant on schedule. Interestingly, despite the inclusion of more maternal characteristics into the statistical model, a higher relative contribution from infant characteristics was observed in only the maternal concern about infant undereating or becoming underweight subscale.

Conclusion: In conclusion, the present study highlights that maternal feeding beliefs and practices can be influenced by both maternal correlates and by infant correlates at 15 months of age.
Children’s pester strategies in supermarkets and parent’s strategies to deal with them.

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SIG: Children and families

Awards: Yes, for the Student Competition*

Objectives: This study aimed to describe the extent of, and reasons for, children’s ‘pester power’ while grocery shopping and to elucidate parents’ views on ways to support them to reorient their child to request healthy choices.

Methods: Parents and children aged 5-8 years were overtly observed (ethnographic participant observation) while shopping at supermarkets and interviews were conducted with parents and children after the shopping trip.

Results: Fifteen parent-child dyads participated in this study. No tantrums were observed and children predominately accepted when product requests were denied. Approximately 120 products were requested by children. Food products were coded as core or discretionary, based on Australian nutrition guidelines. Eighty nine of the foods requested were discretionary. Children requested products an average of once every three minutes during shopping trips. Children reported the factors encouraging them to request food and beverage products were taste, packaging (cartoon, colours, convenient) and positive personal experiences from parents, siblings and friends. Parents’ strategies when dealing with purchase requests included reasoning with their child, choosing only one treat and saying that they would buy products later. However, parents also reported a threshold for saying no, as they can only do it so much before giving in. Parents’ suggestions for reorienting a child’s requests to healthy foods included: making food and vegetable aisles more appealing for children, placing fruits and vegetables in prominent areas or key locations (e.g. checkout, at children’s eye level and within children’s reach), making a storybook and a healthy shopping list for use in the supermarket.

Conclusions: Children frequently request unhealthy foods when in the supermarket and parents yield to such food requests. These findings can be used to develop interventions to redesign the shopping experience to increase children’s preferences for, and consumption of, healthy foods.
More rural high school students eat school breakfast as a result of changes in school practices.

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SIG: Policies and environments

Awards: No

Objective: Regular breakfast eaters have healthier diets and weigh less. Participation in the U.S. National School Breakfast Program (SBP) is generally low and decreases with grade level. The purpose of this group randomized trial was to evaluate the effectiveness of a school-based intervention designed to increase participation in the SBP among rural high school students by improving physical access to the program, changing social norms, and engaging in promotional activities.

Methods: A convenience sample of 16 rural Minnesota, USA high schools (17% minority; 34% free/reduced lunch) was randomized to treatment or delayed treatment (control). Intervention schools were trained to engage students, teachers, and staff to implement a grab-and-go breakfast service cart outside of the school cafeteria, serve healthy convenient menu items, and market the changes. Baseline screening among all 9th and 10th grade students (n=5,767) identified 44% that typically ate breakfast ≤ 3 times in a normal school week; from this group of “breakfast skippers” were randomly selected (n=1253) and enrolled in the study (n=904) for cohort assessment. School-provided attendance and SBP participation were obtained prior to the start of the intervention school year and at the end of the school year. School-level data were analyzed using Wilcoxon test. Student-level data were analyzed using linear models with a random effect for school and adjusted for fixed effects of intervention, age, gender, free and reduced priced meal eligibility, and race. To calculate relative change, an average of total days purchasing breakfast was divided by total attendance days for students.

Results: Engagement and implementation strategies of the new breakfast program varied across schools. Best breakfast practices (popular menu items, serving breakfast later) for rural high schools were identified. Relative school-level percent changes in SBP participation were significantly different between the intervention arms (I=56% vs C=7% p=0.04). Among the cohort of breakfast skippers, relative percent changes in SBP participation were significantly different between the intervention arms (I=107% vs C=24% p=0.01).

Conclusions: Implementation of a grab-and-go breakfast program in rural high schools was feasible and successfully improved breakfast participation, including among breakfast skippers. Effects upon student weight, dietary intakes, attendance and grades are forthcoming.
P2.072

Make Half Your Child’s Plate Fruits and Vegetables: Correlations with Food-Related Practices and the Home Food Environment

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SIG: Children and families

Awards: No

Objective: Few studies have examined how often the United States Department of Agriculture’s (USDA) MyPlate guidelines are followed including limited methods of how to measure it beyond observation. This study examined the prevalence of parental report of children’s adherence to MyPlate guidelines of ‘fill ½ your plate with fruits and vegetables (½ plate FV)’ and associations with parent report of food-related practices and the home food environment.

Methods: Baseline data (n=160 parent-child dyads) from the Healthy Home Offerings via the Mealtime Environment (HOME) Plus study were analyzed. HOME Plus was a randomized controlled trial to prevent excess weight gain among 8-12 year-old children. Parents were predominantly female (95%) while children were equally split by gender. Based on Social Cognitive Theory, parent and child surveys assessed food-related personal, behavioral and home environmental factors, including parent self-efficacy to cook healthy meals, cooking skills, child food neophobia, family meal frequency and home food availability. Children’s height and weight were measured by study staff. Spearman correlations were used to assess associations between a newly created ½ plate FV variable “During the past seven days how many times was ½ of your child’s plate filled with fruits and vegetables at dinner?” and personal, behavioral and environmental factors as well as child standardized body mass index (BMIz scores).

Results: Parents reported their children had ½ their plate filled with FV at dinner on average 2.6 days per week. Adherence to ½ plate FV was significantly and positively associated with parent self-efficacy to cook healthy meals, parent cooking skills, parent perception of child's cooking skills, family meal frequency and availability of a variety of fruits and vegetables in the home while a significant inverse association was found for child food neophobia. The ½ plate FV variable was not significantly associated with child BMIz.

Conclusions: Results suggest that nutrition programs may increase children’s adherence to MyPlate guidelines of having ½ their plate filled with FV by promoting healthful meal planning and cooking skills for both parents and children, increasing children’s willingness to eat more FV and the availability of FV in the home.
Integration of Youth Mentors in a Nutrition Education Recreation and Fitness Intervention to Improve Weight Status among Disadvantaged, School-Aged Children during Summer Months: A Pilot Study

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SIG: Early care and education

Awards: Yes, for the Student Competition*

Peer-led education interventions have been utilized in areas pertaining to alcohol, tobacco, illegal drugs, violence, and sexual behavior, and more recently, nutrition and physical activity (PA). Children who are mentored by youth peer mentors (YPMs) are less likely to participate in risky health behaviors and more likely to succeed academically. While there is potential for mentoring to positively impact YPMs themselves, YPMs have been highly understudied. The aim of this study was to assess the impact of a child health behavior intervention, which utilized YPMs in program delivery on YPMs’ own health behaviors and weight status through an innovative, triangulated, mixed methods approach. Camp NERF (Nutrition Recreation Education and Fitness) is an 8-week multi-component evidence-based health behavior intervention coupled to the USDA Summer Food Service Program and designed to prevent unhealthy summer weight gain in disadvantaged school-aged children, K-5th grade. During summer 2015, 10 eligible sites were randomized to: 1) Active Control (non-nutrition, PA, or mental health); 2) Standard Care (nutrition and PA); or 3) Enhanced Care (nutrition, PA, and mental health) programming. YPMs from the site communities were hired and trained to assist with program delivery at the Enhanced Care sites. Data were collected from YPMs at baseline and post-intervention. Diet was assessed via 24-hr recall methodology. A survey consisting of validated nutrition, PA, and social support questionnaires was administered. Height, weight, and waist circumference were assessed. In-depth interviews (IDIs) were conducted at post-intervention to further probe the quantitative data. Eleven YPM baseline and post-intervention surveys were completed. 64% were female. Mean age was 16 years and 100% were African American. Sugar-sweetened beverage intake significantly decreased (p=0.05). Total screen time hours decreased from baseline (7.41 vs. 6.18), although not significant (p>0.10). There was no change in perceived parental and peer support for healthy eating. Finally, there was an increase in BMI z-score (p=0.02). IDIs were conducted with 11 YPMs (data forthcoming). Results from this study will be utilized to improve YPM training and the use of a peer-mentoring model in the delivery of this and similar health behavior interventions for disadvantaged school-aged children.
**P2.074**

**Change in dietary intake among rural adolescents as a result of the BreakFAST group randomized trial.**

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**SIG:** Policies and environments

**Awards:** No

**Purpose:** Breakfast skipping contributes to poor diet quality among adolescents. This research evaluated whether altering breakfast-related school policies changed dietary quality among adolescents who were breakfast skippers.

**Methods:** Sixteen rural Minnesota, USA high schools were randomized to a policy and environmental change intervention or delayed intervention (control) group. The intervention consisted of training students, teachers and staff to market and implement healthier and more convenient breakfast distribution and eating options. Baseline screening among all 9th and 10th grade students (n=5,767) identified 44% of students that typically ate breakfast <3 times in a normal school week. From this group, a cohort of "breakfast skippers" was randomly selected (n=1253) and enrolled (n=904) for assessment. Cohort participants were asked to complete three 24-hour dietary recalls at baseline and follow-up. Analyses were limited to those with at least 1 weekday dietary recall at both baseline and follow up (n=572). A Healthy Eating Index-2010 (HEI-2010) score was calculated for each participant for each measurement period. Change in HEI-2010 score from baseline to follow up was calculated and compared between intervention and control groups. Adjusted models included random effect of school and fixed effects of intervention, baseline age, gender, free and reduced priced meal eligibility, and race.

**Results:** School breakfast participation increased significantly more in the intervention compared to control group. Total energy (kcal/day) remained constant in the intervention group (pre & post=1725 kcal/day) and increased in the control (pre=1742 kcal/day; post=1848 kcal/day) although not statistically significant. There was no significant change in the HEI-2010 total score by intervention (pre=49.3; post=49.9) or control (pre=49.1; post=48.8) condition. Total fruit component score remained at 2.1 for the intervention group but decreased from 2.2 to 1.8 in the control group, and the difference in change between groups was statistically significant in unadjusted (0.03) and adjusted (0.05) models. There were no other significant differences in change in component scores between groups.

**Conclusions:** Diet quality, as measured using the HEI-2010, was not improved by the school breakfast intervention evaluated in this study. However, the intervention may have had a positive influence on fruit consumption.
Appraisal of Mobile Apps for Encouraging Good Nutritional Practices among Youth

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SIG: E- & m-health

Awards: No

PURPOSE: Proliferation of mobile apps for smartphones has led to the appearance of many products targeting healthy lifestyle and wellness promotion. Often, they are developed without explicit reference to behavior-change methodology, relying on consumer popularity to provide market ratings that determine their public visibility and popularity. When such apps are intended for use by preteen youth, popularity may be an inadequate indicator of appropriateness for intended purpose. This study appraises some popular youth health and fitness apps, using recently proposed systematic quality assessment criteria, and provides a mechanism-based categorization.

METHODS: Ten highly rated (>3 star) nutrition targeted apps were sourced from the Apple iTunes Store, marketed as applicable for preteen youth. The apps were categorized according to West's modified Precede-Proceed Model (PPM) and Hides's Mobile App Rating Scale (MARS). PPM defines app properties according to Predisposing, Enabling, and Reinforcing elements contributing to health behavior-change, according to the original model of Green et al. MARS represents properties of apps using 23 items identified by expert panel and measured on a five-point scale, with subscales of Engagement, Functionality, Aesthetics, Information and Selective Quality.

RESULTS: Apps considered in this study were found uniformly across all 3 PPM categories, and consistently scored above average (>3.0/5.0) in all 5 MARS subscales. The PPM and MARS results were further analysed, to establish the underlying apps mechanism used and deduce association with underlying behavior-change theory. This categorization distinguished three major mechanism groupings for the apps: Games and Simulations, Tracking and Estimating, and Education and Information. A comparative tabulation of the findings for all 10 apps was constructed.

CONCLUSION: Popular apps for encouraging good nutritional practices among preteen youth (as rated by consumers) cover a wide range of types, and are of above average quality as determined by systematic criteria. This suggests that consumer-rated popularity is a reasonable determinant of appropriateness for purpose, at least to the extent that the chosen systematic criteria dictate. The effectiveness of the apps in actually changing nutritional practices still requires investigation.
What do adolescents think that their peers are eating at school?

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: Perceived peer norms play an important role in adolescents’ eating behavior. Also, some past studies suggest that perceived peer norms (perceptions of the behaviors of peers) may be more important in determining eating behavior than actual norms (actual peers’ behaviors). In this study, we sought to examine 1) to what extent perceived peer norms do reflect actual norms among an important risk group for unhealthy (eating) behavior, i.e., adolescents attending lower levels of education, and 2) how both perceived and actual norms are associated with purchase and consumption of fruit, bread products, snacks and sugar-sweetened drinks.

Methods: A cross-sectional survey among 598 (pre-)vocational students aged 12 to 22 assessed the frequency by which fruit, bread products, snacks and sugar-sweetened drinks were brought from home, purchased in-school and in the vicinity of school. Also the consumption of these products were asked. Participants were asked to answer these questions for their own behaviors as well as to estimate their peers’ behaviors.

Results: Adolescents overestimated the purchase and consumption of most healthy and unhealthy products, with largest overestimations for snacks and sodas bought in school canteens. Perceived peer norm was associated with each of the eating behaviors of (pre)vocational students during school-time and generally more so than actual norms. Importantly, however, for food purchased in school canteens, the actual norm was significantly associated with the eating behaviors independent from perceived norms.

Discussion: The results suggest interventions should address misperceptions of purchase and consumption of snacks and sugar-sweetened drinks of (pre)vocational students.
Assessment of intelligence quotient, academic performance and nutritional status of school age children in private schools in Umuahia metropolis

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SIG: Early care and education

Awards: Yes, for the Early Career Award**

Purpose: Evidence exists that poor feeding practices is associated with impaired growth status, poor school performance and low intelligence quotient. This cross sectional study was carried out to assess the relationship between intelligence quotient, academic performance and nutritional status of primary school pupils attending private schools south east Nigeria.

Methods: The study was a cross sectional survey of 400 pupils in private schools randomly selected from the 3rd to 4th grade. Information on socio economic status was obtained using a structured questionnaire. Academic performance was assessed using the average of the overall scores in the three term examinations of same session. Intelligence quotient was determined using the Draw-A-Person (DAP) test, while anthropometric measurements of height and weight were measured using standard procedures. WHO anthropplus software was used to assess nutritional status of weight-for-age (WAZ), height-for-age HAZ) and weight-for-height (WHZ) Z-scores. Data were analysed using descriptive and Chi square.

Results: The prevalence of low IQ and poor academic performance was 29.2% and 7.0%, respectively. Stunting, underweight and wasting were 12.5%, 11.0% and 4.8%, respectively. Academic performance showed significant association with WHZ score ($X^2=14.781; p= 0.0283$) ($p<0.05$). Low IQ scores were significantly associated with low academic performance ($X^2=12.315;p= 0.033$) ($p<0.05$).

Conclusion: The study underscores the importance of good nutritional status of children on learning and educational achievement
An investigation of exposure to food outlets around primary schools and childhood weight status

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SIG: Policies and environments

Awards: No

Purpose. The food environment surrounding schools is of increasing government interest; a number of UK Local Authorities having drawn up Supplementary Planning Documents to restrict the development of new fast food premises. However, the relationship between food retail outlets and obesity in children is unclear. The aim of the present study was to examine the association between the number of food outlets surrounding primary schools and children's weight status.

Methods. Secondary analysis of three cross-sectional cohorts of 11-12 year old children from Leeds, UK. BMI z-scores were calculated using UK 1990 national reference growth charts. The number of total food outlets and the number of fast food outlets within 0.5km, 1km, 1.5km and 2km Euclidean (straight line) radial buffers of participants’ primary school postcodes were determined using geographical information system software. Multilevel modelling was used to account for the clustering of children within schools.

Results. Separate models for all food outlets and fast food outlets for each of the four buffer sizes showed no evidence of an association between the number of food outlets surrounding primary schools and children's BMI z-scores.

Conclusions. This study found no evidence to support local government initiatives to restrict the number of fast food outlets around primary schools. A better understanding of the interplay between the food environment surrounding primary schools and childhood obesity is required in order to identify modifications that may potentially reduce obesity incidence and prevalence.
Stakeholder views on Universal Free School Meals for infants in Scottish primary schools

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SIG: Policies and environments
Awards: No

Purpose

School meals have historically aimed to improve children's nutrition. In January 2015 Scotland moved from a mean tested system for free school meals (FSM) to a universal system for Primary 1-3 children. The aim of this study was to identify support and opposition to the policy in the media, and examine the ways in which this support or opposition was framed. The study's research questions were: a) Who were the key stakeholders? b) How did stakeholders frame their support for, or opposition, to the policy?

Method

Relevant newspaper articles were identified from the Nexis UK database. The term "Free School Meals" was used to search Scottish newspapers from January 2014 to July 2015. Quantitative and qualitative analysis of the information was undertaken. Key stakeholders were identified and grouped based on organisational affiliations. Stakeholder statements were coded based on a-priori categories of support for, opposition to, or neutral statements about the policy. Five themes emerged and were used to code statements: poverty, health, attainment, resource concerns, and logistics of implementation. Qualitative analysis probed the representation of these themes in more detail.

Findings

The search identified 127 articles for coding. Stakeholders included: Government representatives (n=1), Politicians (n=5), Academics (n=2), Charities (n=2), Others (n=6) and Unaffiliated (n=12). The governing Scottish National Party focused more on the potential positive outcomes of the policy around poverty reduction, improving health, and raising attainment. Both short term and long term benefits of health were discussed. Charities, unions and academics also stressed these issues, specifically drawing attention to existing poverty amongst working families, the rising cost of living, and its potential to remove the stigma of free school meals. Opposition parties focused more on resource concerns and logistical issues. Concerns were raised over the costs and logistical difficulties of the space available to feed children within older school building. Parents also expressed concern over aging school facilities.

Conclusion

Findings suggest the debate was dominated by politicians. Future work should examine the opinions of schools, parents and children to determine whether their experience of the policy's implementation differs from the hopes and concerns expressed by these stakeholders.
Implementing a Universal Free School Meal Policy in Scotland: Results from a Process Evaluation of Implementation and Uptake

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SIG: Policies and environments

Awards: No

Purpose

Few countries operate a system of Universal Free School Meals (UFSM). In January 2015, Scotland moved from a means tested system for FSM to a universal system for children in Primary 1-3 (aged 4-8 years). Many policy advocates believed a universal system would improve children's eating habits, and reduce nutritional and other inequalities. This work reports on a process evaluation of implementation and uptake of the policy focusing on the following research questions: 1) What were the common barriers and facilitators to implementation and uptake? 2) What were the unintended consequences of implementation and uptake?

Method

Data were collected from a number of sources. A self-completion questionnaire was sent via email to all local authorities in Scotland (response rate 97%) and asked about nine key areas of activity, including school building condition and communication. Information was also asked on uptake. Indepth telephone interviews were also carried out with local authority representatives (n=19). Case studies were carried out in 10 schools to examine how they had coped in the first few months of the policy's implementation, and in the new school year. Forty-nine interviews were carried out with school staff (catering, senior managers and teaching), and observations of the dining hall environment. Six focus groups were carried out with parents (n=37) whose children were both previously and not previously eligible for FSM.

Findings

Overall, the policy was implemented with only minor difficulties. Uptake levels ranged (64% to 91%), with a mean of 76% across local authorities. Facilitators included forward planning, previous levels of high uptake, good communication at all levels, staggered lunchtimes, popular menu choices and taster sessions. Barriers included school space, staff recruitment and funding, and children's speed through the dining hall. Unintended consequences included queuing, increased pressure on catering staff and a perceived increase in food waste. Parents were supportive of the policy and believed that it afforded them financial and time savings and had nutritional benefits.

Conclusions

UFSMs for P1-3 children have been implemented successfully. The policy has the potential to improve Scottish children's dietary intakes through nutritional standards for school meals and to reduce nutritional inequalities.
The “Healthy Habits, Healthy Girls – Brazil” randomized controlled trial: are the girls following the recommendations of the Brazilian Food Guide Pyramid?

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\textbf{SIG:} Policies and environments

\textbf{Awards:} Yes, for the Student Competition*

\textbf{Purpose:} to evaluate the 6-month effects of a school-based obesity prevention program for adolescent girls on dietary intake according to recommended guidelines for Brazilian adolescents. \textbf{Methods:} The “Healthy Habits, Healthy Girls – Brazil” was a school-based randomized controlled trial with 253 (mean age 16.05; standard error 0.05 years) adolescent girls attending 10 governmental schools in São Paulo, Brazil. It was based on the Social Cognitive Theory. Details of the study design, protocol and baseline results are published elsewhere. Moreover, the study are registered in the clinicaltrials.gov platform and reported according to the CONSORT checklist. Diet was assessed using a validated semi-quantitative food frequency questionnaire. Individual foods were categorized into the eight groups of the Brazilian Food Guide Pyramid and the total energy intake calculated. Dietary intake was compared to the recommendations of the Brazilian Food Pyramid. Data were checked for normality and those that were not normally distributed were square root transformed. Linear mixed model adjusted for the nature of the data (i.e., school) was used to evaluate the intervention impact. Analyses followed the intention-to-treat principles and were conduct in SPSS (version 21.0 Mac OS) with significant levels set at $p \leq 0.05$.

\textbf{Results:} After 6 months, there were no intervention effects for the following food pyramid groups: rice (adjusted mean 1.44 serving/day, standard error 0.99, $p=0.59$), fruits (0.19 serving/day, 0.18, $p=0.18$), meats (-0.17 serving/day, 0.27, $p=0.70$), beans (0.16 serving/day, 0.31, $p=0.82$) and oils (0.22 serving/day, 0.70, $p=0.42$). However, there was an increased tendency for the veggies group (1.77 serving/day, 0.89, $p=0.09$) favoring the H3G-Brazil girls. Group-by-time interactions were found for the milk (0.33 serving/day, 0.33, $p=0.04$) and the sweets (-1.25 serving/day, 0.49, $p=0.01$) groups.

\textbf{Conclusion:} The Healthy Habits, Healthy Girls – Brazil study demonstrated changes favoring the intervention group for the eight groups of the Food Guide Pyramid for the Brazilian adolescent population. However, for more significant results, future research including more intensive nutrition intervention strategies are required to evaluate whether dietary intake in adolescent girls attending governmental schools in São Paulo, Brazil can be optimized.
Follow in my Green Foodsteps: a branded school- and community-based programme to change cooking behaviours in Nigeria

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Background:

Anemia is considered the most prevalent nutritional deficiency globally with the highest prevalence occurring in Central and West Africa, where approximately 1 out 2 women of reproductive age have anaemia (Stevens et al., 2013). A Knorr branded school- and community-based behaviour change programme called "Follow in My Green Food Steps" has been developed in Nigeria to improve iron intake. The programme focuses on getting mothers and daughters to add green, leafy vegetables and Knorr iron-fortified bouillon cubes to their weekly stews. It is unique in that it is a branded, theory-based programme employing multiple interactive media channels.

Methods:

Based on consumer research, the programme is built on the insight that both mothers and daughters are hoping for a better future and that we can build on mother’s daughters bonding to influence generational cooking behaviour change, and get more iron in her daughter’s diet. The programme uses a similar framework to Lifebuoy, which used a trusted brand as a key part of a programme to drive handwashing behaviour change (Nicholson et al., 2014). The program involves mobilisation of social support, the use of role models, self-regulation techniques (i.e., creating the intention, setting a goal, monitoring behaviour and reviewing of the behavioural goals) and behavioural prompts/cues. The programme is supported by various media activities (e.g., an induction event, a radio drama, sms messages, interactive voice recording, door-to-door interaction, resident cooking events led by chefs for mothers groups).

Results/Findings:

The programme is in the field from October 2015 until the end of January 2016. An initial baseline found that knowledge of importance of eating greens was high yet regular eating was not happening. The impact on brand perceptions, individual elements effectiveness as well as claimed behaviour change will be ready to present at the conference.

Conclusions:

Implications of the programme will be discussed in terms of the impact of branded behaviour change on public health and (dis)advantages of private-public partnerships to scale up behaviour change programmes.
Associations between family meals, weight status and parental education among 10-12 year olds in eight European countries

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SIG: Children and families

Awards: No

Objective: The aims of this study were to assess (i) the prevalence of eating breakfast, lunch, dinner together with family (family meals) among 10-12 year olds in Europe, (ii) the association between family meals and weight status, and (iii) potential differences in having family meals according to parental levels of education.

Methods: 7716 children (mean age: 11.5 years) in eight European countries participated in a cross-sectional survey and completed a questionnaire at school. Data on family meals, i.e. how often parents reported to eat breakfast, lunch, dinner together with their child, were collected. Height and weight of the children were measured. Binary regression analyses were conducted to test for associations of eating family meals (adjusted for gender, ethnicity, parental education and country) with overweight and to test for differences in having family meals according to parental education.

Results/findings: The prevalence of eating breakfast, lunch, dinner together 5-7 times/week was 35%, 37% and 76% respectively. The children who ate breakfast together with their parents 5-7 times per week had lower odds of being overweight (OR = 0.74 (95% CI 0.63-0.86)) compared to those who ate breakfast with their parents 2-4 times or less per week. Children of higher educated parents were more likely to have breakfast 5-7 times per week with their parents (1.63 (95% CI 1.42-1.86)) and less likely to have lunch 5-7 times per week together with their parents (0.72 (95% CI 0.63-0.82)) compared to children of lower educated parents.

Conclusions: The most prevalent family meal was dinner. The odds of being overweight was lower for children who ate breakfast regularly together with their parents compared to those who did not. However, the present study has a major weakness in that we were not able to separate out the potential ‘effect’ of having breakfast as such from having breakfast with a parent present, and may indicate an association between family meals and overweight. Children of highly educated parents had higher odds of having breakfast together with their parents and lower odds of having lunch together with their parents compared to children of lower educated parents.
An Integrated Approach to the Treatment of Anorexia Nervosa in Adolescents

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SIG: Children and families

Awards: No

Objective
This paper examines change over time in eating disorder symptoms, family functioning, and other comorbidities (i.e. depression and anxiety) in a sample of adolescents receiving intensive family treatment for moderate to severe anorexia nervosa at a leading pediatric hospital in the United States.

Methods
We conducted a prospective longitudinal cohort design to examine changes over time in eating disorder symptoms and family functioning. All patients admitted into either the partial hospitalization program or the intensive outpatient program at the NCH Eating Disorders Clinic were eligible to participate. The sample consists of patients ages 12-18 who participated in the partial hospitalization program or the intensive outpatient programs. Both programs use an integrated approach incorporating aspects of CBT, DBT, and family based treatment and include physician, nurse, dieticians, therapists, and occupational and massage therapy. The partial program focuses primarily on reducing malnourishment and weight restoration while providing a foundation of mental health support. Patients and primary caregivers completed measures within 48 hours of admission and discharge into their respective program. Key variables were measured using the following instruments: Eating Disorders Examination Questionnaire (EDE-Q), Body Appreciation Scale (BAS), Quick Inventory of Depressive Symptomatology - Self Report (QIDS-SR16), Revised Child Anxiety and Depression Scale (RCADS), Parent vs Anorexia Scale (PVA), and the McMaster Family Assessment Device (FAD). Data analysis examined statistical differences between mean scores on psychological assessments and family functioning across time points.

Results
Preliminary results reveal significant change in time in parental efficacy as measured by the PVA. Parents reported significantly lower scores on the PVA at discharge suggesting an improvement in their confidence in their ability to appropriately care for their child with anorexia nervosa. In addition, patients reported a significant reduction in eating disorder symptoms at time 2 (discharge from initial level of care).

Conclusion
This study provides preliminary empirical evidence for the usefulness of an integrated behavioral health approach in a clinical population of adolescents diagnosed with eating anorexia nervosa. It also speaks to the usefulness of incorporating multiple evidence based modalities in one setting to improve treatment outcomes.
How Family Mealtime Practices Relate to Child Health- A Systematic Review and Meta-Analysis

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Purpose: Today’s environment has been called “obesogenic”, mainly because of its overabundance of readily available, energy-dense food. The resulting poor dietary behavior is one of the major contributors to the current obesity epidemic in children and adolescents. Eating habits and food preferences are acquired early in life; thus, childhood is a formative period for healthy eating patterns. Family meals can be called the cradle of eating behavior: by the age of ten, a child has eaten about 10,000 meals, most of them in a family setting. An increasing amount of research shows that having frequent family meals is associated with a healthier diet and body weight in both, children and adolescents. However, research findings concerning potential key protective mealtime practices are inconsistent and many open questions remain. Based on this state of research, it is difficult to advice parents about healthy family meal practices.

Methods: We conducted a systematic review to identify mealtime practices frequently investigated in the context children’s nutritional health (i.e., body mass index and diet quality). We ran separate meta-analyses to investigate the association between each identified mealtime practice and nutritional health in children and adolescents. Results: Results indicate that the following seven mealtime practices are associated with better nutritional health: having frequent family meals (r=.12, all rs reported represent pooled effect sizes), parental role modeling (r=.09), involving children in meal preparation (r=.15), creating a positive atmosphere (r=.20), serving healthy food (r=.13), avoid watching television during meal (r=.08), and taking time to eat together (r=0.19). Conclusion: We identified seven evidence-based family meal practices that are, across studies, associated with better nutritional health in children and adolescents. Because primary studies were mostly cross-sectional, the causal effects of these family meal practices need to be tested. Importantly, our study results provide a basis for such future experimental tests. Family meals performed according to the meal practices identified in this study may have the potential to promote healthy eating habits in children and adolescents, and therefore help them to better prevail in an obesogenic environment.
Unhealthy Food Consumption and Dental Pain among Children in Texas

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Purpose: Few studies have examined the relationship between consumption of unhealthy foods and dental pain among children. The objective of this study is to examine the association between child dietary intake of sugary and starchy food items and dental pain.

Methods: A cross-sectional analysis was performed combining individual child survey data from two time points in the Texas Childhood Obesity Research Demonstration (TX CORD) project. Fifth grade students (n=1154) attending 31 elementary schools in Austin and Houston, Texas completed the TX CORD survey, a reliable and valid survey instrument that focuses on nutrition and physical activity behaviors. Nutrition questions ask about the number of servings of foods and beverages consumed on the previous day. Mixed effects logistic regression models were utilized to test the association between eleven individual sugary, starchy, or acidic food items and child dental pain. All models controlled for sociodemographic variables.

Results: 108 (9.4%) 5th grade students reported having dental pain in the last two weeks that made their mouth hurt so much that they could not sleep at night. Children with dental pain reported to have consumed more foods and beverages containing sugar and starch compared to children without dental pain (p<0.05). Dental pain in children was significantly associated with the intake of the following sugary items: soda, frozen desserts, candy, and sweet rolls (p<0.05); no association was found with punch (p=0.180). Dental pain was also significantly associated with the intake of most starchy foods, including French fries, cereal, starchy vegetables, and white pasta (p<.05), but not with white bread (p=0.998). Children with dental pain are 2.26 times more likely to drink diet soda compared to children without dental pain (95% CI=1.39, 3.66).

Conclusions: Children who eat more sugary and starchy foods are more likely to report dental pain. Behaviorally-based interventions should focus on improving oral health as a health outcome by reducing intake of these foods.
**Are parent food rules associated with child dietary intake and weight among low-income, ethnically diverse families in Texas?**

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**SIG:** Children and families

**Awards:** Yes, for the Student Competition*

**Objective:** The influence of parents on child dietary behavior and weight, through the use of specific, predetermined food rules, is not well understood. The objective of this study is to examine the use of parent food rules in relation to child dietary intake and weight.

**Methods:** This cross-sectional study is part of the Texas Childhood Obesity Research Demonstration (TX CORD) Project, a multilevel, community-wide, quasi-experimental intervention designed to evaluate childhood obesity prevention programs in Austin and Houston, Texas. For this study, parent-child dyads were created by matching anthropometric measurements for pre-kindergarten (n=685), 2nd grade (n=485) and 5th grade (n=391) students, with self-reported parent surveys at baseline. Valid and reliable survey items used in this study included sociodemographic characteristics, the use of 7 different food rules, and child consumption of various foods on the previous day. Linear regression was conducted to examine associations between the total number of parent food rules and: 1) consumption of various food items, 2) healthy and unhealthy dietary intake, and 3) child BMI z-scores. All models controlled for parent income and education, as well as child race, gender, and grade.

**Results:** Participants were primarily Hispanic/Latino (77.5%) or African American (17.8%). Most (93.3%) reported an annual household income of $35,000 or less. The total number of parent food rules was positively associated (p<.001) with intake of fruit, vegetables, and water, and negatively associated (p<.001) with intake of French fries or chips, soda, and sports drinks or punch. Parents who reported a higher number of food rules for their children also had significantly higher healthy food scores (p<.001), lower unhealthy food scores (p<.001), and lower BMI z-scores (p=0.019).

**Conclusions:** Parent food rules are positively related to healthy dietary intake and weight of their children. These associations provide evidence that can be used to inform guidelines for healthy family dietary behaviors. The findings can also be used when designing obesity prevention interventions for parents of young children in similar low-income, minority populations.
Dietary quality during transition periods of drop-off and pickup from childcare.

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SIG: Children and families

Awards:

Background: Children in childcare centers make two transitions daily between home and center, which are stressful for parents and children, thus potentially vulnerable for obesogenic feeding behaviors. Little is known about children's dietary intake during these transition times.

Objectives: To compare children’s 24-hour intakes to dietary guidelines and to compare children’s dietary quality during transition and non-transition periods.

Methods: Participants (n=307) in this cross-sectional study attended 30 local, randomly selected, full-day child-care centers. A validated visual estimation protocol was used to record all foods/beverages consumed at the center. Parents reported foods/beverages consumed outside the center in a food diary. The 24-hour period under observation was separated into 6 time points: 4 transition periods-1 hour before and after drop-off (T1, T2) and 1 hour before and after pickup (T4, T5)- and 2 non-transition periods, the rest of day at the center (T3) and at home (T6). Hierarchical linear regression with center as a random effect was used to test for differences in measures of diet quality per 1000 kcal during transition and non-transition time periods.

Results: 24-hour mean (sd) intakes of energy [1472 (418) kcal], added sugar [58 (36) g], snack foods [1.8 (1.6) svg], and sugar-sweetened beverages [0.6 (0.8) svg] exceeded dietary recommendations (1300 kcal and minimal added sugar). Servings of vegetables were lower (β=-0.53), while added sugar (g) (β=14.03) and snacks (β=0.64) were higher, when comparing all transition times to non-transition times. When comparing the hour after pickup to non-transition times, consumption of added sugar (g) (β=21.74), snacks (svg) (β=1.09), and sugar sweetened beverage (svg) (β=0.46) were higher while dairy servings were lower (β=-0.87).

Conclusions: Children consumed more added sugar, sugar sweetened beverages, and snack foods with fewer servings of vegetables and dairy during transitions compared to non-transition periods. Transition periods may provide a window to improve dietary quality of preschool children attending childcare.
Correlates of dietary behaviors among adolescents

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objectives: There is a need for more studies looking at the influence of the school and neighborhood food environment on the dietary behaviors of youth. Using a social ecological model, the present study aimed at exploring individual, interpersonal and perceived school/neighborhood environmental correlates of dietary behaviors among adolescents.

Methods: A cross-sectional survey was conducted in 2015 among 742 adolescents (mean age 13 years) from eleven secondary schools. Data was collected using an online questionnaire filled in at school. Linear regression analyses were conducted to explore factors associated with the consumption of fruits, vegetables, soft drinks and unhealthy snacks.

Results: The factors positively associated with soft drink consumption were accessibility at home, parental modeling, the frequency of food/drink purchase in shops in the neighborhood on the way to and from school and the frequency of food/drink purchase in school canteens. Parental rules (restrictive) and self-efficacy related to healthy eating were inversely related to soft drink consumption. The factors positively associated with unhealthy snack consumption were accessibility at home, parental modeling, perceived price (compared to healthy foods) and the frequency of food/drink purchase in shops around schools; self-efficacy related to healthy eating and parental rules were inversely related to snack consumption. Self-efficacy related to healthy eating, accessibility at home and parental modelling were positively related to fruit and vegetable consumption. No perceived school or neighborhood environmental factor was found to be associated with fruit and vegetable consumption.

Conclusions: The results indicate the crucial role of the family environment in determining the dietary behaviors of adolescents. Perceived environmental determinants appeared more relevant for unhealthy food consumption. Future studies using objective measures of the environment are needed to compare the results to those obtained using perceived environmental correlates.
Obesity in Jordanian school children and its association with maternal feeding practices

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SIG: Children and families

Awards:

Obesity has become a significant worldwide contributor to morbidity with an alarming increase in incidence of childhood obesity. Few studies have evaluated parental feeding practices and their impact on children obesity in the Middle East. The Comprehensive Feeding Practice questionnaire (Musher-Eizenman & Holub, 2007) was validated in different age groups and in different countries, however no previous studies have validated the questionnaire in the Middle East.

Objective:

This study validated the questionnaire in the Middle East to evaluate children and adolescent obesity and parental feeding practices

Method:

In this study, 970 children aged 6-12 completed the Arabic translated version of the CFPQ. The height and weight of the children were also measured. The children BMI, BMI z-scores and obesity status was determined. Confirmatory factor and Exploratory Factor Analysis were used to evaluate different factor models. General linear model regression was conducted to evaluate the association between maternal feeding practices, maternal BMI and education level and child’s weight status (normal, overweight, and obese)

Results

Confirmatory Analysis of the CFPQ determined that the original 12 factors structure of the questionnaire was not suitable for this sample. The analysis suggested that the most suitable structure was an 11 Factors model (CMIN/DF=2.18, GFI= 0.92, CFI= 0.93, TLI= 0.92 and RMSEA= 0.03) that included Modelling, Monitoring, Child control, Food as a reward, Emotional regulation, Involvement, Restriction for health, Restriction for weight control, Environment, Teach and encourage and Pressure. The results indicated that 12.6% of the children tested were obese and 25.1% were overweight. The regression showed that restriction to health and weight, emotional regulation and maternal BMI were positively associated with child weight status, while Modelling, Monitoring, Child Control, Environment, Involvement, and Teach and encourage were negatively associated with child’s weight status

Conclusion

This study indicated that Jordanian children aged 6-12 had high prevalence of overweight/obesity and this was associated with negative parental feeding practice.
The role of parents in child healthy and unhealthy food consumption: A systematic review and meta-analysis

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SIG: Children and families

Objective: The family is an important social context where children learn and adopt eating behaviors. Specifically, parents play the role of health promoters, role models, and educators in the lives of children, influencing how they think about food choices. This study attempts to systematically review the evidence of parental influence on child food consumption behavior, to identify what parenting practices are most effective, and highlight research gaps that need addressing.

Methods: From a total of 6428 titles extracted from Web of Science, ERIC, PsycINFO and PubMed, seventy eight studies met the inclusion criteria for a systematic review, while thirty seven articles contain requisite statistical information for meta-analysis. The parental variables examined include active guidance/education, restrictive guidance/rule-making, availability, accessibility, modeling, pressure to eat, rewarding food consumption, rewarding with verbal praise, and using food as reward. The food consumption behaviors examined include fruits and vegetables consumption, along with sugar-sweetened beverages and snack consumption.

Results: Results indicate that availability (Healthy: r = .24, p < .001; Unhealthy: r = .34, p < .001) and parental modeling effects (Healthy: r = .32, p < .001; Unhealthy: r = .35, p < .001) show the strongest associations with healthy and unhealthy food consumption. In addition, the efficacy of some parenting practices might be dependent on the food consumption context. For healthy foods, active guidance/education might be more effective (r = .15, p < .001). For unhealthy foods, restrictive guidance/rule-making might be more effective (r = -.11, p < .01). Several areas of research are understudied, specifically in the area of active guidance/education. Studies that take into account psychosocial mediators are also lacking.

Conclusions: This study highlights several research gaps that needs to be addressed. First, some parenting practices, such as manipulating accessibility and active guidance/education are understudied and conclusions are difficult to draw without sufficient evidence. Second, studies utilizing theoretical models which account for psychosocial mediators, can help provide better understanding of the processes which drive child food consumption behavior. More research needs to be conducted to address these gaps to provide a better understanding of how parents can influence child food consumption outcomes.
Parental rules at home during mealtime. How can parents create a healthy food environment?

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SIG: Children and families

Awards:

Background:
The home-food environment is established and maintained primarily by children's parents and families. Parents are largely responsible for providing healthy home-food environments necessary to preventing obesity. Children's eating behaviors are strongly influenced by this environment and it is where they have their first experiences with many foods.

Methods:
Secondary data analysis using baseline data from the study known as Brighter Bites. It is a collaboration between UTHealth School of Public Health, Texas Children's Hospital and the Houston Food Bank. The study is a group randomized controlled study with three KIPP Explore Academy schools per group with a 97% Hispanic student population. Parent-child dyads were surveyed in Fall 2013 through Spring 2014. Measures used in my analysis included student's anthropometric measures, demographics, child dietary habits and home nutrition environment.

The statistically significant associations using BMI as a continuous dependent variable and parental rules at mealtime as independent variables were limit portion size (Beta Coefficient = 1.71, pvalue= 0.04, 95%CI 0.90-3.33) and limit fast food (Beta Coefficient = -3.22, pvalue=0.03, 95% CI -6.04-0.41). The linear regression indicated the association of overweight/obese children and parental rule limit fast food. Children whose parents used limit fast food had a mean BMI 20.08, which is higher than children whose parents did not the rule (BMI= 18.56).

Conclusion:
Parental rule regarding limit portion size had a positive association with child BMI. When limit portion size was used the children had increased weight status. Parental rule regarding limit fast food had a negative association with child BMI. When limit fast food was used the children had decreased weight status. Parental rules regarding limit portion size and limit fast food had negative associations with children's sugary beverage intake. Children whose parents used the rules, consumed less sugary beverages compared to children whose parents did not use the rules. Mealtime rules related to increased BMI had more to do with sugary drinks, not fruit and vegetable intake. These findings are important in telling us how to help parents create a healthy food environment at home.
**LP2.093**

**Dietary patterns among Finnish preschool children and their parents**

Henna Vepsäläinen¹, Liisa Korkalo¹, Vera Mikkilä¹, Kaija Nissinen⁵, Essi Skaffari¹, Nina Sajaniemi⁵, Eva Roos⁴, Maijaliisa Erkkola; on behalf of the DAGIS consortium group¹

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**SIG:** Children and families

**Awards:**

**Purpose:** Dietary pattern approach has become popular in nutrition science, but there is only limited information on dietary patterns among preschool-aged children and their parents. Our aim was to study familial dependence of dietary patterns among Finnish children and their parents. In addition, we will investigate the associations between socio-economic status (SES) and the dietary patterns.

**Methods:** The present analyses are a part of the DAGIS study that investigates energy balance-related behaviors and stress among preschool-children. The participants were 3-6-year-old children (n=382) from 57 preschools in Finland. Parents filled in 47-item (children's diet) and 49-item (parents' diet) food frequency questionnaires (FFQs) measuring food consumption during the last week. In the children's FFQ, we only measured foods eaten outside daycare. We used principal components analysis to identify dietary patterns using the FFQ food groups as input variables. SES was assessed using self-reported questionnaires.

**Results:** We identified two dietary patterns among the participating children. Pattern 1 was most positively correlated with berries, natural yogurt, plain nuts and eggs. Pattern 2 was strongly characterized by ice cream, soft drinks, sweet biscuits and white rice/pasta. Among the parents, two dietary patterns with similar outlines but somewhat different contents were identified: pattern 1 included lots of e.g. fresh fruit, vegetables and berries. Pattern 2 was characterized by potatoes, sweet pastries, white wholemeal bread and sausages/luncheon meats. In the upcoming analyses, we will investigate familial associations and SES determinants of the dietary patterns.

**Conclusions:** The study will provide new information on familial dependence and SES determinants of dietary patterns among preschool-children and their parents.
Dietary patterns in relation to blood pressure in 9 to 11 year-old children

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SIG: Children and families

Awards:

Objectives: Globally, cardiovascular disease (CVD) is the leading cause of mortality. High blood pressure (BP) is the main risk factor for developing CVD, which can develop during childhood. In adults, well-established dietary modifications such as reduced salt intake and promoting the consumption of dietary patterns rich in foods such as fruits, vegetables and whole grains have been shown to decrease BP. However, there is a paucity of data on the association between dietary patterns and BP in children. This study examined the association between dietary patterns and BP in school children living in New Zealand.

Methods: A cross-sectional study was conducted in 460 children aged 9-11 years from Dunedin, New Zealand (n=460). Children's brachial systolic (SBP) and diastolic (DBP) BP were measured three times in a single setting using the SphygmoCor XCEL (AtCor Medical). Measurements were taken in a supine position, after at least a five-minute rest, on the left arm. Children filled in a self-administered validated 28-item food frequency questionnaire (FFQ). Major dietary patterns were derived using principal component analysis (PCA). The suitability of food items in the FFQ entered into the PCA was assessed using the Kaiser-Meyer-Olkin (KMO) criterion. Generalized estimating equations (GGE) with robust standard errors was used to determine the association between dietary patterns and BP in children.

Results: Mean SBP and DBP were 111±10 mmHg and 68±6 mmHg, respectively, and no significant differences were found between boys and girls. Preliminary analysis identified three major dietary patterns [Snacks (sweet and salty snacks), Fruit and Vegetables (fruits, vegetables, dairy products and brown bread), and Breakfast Foods (cereals, fruit juice, rice and pasta)], explaining 42% of total variation in intake. None of the three dietary patterns were significantly associated with BP.

Conclusions: Although diet is an important determinant of BP in adults, the preliminary results of this study did not show similar findings in 9-11 year-old children. This could be due to the fact that the most common cause of elevated BP is hardening of the vessels and therefore, decrease in overall compliance and peripheral resistance, which is usually the case in adults but not children.
Understanding infant anemia from a nutrition and sociologic point of view to raise awareness and design a relevant complementary food enriched in iron

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Malnutrition is a major health issue in Cote d'Ivoire with main deficiencies on iron, vitamin A & iodine. Poverty, poor nutritional practices and lack of food and knowledge are the main causes for malnutrition leading to 33% of infant death. It is then essential to better understand anemia and iron deficiency in infant from 0 to 3 years old from a nutrition and cultural perspective to propose relevant and accessible complementary food.

Methods: Two studies were conducted in 2010 and 2013. An exhaustive literature review (23 publications) combined with 20 experts' discussions to understand the main nutrition and health issues and existing-related programs. A qualitative study conducted by food sociologists (100 mothers interviewed) to understand the food journey of infant below 3 years old, their mothers' knowledge and representations of infant diet and the link perceived with obesity and anemia.

Results: Children are more prone to malnutrition during the diversification period due to bad complementary feeding practices. Iron deficiency prevalence is over 70% due to low intakes and health issues (malaria and parasitosis). Anemia prevalence is 74% and more frequent in rural than urban areas (77.9 vs 67.8%). Anemia is culturally known by mothers and recognized as a disease. However, there is a lack of awareness of the link between diet and anemia. Mothers use "traditional" treatments to cure anemia, putting in place strategies which are linked to the red color (blood color) like bissap, leaves, Coca-Cola and tomato sauce.

Conclusions: These studies contributed to enrich existing range of infant cereals with iron to provide 70% of infant needs during weaning period. It also contributed to increase awareness in the nutrition scientific community thanks to presentations at the 2014 RANI Congress (African Meetings on Infant Nutrition) in Yaoundé, trainings for health care professionals on nutrition & food sociology and the publication of 3 educational guides for mothers on pregnancy, breastfeeding and complementary feeding.
Can parenting practices explain the differences in beverage intake according to the socio-economic status: the Toybox-study

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SIG: Early care and education

Awards:

Objective: Previous research indicated that preschoolers of lower socioeconomic status (SES) make more unhealthy beverage choices than their high SES peers. The purpose of this study is to investigate the potential mediating role of eight parenting practices in the relationship between SES and plain water, soft drink and prepacked fruit juice consumption in European preschoolers.

Methods: Parents of 3.5 to 5.5 year olds (n=6776; mean age: 4.8 ± 0.4 years; 52% boys) were recruited through kindergartens in 6 countries (Belgium, Bulgaria, Germany, Greece, Poland and Spain) within the ToyBox-study. Parents completed a questionnaire including items on the socio-demographics and dietary behaviour of themselves and the child and filled in a semi-quantitative food frequency questionnaire about their children’s daily beverage intake. The intake of beverages was used to determine plain water, soft drink and fruit juice consumption. Multilevel multiple mediation analyses were performed using MLwiN, including SES as the independent variables, beverage intake as the outcome and parenting practices (i.e., availability of plain water and soft drinks/prepacked fruit juice, permissiveness, rewarding, encouragement, awareness, avoiding negative modelling and lack of self-efficacy) as the possible mediators. Differences were tested in the total sample and stratified by country.

Results: Availability of soft drinks/prepacked fruit juice and plain water, permissiveness and lack of self-efficacy showed a mediating effect on SES differences in both plain water as well as soft drinks and prepacked fruit juice consumption. In addition, rewarding with soft drinks/prepacked fruit juice significantly mediated SES differences for both plain water and fruit juice. Encouragement and awareness were found as a mediator of this SES-intake association for respectively plain water and fruit juice. Parents’ avoiding of being a negative role model did not mediate any association. The stratified analyses showed mixed results. However, availability of soft drinks/prepacked fruit juice was seen as the most important mediator.

Conclusion: In order to overcome SES inequalities in beverage intake among preschoolers, interventions aimed to improve healthy beverage choices in preschoolers should focus on parenting practices and especially availability of soft drinks/prepacked fruit juice in the home environment.
Design and methods for a site-randomized family-based intervention to reduce sugar-sweetened beverage consumption among youth: H2GO! pilot study

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SIG: Children and families

Awards:

Objectives

Reducing sugar-sweetened beverage (SSB) intake is an important dietary target among underserved children at higher risk for obesity and associated morbidities. Family-based approaches to reduce SSB intake are needed. The use of narrative-based approaches (presenting messages within the context of a story) can facilitate connection with target health messages. The H2GO! program is a narrative-based behavioral intervention designed to reduce SSB consumption among school-age youth and parents.

Methods

Guided by the Social Cognitive Theory, the H2GO! intervention consists of 6 weekly sessions that target SSB knowledge, attitudes, and behaviors, facilitat youth-produced narratives (e.g., print, audio, and video PSAs) featuring messages to reduce SSB intake, and include interactive family activities. Participants (children ages 9-12 years and their parents) will be recruited from youth-based community settings in Massachusetts, USA. Intervention protocols were pilot-tested with a sub-set of parent-child pairs. Intervention efficacy will be assessed through a site-randomized trial (N=2 youth-based community sites, pair-matched for size and racial/ethnic composition) with 50 parent-child pairs (N=100) enrolled per site. The comparison site will carry on with usual practice. Primary outcomes (child and parental SSB consumption) and secondary outcomes (child and parental SSB purchasing patterns, knowledge and attitudes around SSBs, and water consumption) will be measured via self-report survey. Additional outcomes include: children’s anthropometric data (measured by trained staff), other dietary behaviors, and physical activity. Data will be collected at baseline, 6 weeks (post-intervention), and 6 months follow-up. Feasibility and process outcomes will be collected and analyzed through quantitative and qualitative methodology.

Results

A total of 12 parent-child pairs were recruited for the intervention pilot test (retention rate of 75%). Results suggest that a narrative-based family behavioral intervention targeting SSB consumption can be feasibly delivered through a youth-based community setting.

Conclusions

Narrative-based interventions hold potential for decreasing SSB consumption among youth and families. This study describes the design and methods of a narrative-based behavioral intervention targeting SSB consumption and associated obesity risk among underserved youth and families in a youth-based community setting. Findings from the site-randomized study will be used to assess efficacy on reducing SSB consumption among youth and families in the USA.
Short Pictorial Sweetened Beverage Scale Demonstrates Validity with Anti-inflammatory Index blood values

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SIG: Children and families

Awards:

Background: Many nutrition programs target sugar-sweetened beverages [SSB] in an effort to improve child health behaviors. Focus on Sweet Drinks was developed. Test-retest reliability (r=.65, p<.0001), and convergent validity using volume of SSB and weight of added sugar from three diet recalls [r=0.31, p<0.01] were reported.

Purpose: Our objectives were to demonstrate further validity using the child's blood biomarkers and parent's soda behaviors: 1) children with healthier SSB scores have more favorable plasma anti-inflammatory markers, specifically interleukin 10 [IL-10] and insulin growth factor binding protein-1 [IGFBP-1], and 2) child SSB scores were related to the beverage behaviors of the parent.

Methods: Low-income parents (n=133) provided self-administered Focus on Sweet Drinks and parent soda behaviors. Children provided blood samples.

Results: The biomarker levels were ranked and combined to make one index. A sub-scale of two soda items was related to this anti-inflammatory index [r=.22, p=.018; tau=.17, p=.019]. Kendall-Wallis [p=.12] and ANOVA generated similar results [R2=.11]. The higher the score on Focus on Sweet Drinks, the healthier the anti-inflammatory profile. In addition, as anticipated the parent and child SSB behaviors were related [tau=.30, p<.0001].

Conclusion: These findings support evidence for validity of Focus on Sweet Drinks and may be useful in assessing the child's SSB with low-income families.

Supported by Agriculture and Food Research Initiative #2010-85215-20658 from the USDA National Institute of Food and Agriculture, Human Nutrition and Obesity 93330.
Systematic development of implementation strategies and materials for the Dutch Guidelines for Healthier Canteens in Dutch secondary schools.

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SIG: Policies and environments

Awards:

OBJECTIVE
In 2014, the Netherlands Nutrition Centre developed Guidelines for Healthier Canteens. Which is an elaboration of the earlier Guideline Healthy School Canteen. The aim of this study is to systematically develop implementation strategies and materials, to facilitate dissemination of the new Guidelines in secondary schools throughout the Netherlands.

METHODS
To develop the implementation strategies and materials we used a systematic approach based on the Intervention Mapping Protocol. By interviewing 17 relevant stakeholders (e.g caterers, canteen manager, school director) we first gained insight in barriers and facilitators for creating a healthy school canteen. These were supplemented by a review of the literature. During an expert meeting 25 experts in the field of implementation and dietary behavior and stakeholders from practice and policy were then asked to prioritize the identified barriers and facilitators and provide ideas for implementation strategies and materials. Finally, the results of the expert meeting and literature were translated into implementation strategies and materials were developed.

RESULTS
Barriers and facilitators identified in the interviews were: Vision of the school board, knowledge and motivation of stakeholders, balance in offer of healthy and unhealthy products, ownership, collaboration and involvement of stakeholders (parents, students, teacher). Literature showed that insight in the current situation is an important facilitator as well. In the expert meeting motivation, involvement and support of involved stakeholders, insight in the current situation and positive environment were mentioned as most important factors to influence. Implementation strategies corresponding with these factors are for example tailoring, individualization, feedback, reinforcement, community development and peer education. Subsequently these strategies were translated into the following materials: A visit of the School Canteen Brigade to provide the school with tailored advice how to achieve a healthy school canteen; an exchange and collaboration Facebook group; healthy school canteen leaflets; newsletters; a factsheet per school of (determinants) of purchases of the school's students.

CONCLUSIONS
The implementation strategies and materials for creating a healthy school canteen were systematically developed based on theory and experts' opinions from practice, policy and research. They will be evaluated in a quasi-randomized trial in 20 schools until June 2016.
Healthy children’s menu changes in restaurants: evaluating industry trends over the past decade

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SIG: Children and families

Awards:

Objective: Restaurant meals are lower in nutritional quality on average than home-prepared meals, and one-third of children eat quick-service restaurant (QSR) meals on a given day. Meal offerings on children’s restaurant menus have historically lacked variety and been of poor nutritional quality. There is some evidence of improvement, particularly among side and beverage offerings, yet historical trends in the availability of healthy sides and beverages are not well understood.

Methods: A historical dataset of children’s menu items available from 2004 to the present for top 16 QSR chains was developed using Technomic’s MenuMonitor, which provides complete information on children’s menu items for 800 national restaurant chains. Healthy menu items were identified as fruit and vegetable (FV) sides and non-sugary beverages. When sides and/or beverages were part of a multi-component meal, we determined whether FV sides and/or non-sugary beverages were automatically included (bundled) in the child meal on the menu. Restaurant-level data on the number of customers served per year were also abstracted from QSR Magazine. All diagrams will be created using a weighted measure based on the number of customers served per year by each chain to evaluate the potential reach of supply-side changes.

Results: Changes in the number and proportion of FV sides and non-sugary beverages will be graphed over time, at the chain level and as a customer-weighted national average. The proportion of child meals automatically bundled with FV sides and non-sugary beverages will also be diagrammed. Trends in the prevalence of healthy menu items will be noted and chains that are early adopters of healthy menu changes will be identified.

Conclusions: The availability of healthy sides and beverages has implications for the nutritional quality of children’s meals in restaurants and potential for public health impact, given that millions of children consume restaurant foods regularly. Since the QSR industry has adopted a “fast follower” business strategy, where chains aim to quickly adopt the latest trends in menu offerings, insight into which firms lead trends within the restaurant industry can highlight effective partners for restaurant-based nutrition intervention efforts.
**P2.101**

**Practicality of using high intensity interval training (HIIT) to improve health in a sedentary working population: a pilot study**

Janet Viljoen, Shannon Lilford, Candice Christie

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Early Career Award**

**Purpose:** Time is an oft cited barrier to engaging in regular habitual activity. "High intensity interval training" (HIIT) protocols may offer the same benefits to health and wellbeing as a longer duration exercise session but without the time commitment. The aim of this study was to assess this claim in a sample of sedentary, desk-based office workers, evaluating measures of anthropomorphology, performance and cardiovascular health.

**Methods:** Following ethical clearance and voluntary consent, 15 male participants were randomly assigned to the HIIT protocol (n=8) or to an inactive control (n=7). The exercise group underwent baseline measures and subsequently commenced a four week HIIT protocol on three days of the week for a total of 16 minutes per session. The exercise protocol consisted of eight full-body exercises, using body weight as resistance. All sessions were supervised.

**Results:** Participants in each group were matched at baseline: age 37.3 ± 7.5 years (control) and 33.0 ± 5.7 years (HIIT), with body mass indices of 28.2 ± 1.9 kg.m$^{-2}$ and 28.9 ± 4.1 kg.m$^{-2}$ respectively. Following the intervention there was no difference in anthropomorphic data in either cohort, nor for waist circumference, blood pressure or measures of muscular endurance. Of interest, however, was a 2.25 cm drop in waist circumference in the HIIT group which was not noted in the control. Additionally, blood pressure (systolic and diastolic) differed (p<0.05) between groups at both the pre- and post-intervention measurements.

**Conclusion:** Limited by the sample size, this pilot study provides initial insight into the efficacy of HIIT in time-poor populations. Trends toward positive responses were noted, and warrant full-scale investigation of longer duration.
A systematic review of active transportation research of children and youth in Africa

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SIG: Children and families

Awards: Yes, for the Early Career Award**

Purpose
Previous systematic reviews indicate that active transportation (AT; the use of non-motorized travel modes such as walking, running and cycling) is an important source of daily physical activity (PA). No previous systematic review has examined travel behaviours among children and youth in Africa. The aim of the present systematic review was to provide a summary of the AT literature among children and youth in Africa (aged 5-17 years).

Methods
Studies on AT among children and youth in Africa (aged 5-17 years) were identified through 1) the MEDLINE and Embase databases; 2) manual searches of six African journals that are not indexed in these databases; and 3) the articles included in a previous systematic review on PA among children and youth in Sub-Saharan Africa. To be eligible, studies had to be original reports including descriptive statistics on travel patterns among African children and youth. Study quality was assessed with a modified version of the Downs and Black checklist comprising 10 different items. The review methodology was prospectively registered in PROSPERO (registration number: CRD42011001456).

Results
Out of the 815 potentially relevant articles, 20 papers describing the findings of 15 different studies met inclusion criteria. Sixteen of the studies reported quantitative data, 4 were qualitative and only three studies were based on representative samples. Two population-based studies reported rates of AT ranging between 19.8% and 66.6% in multiple countries. Studies of Africa children and youth seldom examined non-school travel and only one reported data on the psychometric properties of their measures of travel behaviours. Rates of AT to/from school were lower in urban areas and in youth attending higher socioeconomic status schools.

Conclusion
These findings emphasize the need for more research examining travel behaviours among children and youth in Africa, particularly for non-school travel. Further research is needed to develop valid and reliable measures of non-school travel and to examine their psychometric properties in the African context. These measures could then be used to evaluate AT promotion interventions to promote healthy active living.
When is a change in sedentary behaviour a real change?

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SIG: Ageing

Awards: Yes, for the Early Career Award**

Purpose
To examine the effectiveness of interventions at reducing sedentary behaviour (SB), accurate measurements are paramount. Measurement tools need to be valid and reliable, but more importantly sensitive to change. When researchers find a decrease in SB, they often assume that their intervention worked. However, there is a risk that the difference in SB is a result of measurement error, which includes typical day-to-day variability. To determine whether a change is real or within the measurement error, information about the Minimal Detectable Change (MDC) of the measurement tool is needed. The MDC is the minimum amount of change that is larger than the measurement error. The purpose of this study was to assess the MDC of two subjective methods to measure SB in older adults.

Methods
Sedentary behaviour of 22 older adults (aged 73±6 years, BMI 26.1±3.9 kg/m2, 68% male) was assessed with a previous day recall questionnaire (7 times; days 5-11) and an average day in the previous week recall questionnaire (2 times; day 8 and 15). MDC scores for total sitting time are based on the Standard Error of Measurement (SEM) which is derived from the square root of the mean square error term in the Repeated Measures ANOVA (MDC = SEM X 1.96 X √2).

Results
The mean (±SD) time spent sedentary was 495 (± 101) minutes per day. For total sedentary time, the MDC of the previous day recall was 296.6 minutes, and of the average day recall 244.8 minutes. This represents approximately a 60% and a 50% change relative to total sitting.

Conclusions
Previous day recall questionnaires have generally been found to be more valid and accurate than average day recall; however they seem to be less sensitive to change probably because they capture day-to-day variability better. To be considered as a real change, the difference in total daily sitting time should be more than approximately 5 hours when using a previous day recall questionnaire, and more than approximately 4 hours when using an average day recall questionnaire. This implies that self-report is unlikely to be a suitable measurement tool for intervention studies.
A hierarchy-analysis of socio-demographic correlates of sitting time in European adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective
Sedentary behaviour has emerged as a public health concern. Identifying groups that show high levels of sedentary time is needed to develop targeted interventions to reduce time spent sedentary. The aim of the current study was to explore the hierarchy of socio-demographic correlates of self-reported sitting time in European adults.

Methods
We used data from 27,919 adults participating in the Special Eurobarometer 412 "Sport and physical activity" in 2013. In each European Union Member State, approximately 1000 participants were randomly selected and interviewed face-to-face. Self-reported sitting time was dichotomised into sitting less or more than 7.5 hours per day. Chi-squared Automatic Interaction Detection (CHAID) analysis was used to explore the hierarchy of socio-demographic correlates of sitting more than 7.5 hours per day. This analysis identified the strongest correlate of sitting more than 7.5 hours per day, and segmented the population into homogeneous subgroups based on this correlate. Within each of the subgroups, this process continued, until no further correlates were identified. This resulted in a graphical tree illustrating the different risk profiles of sitting more than 7.5 hours per day.

Results
Overall, 18.5 percent of the participants reported sitting more than 7.5 hours per day. Occupation was identified as the strongest correlate of sitting time. The subgroup that reported the highest level of sitting time were participants with white collar occupations, no difficulties paying their bills, frequent internet access and a high educational level. 47.5 percent of these participants reported sitting more than 7.5 hours per day. In contrast, of the married women with low levels of life satisfaction who were retired or self-employed and living in Ireland, Italy, Malta, Portugal, Slovenia and Spain only 2.9 percent reported sitting more than 7.5 hours per day.

Conclusions
The CHAID analysis identified different risk profiles for sitting more than 7.5 hours per day, with large differences in their sitting time. In general, participants with higher socio-economic status seem to report more sitting than people with a lower socio-economic status. The results suggest that the work environment is an important context for interventions to reduce sitting time.
Spread the Word: Making the physical activity recommendations more accessible through the use of infographics

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Objective

Physical activity recommendations provide an important foundation for educational and promotional campaigns, and provide the benchmark against which population prevalence of physical activity is assessed. In 2011 updated physical activity recommendations were released in the United Kingdom (UK), and provide guidance on the amount of physical activity needed across the life course. However, awareness of the physical activity recommendations remains low. As a result, in 2015 the Chief Medical Officer for England sought the help of an expert group to help translate the physical activity recommendations into simpler messages which can be more easily understood by health professionals and the general public.

Methods

Working with physical activity and design and communication experts, a set of infographics were developed to summarise the physical activity recommendations for 1) children and young people, and 2) adults and older adults. For both infographics, consultation with experts and testing among end-users was undertaken and used to refine the infographic design and content. Feedback was also obtained on appropriate hard copy and electronic formats of the infographics as well as the dissemination strategy.

Results

The aim of the infographics is to summarise the health benefits of physical activity and the recommended amount of physical activity to be undertaken, while being simple and visually appealing. Both infographics were launched at public events by the Chief Medical Officers from each of the four home countries, helping to raise visibility and the political profile of physical activity and health. In addition, the adult infographic was published in the BMJ, accompanied by a commentary from the four UK Chief Medical Officers.

Conclusions

Physical activity recommendations are based on complex scientific evidence on the dose-response relationship between physical activity and health. These types of recommendations are often published in comprehensive reports which are overwhelming and inaccessible to both health professionals and the general public. Infographics present a new opportunity to convey these types of recommendations in a visual and comprehensible manner, which holds promise for increasing public awareness and potentially encouraging behaviour change.
Associations between leisure time physical activity and vertebral fracture in elderly adults

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SIG: Ageing
Awards: No

Objective: Vertebral fractures are common osteoporotic fractures, leading to morbidity and increased risk of mortality. In addition to individual burden, osteoporotic fractures have substantial economic costs for the society. Physical activity has shown to have a beneficial effect for bone health and preventing osteoporotic fractures. However, evidence concerning preventing vertebral fractures is scarce and the focus has primarily been on physical activity as rehabilitation after a vertebral fracture has already occurred. Therefore, the aim of this study was to investigate the association between leisure time physical activity and osteoporotic vertebral fracture.

Methods: In 2007-2008, 2098 adults (968 men and 1130 women), aged 50-87, were examined as part of the sixth survey of the Tromsø Study, a longitudinal population study in northern Norway. Physical activity was assessed by a multiple-choice questionnaire including exercise and physical exertion in leisure time. Vertebral fracture was ascertained by lateral vertebral fracture assessment performed from dual X-ray (DXA). At least 9 and maximum 13 thoracic and lumbar vertebras were examined in each subject. We used logistic regression models to analyze associations between physical activity and osteoporotic vertebral fracture.

Results: Compared with the sedentary subjects, the moderately and highly active men and women did not show any association between leisure time physical activity and osteoporotic vertebral fracture. Age-adjusted OR was 1,37 (95% CI: 0,82-2,29) for moderately active men and 1,20 (0,66-2,21) for highly active men. In women, the respective ORs were 1,07 (95% CI: 0,65-1,76) and 1,55 (0,76-3,16). In the multiple adjusted model, OR for moderately active men was 1,56 (95% CI: 0,91-2,68) and for highly active men 1,41 (95% CI: 0,74-2,66. In women, the respective ORs were 1,12 (95% CI: 0,66-1,91) and 1,73 (95% CI: 0,82-3,67).

Conclusions: This cross-sectional study did not confirm any significant associations between levels of leisure time physical activity and prevalent vertebral fracture in elderly adults. Future studies on this topic might benefit from a longitudinal study design in predicting vertebral fracture.
P2.107

Understanding strength exercise intention and behavior in hematologic cancer survivors: An analysis of the intention-behavior gap

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SIG: Cancer prevention and management

Awards: No

Background: Strength exercise improves health outcomes in hematologic cancer survivors (HCS) but the prevalence and correlates of strength exercise is not well-described. Forming an exercise intention is one of the strongest correlates of exercise behavior, yet an intention does not always translate into actual exercise participation. To date, no study has examined the intention-behavior gap for exercise in cancer survivors. Purpose: To quantify the intention-behavior gap in HCS and examine correlates of both intention formation and translation, using the multi-process action control framework (M-PAC). Methods: 2,100 HCS were mailed a survey assessing strength exercise behavior, components of the M-PAC, and demographic/medical variables. Two separate hierarchical logistic regressions analyzed the relationships between correlates and the odds of intention (a) formation and (b) translation. Results: N=606 HCS completed the survey, of which 58\% (n=353) intended to do strength exercise. HCS who were not retired (OR=1.56, p=.001), highly educated (OR=1.32, p=.001), had a favorable attitude (OR=1.56, p<.001), descriptive norm (OR=1.38, p=.006), injunctive norm (OR=1.45, p=.004), and perceived control (OR=1.38, p<.001), had greater odds of intention formation. Of those with an exercise intention, 51\% (n=181) reported regular strength exercise. HCS with a detailed plan (OR=1.86, p<.001), favorable attitude (OR=1.68, p=.001), sense of obligation (OR=1.38, p=.010), and self-regulated their affinity for competing activities (OR=1.35, p=.012), had greater odds of intention translation. Conclusion: These results provide support for the M-PAC framework. Many HCS intend to do strength exercise, yet only half translated their intention into exercise. Interventions for helping pre-intentional HCS form an exercise intention may wish to focus on detailing the compelling benefits of strength exercise and making it more enjoyable (attitude), engaging support from important others (norms), and providing the necessary access and exercise skills (perceived control). Retired and less highly educated HCS may require additional support in forming an exercise intention. Efforts to assist HCS translate their intention into strength exercise behavior may wish to further target their attitude, help create a detailed plan to implement their intention, encourage personal accountability by helping HCS self-identify as exercisers (obligation), and provide strategies to self-regulate the temptation to avoid exercising (competing activities).
**P2.108**

**Social Support and physical activity participation among healthy adults: a systematic review of prospective studies**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Student Competition*

**Objective:** Social support has been implicated in the improvement of health and well-being among adults and may be associated with physical activity. However, the consistency and strength of the relationship with PA is unknown. Therefore, the objective of this study is to determine the consistency and strength of the association between social support and physical activity among healthy adults. With this information, we may be able to inform interventions aimed at improving PA among adults.

**Methods:** A systematic review was conducted using electronic databases (Ovid MEDLINE, EMBASE, PsychINFO, SPORTDiscus and Scopus). Published English and French written articles with health adults aged 18 to 65 years were included if the reported study used a prospective-based (i.e., longitudinal) design where social support and physical activity were assessed. Data extraction and assessment of risk of bias were conducted by two reviewers. Study-level effect sizes were calculated and reported as odds ratios (OR [95%CI]). Given the observed heterogeneity between studies, no meta-analysis of the results was performed; a qualitative synthesis approach was used to summarise the findings.

**Results:** The initial search yielded a total of 2892 citations and 18 studies were included in the review. A consistent association between social support and physical activity was found, with the strength of the effect sizes ranging from small (0.13) to large (9.33), with the majority reporting small effects (median OR = 1.61). The nature of physical activity behaviour (initiation vs. maintenance), gender, source (family vs. friends support) or type (emotional vs. material) of social support were examined in post-hoc analyses within the included studies. Studies with lower risk of bias for social support and physical activity measures demonstrated a positive indirect effect of social support (via perceived capability) on physical activity, as well as direct positive associations with physical activity.

**Conclusions:** Given the findings, interventions targeting social support appear to be warranted among healthy adults. An examination of multiple dimensions and providers of social support as well as exploring gender as a moderator of the social support - physical activity association are needed.
Comparing wrist-worn Fitbit and waist-worn Actigraph in free-living adults

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Awards: Yes, for the Student Competition*

Purpose: Accelerometers are considered state of the art in monitoring free-living physical activity in epidemiological studies. Recently, however, consumer-based activity monitors (wearables) and Smartphone in-built accelerometers have become increasingly popular. The aim of this study was to compare the wrist-worn Fitbit Flex with the widely established waist-worn Actigraph wGT3X-BT in real-life settings among healthy adults.

Methods: A convenience sample of 107 adults from a public university and a hospital in Singapore were recruited. They were requested to wear a Fitbit Flex on the wrist and an Actigraph on the waist concurrently for 7 consecutive days while maintaining their normal activities. Participants who provided at least 4 valid wearing days (≥1500 steps per day) were included in the analyses. Based on the commonly recommended cutoff of 10,000 steps per day, ActiGraph derived steps/day was used to define two daily physical activity categories (inactive and active days). Comparisons in step counts between the activity trackers were made for overall, by gender and daily physical activity categories (inactive and active days).

Results/findings: A total of 104 adults (median: 31.0 years) met the wear time criteria. Participants were predominantly female (66.3%), from the university (67.3%), had a university degree (74.0%), and with a body mass index of 22.6. On average, 6.6 valid wear days were recorded. The overall steps/day recorded by ActiGraph and Fitbit Flex were 8815.0 and 10193.0, respectively. Strong significant positive correlations and agreement were shown in overall, by gender and daily physical activity categories (rₛ: 0.76-0.91; ICC: 0.73-0.87). The median absolute percentage differences were: overall (15.5%), men vs. women (16.9% vs. 15.1%), and inactive vs. active days (20.4% vs. 9.6%) for steps. Bland-Altman plots further demonstrated that the difference between devices were dependent on the underlying activity level and suggested considerably larger overestimations in step counts by the Fitbit on inactive days.

Conclusions: Our findings indicate considerable accuracy of the wrist-worn Fitbit in monitoring free-living physical activity. However, they also suggest an overestimation in step counts, which is dependent on underlying activity levels. This information is relevant for the appropriate planning of health promotion strategies based on such devices.
P2.110

A systematic review and meta-analysis of workplace intervention strategies to reduce sedentary time in white-collar workers

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose: Sitting often occupies majority of total daily sedentary time during work among desk-based employees. Hence, the working environment is a practical platform for health promotion programs targeting sedentary behaviour. The aim of this systematic review and meta-analysis was to examine the overall effectiveness of workplace interventions, and by intervention type (i. educational/behavioural, ii. environmental, and iii. multi-component interventions), in reducing sedentary time among white-collar working adults.

Methods: Articles published through March 2015 were identified through five online databases and manual searches. Only workplace-based interventions with a parallel control group, such as, randomized controlled trials (RCTs), quasi-experimental studies or controlled trials conducted among white-collar working adults were considered. Sedentary behaviour outcomes were either self-reported, or objectively measured. Two reviewers performed data extraction and independently assessed the methodological quality of included studies. Studies were included in the meta-analysis if they compared the intervention to a control group that received no intervention. Data synthesis was based on the Cochrane handbook for Systematic Reviews of Interventions. Subgroup analyses were conducted according to intervention strategies. We reported the pooled intervention effect.

Results/findings: Out of 4202 studies, 18 controlled intervention studies published between 2003 and 2014 of approximately 3600 working adults met the selection criteria. Only one study was rated to be of 'high quality', eight of 'good' and nine of 'fair' methodological quality. Out of 18 studies, 10 reported a significant reduction in sitting time. The pooled intervention effect from 15 studies, which had a control group as the comparator, showed a significant sedentary time reduction of -42.3 min/8-h workday (95% confidence interval [CI]: -56.9, -27.7), favouring the intervention group. In the subgroup analysis, multi-component interventions reported the largest reduction in sedentary time (-88.8 min/8-h workday; 95% CI: -132.7, -44.9), followed by environmental (-75.5 min/8-h workday; 95% CI: -121.3, -29.6) and educational/behavioural strategies (-16.9 min/8-h workday; 95% CI: -25.5, -8.2).

Conclusions: Our study found consistent evidence for workplace intervention effectiveness in reducing sedentary time, particularly for multi-component and environmental strategies. Larger and more rigorously designed studies are warranted, however, to confirm these findings.
Actual versus shortest routes in active commuting: Finding the most relevant buffer sizes for evaluating the built environment along the route with a grid based method

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SIG: Policies and environments
Awards: No

Objective:
To better understand the relationships between active commuting and built environment, this study compares environmental features along shortest and actually used routes of active commuters at Hatanpää area in Tampere, Finland. Compared to former studies, the route environment is evaluated more elaborately by examining the route not as one elongated space, but as a series of spaces with varying characteristics. To consider the potential associations thoroughly, the effect of each built environment variable on route choice is examined with a range of potential buffer sizes.

Methods:
The data on actually used routes was collected during autumn 2014 and spring 2015 with a smart phone application for GPS tracking. The shortest routes are calculated with MapInfo Drivetime program. The data on built environment characteristics is extracted from national datasets. The route environment is analyzed by creating a grid over the whole study site and calculating the values of several built environment variables for each cell of the grid with multiple buffer sizes ranging from 15 m to 300 m. For each route, various statistics of the cells intersected by the route are calculated and the most significantly associated buffer size, in respect to route choice, is then defined for each built environment variable.

Findings:
59 participants tracked their routes to work, of which 18 were women and 41 men. 45 participants were cyclists and 12 pedestrians. 2 participants tracked both cycling and walking routes to work. Average age of the participants was 42 years. The study reveals built environment characteristics that attract active commuters and affect their route choice. The most relevant buffer sizes for evaluating different built environment variables in respect to route choice will also be determined.

Conclusions:
The study improves our understanding of the impact of spatial scale used for measuring built environment, which may explain some of the inconsistent findings across studies. The grid based method for analyzing the route environment may produce more profound knowledge of the built environment determinants of route choice. The results can be utilized in urban planning purposes and in future studies, e.g. for determining probable route choices for active transport.
Commuting patterns and associations with health in a large Dublin University; a cross-sectional observational study.

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SIG: Policies and environments
Awards: No

Purpose: To observe active and passive commuting patterns for a large Dublin University and to examine associations between self-reported health indices and mode of commuting.

Methods: Following a pilot study to establish peak commuting times, several days of observation were conducted to establish the numbers of cyclists and car users at peak times. A subsample of this population (cyclists, n=286; car users, n=266) was questioned on gender, self-reported height and weight, journey frequency, distance and duration, perceived fitness and quality of diet. These factors were compared between mode of transport groups using Chi-Squared, Mann Whitney and Independent T-Tests.

Results: At peak times, approximately 570 car users and 237 cyclists per hour were recorded. Age was not significantly different between the two types of commuter, with a mean age of 23 years (p=0.964). Although females were less likely (p<0.001) to cycle than males (with 67.1% of cyclists being male), an even sex distribution was found for car users. Car users travelled greater distances (mean 16.1km v 4.7km) and for longer durations (33.9 v 16.3 minutes) than cyclists (p<0.001), giving average commuting speeds of 29km/hr and 17km/hr for cars and cycles respectively. 58% of car users travelled less than 10km in their commute. Of particular note was the difference in BMI between cyclists (mean BMI=23.0) and car users (mean BMI=24.4; p<0.001). Cyclists also rated themselves as having healthier diets and better fitness levels than car users (p<0.00).

Conclusions: In this survey of university commuters at peak travel time, approximately 2.4 times as many chose to travel by car rather than cycle, with females much less likely to cycle. Although the average distance travelled by car was over three times further than that covered by cyclists, a majority of car users travelled less than 10km to university. Cyclists were leaner and perceived themselves as being fitter and healthier than car users. These results indicate that cycling has real and perceived health benefits and that cycling may best be promoted among females and those driving less than 10 km. For these shorter distances, duration of travel is not a major barrier to cycling.
Engaging men in Fit Reds: a men’s physical activity and behaviour change intervention delivered through a professional football club.

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Early Career Award**

**Purpose:** In the UK, professional football clubs are used as a vehicle to recruit men to physical activity and health improvement interventions. Barnsley Football Club’s ‘Fit Reds’ (FR) programme was funded by the British Heart Foundation in order to improve the cardiovascular health of men in Barnsley (South Yorkshire, England). FR targets middle-aged men and aims to promote positive, lifelong behavioural change through a 9-week intervention of physical activity and health education sessions. A mixed methodological approach was adopted to explore participants’ motivations for joining FR and the psychosocial impact of engagement. **Methods:** A non-probability sample of participants (n=21) completed self-report questionnaires providing data on demographics, physical activity status, BMI and health behaviours pre-intervention. Descriptive statistics were used to analyse the data. Three focus groups were conducted with a representative sample of programme participants post-intervention. Focus groups were digitally recorded, transcribed verbatim and analysed using a thematic analysis framework. **Results:** FR engaged men who demonstrated multiple risk factors for cardiovascular disease. Whilst the ‘pull’ of the football club was reported as an important component of the intervention for adoption, analysis revealed that more than half of all FR participants were not fans of Barnsley Football Club and 15% were not even fans of football. Predominantly, participants joined FR because they felt their lifestyle was not health enhancing and they wanted to change this. Participants described how FR provided an opportunity to lose weight, improve their physical health and nutritional knowledge. Key design characteristics such as the delivery staff, a male specific environment and the development of camaraderie were identified as significant influencing factors for adherence. Improvements in psychological health, social wellbeing and health enhancing behaviour change were reported. Participants suggested that they would benefit from prolonged engagement in health educational sessions and regular health screening to maintain behaviour change. **Conclusion:** By sharing the participants’ perspectives, this research provides valuable insights into the design characteristics that make FR an acceptable and appropriate health improvement intervention for engaging ‘at-risk’ middle-aged men.
Stepping cadence and cardiometabolic risk in African-origin adults from 5 populations spanning the epidemiologic transition.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: Walking is the most frequently reported leisure-time physical activity (PA), yet few individuals self-select a walking cadence ≥100 steps/minute, considered the threshold for moderate intensity PA. We compared cadence measures in the young adults spanning the epidemiologic transition, enrolled in a multi-country prospective study of weight gain (Ghana, South Africa, Jamaica, and USA).

Methods: 1,832 men and women provided measurements of anthropometry (weight/BMI), objective PA (Actical accelerometer, 7-day) and cardiometabolic risk (BP, glucose and lipids). PA was explored as 1-min bouts of moderate and vigorous PA (MVPA) as well as daily sedentary time, while cadence was examined as minutes and steps accumulated in the following cadence bands: 0 (non-movement), 1-19 (incidental movement), 20-39 (sporadic movement), 40-59 (purposeful steps), 60-79 (slow walking), 80-99 (medium walking), 100-119 (brisk walking) and 120+ steps/min (fast locomotor movement).

Results: Overall, men and women from Ghana and South African men had the lowest body weights compared to the US (p<0.001). MVPA were also greatest among the Ghanaians and South African men (p<0.001). Among both men and women, almost 90% of the day were accumulated in cadence bands reflective of non-movement, incidental or sporadic movement. Men spent 24 min/d (2%) walking briskly (100-119/steps/min), while women accumulated only 14 min/d (1.5%) of brisk walking. Ghanaians (18%) and South Africans (21%) accumulated significantly more time walking briskly (100-119 step/min) compared to US adults (13%). Sixty nine percent of Ghanaians and 46% of South Africans accumulated ≥10,000 steps/d, compared to only 27% of the US adults (p<0.001). Overall, adults were 60% as likely to be obese if they did not accumulate 10,000 steps/d and 28% as likely to have high fasted glucose. BP and lipids were not associated with cadence or steps.

Conclusions: We find significant differences for both cadence and steps among diverse populations of African origin adults. Accumulating 10,000 steps/d has favorable associations with both adiposity and glucose measures, but not lipid or BP measures, suggesting unique associations between PA and cardiometabolic risk.
Do perceptions of one’s neighborhood environment matter for intervention effects on physical activity among Latinas in San Diego, California?

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Objective: Few studies have examined whether perceived neighborhood environment influences intervention effects on physical activity. Therefore, this study tests whether perceptions of built and social neighborhood environment variables moderate intervention effects on physical activity behavior change among a sample of Latina women participating in a randomized controlled trial for physical activity promotion in San Diego, California, USA (“Faith in Action”).

Methods: This cross-sectional study examined baseline and 12-month follow-up data collected among 436 Latinas recruited from 16 Catholic churches randomized to either a physical activity intervention or attention-control condition. Data were collected between May 2011 and December 2014. Participants completed a survey and were asked to wear an accelerometer for 7 complete days at baseline and 12-months follow-up. A validated scale was used to assess 7 perceived environment variables (e.g., access to places to exercise and safety from crime). The dependent variables were self-report leisure-time and accelerometer-assessed moderate-to-vigorous physical activity (MVPA) at 12-months follow-up. Analysis of covariance mixed effects models were used to examine each physical activity outcome, adjusted for church clustering, baseline physical activity, and demographic variables. Moderation was examined by including interaction terms between the intervention condition variable and each perceived environment variable.

Results: Latinas in the physical activity intervention had significantly higher self-report leisure-time and accelerometer assessed MVPA at 12-months compared to those in the attention-control condition (p=0.03). Higher scores on perceived safety from traffic and neighborhood aesthetics as well as having access to places to exercise facilitated intervention effects on accelerometer-assessed MVPA. For example, at 12-months follow-up Latinas in the physical activity condition that reported having access to places to exercise at baseline had higher accelerometer-assessed MVPA minutes/week (adjusted mean=4.93, SE=0.07) compared to those reporting not having access to places to exercise (adjusted mean =4.56, SE=0.15) (interaction p=0.05). Increases in MVPA by these environment variables were not observed in the attention-control group.

Conclusions: Certain perceived neighborhood environment variables may be particularly important in facilitating Latinas’ accelerometer-assessed MVPA in response to a formal multilevel intervention. Findings may help identify under what conditions interventions may be most effective at changing physical activity behaviors among Latinas.
"Just because you're pregnant, doesn't mean you're sick!" Beliefs regarding physical activity in black South African women.

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Purpose: Despite the benefits of physical activity during pregnancy, the psycho-physiological effects of this unique period may put women at greater risk of being sedentary. Research has shown that black South African women, in particular, are at increased risk of physical inactivity and associated health risks. Little research has been done in this population during pregnancy. Therefore, the aim of this qualitative study was to describe the beliefs regarding physical activity behaviour during pregnancy in an urban African population.

Methods: Semi-structured interviews (n=13) were conducted with pregnant Sowetan women in their third trimester. Deductive thematic analysis was completed based on the Theory of Planned Behaviour. Coding and analysis was completed with the assistance of ATLAS/Ti software.

Results: Participants had a mean age of 28 years, and a mean BMI of 30kg/m². The majority of women believed that physical activity was beneficial to both mother and baby. Despite this positivity, various pregnancy-related discomforts, such as fatigue and size of the stomach, were reported as intrinsic barriers to leading an active lifestyle, whilst extrinsic barriers reported included lack of time and money. Woman reported wanting to look good and avoiding excessive weight gain as intrinsic facilitators to being active. Extrinsic motivators included social support and community-based activities to promote physical activity. Influential role players in physical activity behaviours, such as family and friends, healthcare providers and cultural beliefs, reportedly provided the women with vague, conflicting and often discouraging advice about physical activity during pregnancy.

Conclusions: This study provides new theoretical insight on the beliefs of urban South African pregnant women regarding physical activity. This study adds critical formative work upon which contextually, and culturally sensitive, interventions can be developed.
Talking the walk: using tablet technology to investigate participant views of Open Streets

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SIG: E- & m-health

Purpose: Open Streets are a global initiative using city streets open for recreational and community activities and closed to motorized vehicles. Three international sites (Bogotá, Colombia; San Francisco, CA, USA; and Temuco, Chile) are using Open Streets to evaluate changes to participants’ perspectives of the influence of the environment on PA opportunities and behavior. Using the Stanford Healthy Neighborhood Discovery Tool, residents document their perceptions of neighborhood characteristics on event and non-event Open Streets days. The current project will describe the methods, processes, and challenges of conducting this research in diverse social and geographical contexts as well as present preliminary analyses.

Methods: Using tablet technology, participants take geocoded photos and narrate reasons for taking photos, while walking a designated section of an Open Streets route (prior to and during the initiative). Participants share their views, ideas, and perspectives on perceived barriers to and supports for PA in the built environment. Qualitative data include photos and narratives. Quantitative data are collected from a 25-item survey on the tablet (e.g., "Were there people on your walk today that made you feel unsafe?") and a 16-item Likert-scale reflection survey asking participants to indicate changes in their views of the environment across event and non-event days (e.g., Quality of sidewalks: seemed worse \( \Rightarrow \) seemed better).

Results: Seventy participants have completed study protocols. Recruitment was the primary challenge due to time burden on participants to schedule and show up (2 data collection events of 30 minutes not including transportation time) and scheduling (weekend or workday data collection). Participants varied by income status (homeless to high income), ethnicity, and age (18+). Emergent barriers to PA across communities are amenity connectivity and social support.

Conclusions: Conducting cross-cultural research on Open Streets highlights unique and similar values and barriers to PA in different settings. There are several methodological challenges to evaluating the feasibility of using tablet technology for data collection on Open Streets initiatives. These include the difficulty of recruitment in diverse populations and settings and the time requirement for participants. This project can offer useful information for the development and implementation of Open Streets research.
Physical activity, sitting time, and cardiovascular disease among Lebanese-Australian adults: A cross-sectional study

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objective

The consequences of prolonged sitting time (ST) and physical inactivity on cardiovascular disease (CVD) risk have been widely reported. Few studies, however, have focused on migrant populations. Phenomena, such as the healthy migrant effect, have been postulated to describe the health status of migrants when settling in a foreign country. These phenomena, however, do not apply to all migrants as each group have unique experiences that influence their health status. The purpose of this study was to examine whether Lebanese-Australians born in Lebanon, Australia, or in other countries exhibited higher odds of CVD relative to Australian-born Australians, and the extent to which physical activity (PA) levels and ST contributed to CVD.

Methods

Participants were 60,357 adults from baseline data of The 45 and Up Study, a cohort study of 267,000 adults aged 45 and older. The sample included 59,191 Australian-born Australians, 598 Lebanese-born Lebanese-Australians, 453 Australian-born Lebanese-Australians, and 115 Lebanese-Australians born elsewhere. Odds ratios (OR) for CVD for each group were calculated using multilevel binary logistic regression models with participants nested within Statistical Area Level 2 whilst adjusting for CVD risk factors and socio-demographic variables. Risk factors were dichotomised in accordance with existing recommended guidelines. Sensitivity analyses using expanded categorical variables were performed to address the biases associated with dichotomisation. Separate models excluded PA and ST individually to assess the change in the odds of CVD following their exclusion.

Results

After full adjustment, only Australian-born Lebanese-Australians had significant higher odds of CVD in comparison to Australian-born Australians (OR 1.39, CI=1.04-1.84, p=0.025). No statistically significant differences were observed for Lebanese-Australians born in Lebanon and elsewhere. There was no change in the OR following the exclusion of ST for any of the groups. Conversely, PA had a greater effect on the OR, which suggested that PA explained a greater proportion of the variation in CVD.

Conclusion

Only Australian-born Lebanese-Australians had greater odds of CVD relative to Australian-born Australians. Overseas-born Lebanese-Australians did not exhibit significant lower odds of CVD, which challenges the 'healthy migrant effect'. Further, PA had a greater impact than ST on the degree of CVD experienced among each group.
**P2.119**

*Short-Term Dietary Changes, Cardiovascular Risk, And Insulin Resistance: A Pilot Study In Post-Menopausal Women*

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Student Competition*

**Introduction** Cardiovascular disease and insulin resistance are rapidly increasing in South Africa. As diet may play the biggest role in the development of these diseases, investigation into the impact of different dietary regimes on metabolic health is necessary. **Purpose.** This study aimed to determine whether short term adaptations to either a LCHF or a HCLF eating plan impacted anthropometrical, morphological, and biochemical health parameters in post-menopausal women. **Methods.** A pilot randomized control trial was conducted. Ten female participants (54-65 years) were randomly assigned to one of two groups: a three-day high-carbohydrate, low-fat diet (HCLF); or a three-day low-carbohydrate, high-fat (LCHF) diet. Baseline anthropometric, morphological and cardiovascular health measures were taken, including an oral glucose tolerance test (OGTT), and these were repeated after the dietary intervention. Dietary adherence was monitored via online food-recall diaries. **Results.** There was no significant difference within and between groups with respect to anthropometric, morphological, and cardiovascular health measures pre and post intervention. Additionally, no significant difference in glucose tolerance and insulin sensitivity was found. However, the LCHF group transitioned from ‘pre-hypertensive’ to ‘normotensive’ with respect to systolic blood pressure: a finding of clinical significance. Waist circumference also decreased by a mean of 1.04 cm in LCHF post intervention. **Conclusion.** Short-term adaptation to either diet did not significantly impact anthropometric, morphological or health parameter changes. Despite this, clinical significance was observed with respect to changes in waist circumference and systolic blood pressure in the LCHF group.
On which days of the week are young adults most physically active and least sedentary? The Raine Study cohort.

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** No

**Purpose:** To examine variation by day of the week in young adults’ physical activity and sedentary time.

**Methods:** Data are from 773 Australian young adults (50% women, mean±SD age, 22.1±0.6 y) participating in the 22-year-old follow-up of the Raine Study who wore Actigraph GT3X+ accelerometers on the hip for 24 h/day over a one-week period. One minute epoch intensity counts were classified as moderate-vigorous intensity physical activity (MVPA; <1952 counts per minute, cpm); light-intensity (100-1951 cpm) and sedentary (<100 cpm). Non-wear and “sleep” were excluded. Variation by day of the week in MVPA (log transformed) and sedentary time (expressed as sedentary/light activity ratio, also log transformed) were examined using linear mixed models, adjusting for sociodemographic characteristics. Each day was compared with the overall (grand) mean, as marginal means with multiple comparison adjustment (Sidak), expressed as relative rates (RR).

**Results:** MVPA and sedentary/light ratio both varied by day of the week \((p<0.001)\). Mean MVPA was below average on Sundays, by approximately 30% in relative terms, \((RR=0.72, 95\% CI: 0.64, 0.80)\), and above average on Thursdays, by 13% \((RR=1.13, 95\% CI: 1.04, 1.22)\). Other differences were small and non-significant, ranging from 4% below to 8% above average. Fridays and Saturdays were both less sedentary than average (respectively, by 6% and 9\%, \(RR=0.94, 95\% CI: 0.91, 0.98\) and \(RR=0.91, 95\% CI: 0.87, 0.96\)) while Wednesdays were more sedentary than average (by 5\%, \(RR=1.05, 95\% CI: 1.00, 1.09\)) and the other days showed no significant or large differences from the grand mean (1 to 3% higher or lower). Conclusion: Young adults’ MVPA time, and the balance of time spent in sedentary or light intensity activity, varied by day of the week. The least MVPA was undertaken on Sundays, and most on Thursdays, while young adults were less sedentary on Fridays and Saturdays, and most sedentary on Wednesdays. These findings on the daily patterns of exposure to sedentary time and physical activity can be used to inform targeted interventions in order to try and improve the current behaviours of young adults, and thus their life course trajectories for activity related behaviours and health sequelae.
P2.121

From feeling connected to moving to feeling good: Does individual social capital enhance older adults' health and well-being by promoting physical exercise?

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SIG: Ageing

Awards: No

The aim of this study was to examine the assumption that older adults' individual social capital of being connected to society and the community benefits their physical health and well-being in part by promoting their exercise involvement. A survey was conducted among a population-representative sample (n = 1,298) of older adults (age ≥ 55), including a baseline (n = 949) and a three-year follow-up (n = 409) survey. The results indicate that specified aspects of this social capital benefited the present and, to a diminished extent, the three-year future physical health and well-being of older adults. Even though exercise involvement potently enhanced physical health and well-being, this wholesome effect of older adults' social capital did predominantly not emerge as the result of a promoted involvement in exercise. The experience of safety in society was the only (evaluated) aspect of this social capital that predicted their physical health and well-being at the present and three-year into the future in part by explaining their involvement in exercise. In conclusion, the social capital of being connected to society and the community, and exercise involvement benefit older adults' physical health and well-being mainly independently. The implications for the promotion of successful aging among older adults are discussed.
A 3-year worksite-based lifestyle intervention to reduce cardiovascular disease risk factors in office employees: Rationale, development and design of two parallel randomized controlled trials.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

BACKGROUND: Cardiovascular disease (CVD) is a leading cause of death worldwide. With atherosclerosis as underlying cause for many CVD events, prevention or reduction of subclinical atherosclerotic plaque burden (SAPB) can have substantial public health and economic benefits.

OBJECTIVE: To present the protocol of a randomized controlled trial (RCT) investigating the (cost-)effectiveness of a comprehensive 3-year worksite-based lifestyle intervention program aimed at improving dietary, physical activity, and sedentary behaviours in participants having a high level of SAPB or low level of SAPB compared to standard care.

TRIAL DESIGN: Two parallel RCTs nested within the ‘Progression of Early Subclinical Atherosclerosis’ (PESA) cohort will be conducted. One RCT (n= 350) will focus on a sample of employees drawn from the cohort with high imaging-defined SAPB and a second RCT (n=650) on a sample with low imaging-defined SAPB. In both RCTs, the participants (aged 40-60) will be randomized into either a group receiving a 3-year lifestyle intervention or receiving standard care. The lifestyle intervention primarily aims to improve dietary, physical activity, sedentary behaviours. The intervention consists of three elements: (A) 12 personalized lifestyle counseling sessions over a 30-month period, (B) a wrist worn physical activity tracker, and (C) a sit-stand workstation. Data will be collected at baseline and at 1, 2 and 3-year follow-up. Primary outcome measure is a compilation score of blood pressure, physical activity, sedentary time, body weight, diet and smoking (BEWAT). Physical activity and sedentary time will be assessed objectively with the activPAL inclinometer. Questionnaires are used to assess: diet, smoking, sleep habits, depression, perceived stress, job strain, social support, vitality, relaxation, quality of life, health care consumption and intervention processes. Physical measurements include anthropometrics, noninvasive imaging to assess SAPB (using 2D ultrasound of carotids, abdominal aorta and iliofemoral arteries, 3D ultrasound of carotid and femoral arteries and coronary artery calcification by computed tomography), and blood biomarkers. A process evaluation and a cost-effectiveness evaluation will be conducted.

DISCUSSION: This study will provide insights into the (cost-)effectiveness of a 3-year worksite lifestyle intervention on CVD risk factors, compared to standard care in participants with high-imaging defined SAPB or low-imaging defined SAPB.
Effectiveness of a tailored physical activity app-based intervention for young adults - Active2Gether

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SIG: E- & m-health

Awards: Yes, for the Student Competition*

Purpose: Tailored web-based physical activity (PA) interventions have been found to be effective in increasing levels of PA. Nowadays, smartphones offer new possibilities for the delivery of tailored interventions. Active2Gether (A2G) is an app-based intervention to promote sports participation, active transport and stair use among young adults. The overall aim is to increase levels of weekly moderate-vigorous PA. The intervention is informed by social cognitive and social-ecological theory, and is thus tailored to psychological, social and physical environmental determinants of PA. The app is linked to the Fitbit One activity tracker. The messages sent by the app are based on evidence-based behaviour change techniques (e.g., self-monitoring, goal setting, social comparison) and are framed in an autonomy-supportive style. Furthermore, social network techniques are used to influence beliefs and subsequent behaviour.

Method: A trial is planned with four conditions: 1) The full tailored A2G intervention; 2) The untailored A2G intervention, 3) Fitbit platform, and 4) Generic information. Young adults (18-30 years) will be recruited, randomly allocated to one of the four conditions, and participate in the baseline assessment (intake questionnaire assessing behavioural determinants, context information, PA levels) and will wear an Actigraph GT3x+ for one week. During the course of the intervention, participants will receive questions to reassess the psycho-social variables and motivation. After a 3 month intervention period, participants again will complete the full questionnaire and will wear an Actigraph GT3x+ for one week. Differences in PA and determinants of PA between study conditions will be analyzed with regression analyses.

Results: The intervention will start in January 2016 and results will be available May 2016, in time for presentation at ISBNPA 2016.

Conclusions: This study will evaluate the effectiveness of a highly tailored PA intervention, that surpasses existing apps by sending messages tailored to the person and context. Additionally, this study will compare the effects of a tailored intervention with an intervention that sends messages untailored, the Fitbit and generic information.

This research is supported by Philips and Technology Foundation STW, Nationaal Initiatief Hersenen en Cognitie NIHC under the Partnership program Healthy Lifestyle Solutions.
Measurement Validity Of The Global Physical Activity Questionnaire (GPAQ) In South African Adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: Physical activity measures in Sub-Saharan Africa rely heavily on self-report data in resource poor settings. This study sought to evaluate the WHO recommended GPAQ as a measure of self-reported physical activity in South African adults in comparison to an objective measure of physical activity.

Methods: Service industry employees in physical occupations (n=88; 51% men; mean age 40y) were recruited from workplaces in the North West Province. The GPAQ questionnaire was administered in the participants preferred language by trained researchers. A waterproof tri-axial accelerometer (GENEActiv) was worn on the non-dominant wrist for 5 day physical activity measurement. Self-reported sleep periods were removed from the accelerometer data set.

Results: Compliance was high with 95% of the group (84/88) recording 5 days of accelerometer data and a mean wear time of 23hrs and 11 min, SE ± 5 min per day. GENEActiv data showed lower moderate physical activity (p<0.001) and vigorous physical activity (p<0.001) than the values recorded by GPAQ, with an average over-reporting of 110 ± 14 minutes of moderate and 71 ± 11 minutes of vigorous physical activity/day. While there was no significant difference between men and women in moderate or vigorous activity/day by GPAQ, GENEActiv data showed men had significantly more moderate (116 ± 8 minutes) and vigorous activity/day (31 ± 5 minutes) than women (70 ± 5 minutes; and 6 ± 2 minutes respectively; all p<0.001). When adjusted for gender differences in body mass index, the differences between men and women in moderate and vigorous activity/day by GENEActiv remained (p<0.012).

Conclusions: We found the criterion validity of the GPAQ when used to measure moderate and vigorous physical activity in South African adults to be poor with substantial over-reporting of activity levels. Our finding that differences in moderate and vigorous physical activity between men and women are not detectable by GPAQ has important implications for the development and monitoring of interventions seeking to change physical activity in low resource settings.
Does Facebook offer social support during app based physical activity behaviour change programmes?

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SIG: E- & m-health
Awards: Yes, for the Student Competition*

Purpose:
Facebook (FB) boasts 1.49 million users worldwide (Statista, 2015) and is increasingly used to provide online social support (SS) in regulated physical activity (PA) interventions (Graham et al., 2011). As SS is an important behaviour change technique (Oinas-Kukkonen and Harjumaa, 2008) it is necessary to understand how/if those engaging in self-regulated, application (app) based PA programmes, receive the relevant SS to achieve recommended PA levels. Due to its vast reach and adoption, this research investigates whether FB can provide online SS for those undertaking PA via a well-known beginners running app, independent of professional guidance.

Methods:
Qualitative thematic analysis of publicly available FB group discourse, linked to a beginners running app, took place over a 12-month period. A convenience sample of 501 participants (females n=419) was drawn with data being inductively analysed. Ethical approval for this study was granted by Leeds Beckett University research Ethics Committee.

Results:
Data reduction, of 1685 posts, established using a coding manual (Guest et al., 2012), revealed online SS is a prominent feature of FB running app groups. SS discourse consisted of:

1) Support giving; “….you’re doing great! If you want to share motivation, feel free to send me a friend request, I’m all about getting fit.”

2) Support seeking; “…. I need all the support I can get. Cheer me on please!”

3) Peer mentoring; “Week 1 day 1. Do I do day 2 tomorrow or wait a day?”

Reply: “Always leave a day in between. In practice it generally means you run three times a week. For me that’s Tuesdays, Thursdays and Saturdays.”

4) Value; “THANKS SO MUCH! Love posting here. You all are so sweet and motivating!”

Conclusions:
Findings indicate that valuable online SS is attainable through FB for those undertaking this app based PA programme. This supports previous research indicating FB provides positive SS when adopting PA behaviours (Cavallo et al., 2014; Maher et al., 2014). Future research should aim to determine the effectiveness of naturalistic FB groups that offer SS. Learning from the untapped reach of social media will serve to inform future public health policy and practice.
Physical activity outcomes from a faith-based "not yoga" study among African Americans

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SIG: Cancer prevention and management

Awards: Yes, for the Early Career Award**

Purpose: Mind-body practices are widely accepted as effective for improving physical and psychological well-being, but there is limited data on their use to improve physical activity (PA) in African Americans. This may be due to historical resistance to yoga and meditation among African American Christians due to conflicting religious beliefs. The purpose of this study was to test the efficacy of Harmony & Health (HH), a culturally-adapted mind-body intervention to promote PA adoption and maintenance, among a church-based sample of sedentary African American adults.

Methods: Sedentary, overweight/obese African American men and women were recruited to HH through an existing church partnership. Eligible participants (N=50) were randomized to a mind-body intervention (n=26) or wait-list control (n=24) group. Participants in the mind-body group attended 16 sessions over 8 weeks. Sessions included stretching and guided relaxation that incorporated scripture. All participants completed the International PA Questionnaire and a 7-day accelerometer assessment to assess moderate-to-vigorous-intensity PA (MVPA) at baseline (T1), post-intervention (T2) and 6-week follow-up (T3). Changes in MVPA between groups and by employment status were examined using repeated measures ANOVA; only participants with complete data at all time points were included in this study.

Results: Participants (n=27) were mostly women (92.6%), in their early 50s (M age=50.3±9.1 years), and obese (M BMI=34.3±5.3 kg/m²). Participants self-reported doing 51.3±53.1 min/day of MVPA and did 28.6±17.5 min/day of accelerometer-measured MVPA. After adjusting for gender, age, BMI, education, income, marital status, number of children and employment status, there were no significant changes in self-reported MVPA over time by group. However, there were differential changes in accelerometer-measured MVPA by group and employment status over time (F(2,32)=5.371, p=.010). Among participants in the intervention group, those employed decreased their MVPA from T1 to T2 (∆=-3.4 min/day) and increased from T2 to T3 (∆=1.9 min/day), whereas those who were unemployed/retired increased from T1 to T2 (∆=4.5 min/day) and decreased from T2 to T3 (∆=-2.9 min/day).

Conclusions: HH was effective for increasing but not maintaining PA among church-based African American adults. Future studies should tailor interventions based on intervention status to have the greatest effect on PA among ethnic minority adults.
Fitness and Strength Responses to Exercise Training in African American Men: The ARTIIS Study.

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SIG: Policies and environments

Awards: No

Objective: The effects of exercise on cardiorespiratory (CRF) and muscular strength have rarely been documented in African American men. The purpose of this analysis was to document changes in these variables in response to an exercise program that 1) adhered to the US national physical activity guidelines by combining aerobic and resistance training, and 2) was conducted in a community setting.

Methods: The Aerobic plus Resistance Training and Insulin Sensitivity in African American Men Study (ARTIIS) was a 5 month randomized, controlled exercise intervention conducted in sedentary men with a family history of type 2 diabetes. Participants were randomized to either an exercise training (n = 56) or a control (n = 57) group. The exercise group engaged in 150 minutes of aerobic training at 65% - 85% VO₂ max and 2 days of resistance training. All exercise sessions were conducted in YMCA facilities and supervised weekly by a fitness instructor. The control group received written information promoting healthy lifestyle changes. CRF was assessed using a standardized graded exercise treadmill test and muscular strength was assessed by isokinetic knee extension strength and endurance using a Biodex Dynamometer. Data were analyzed using intent-to-treat, repeated measures mixed models ANOVAs.

Results: The men were 50.5 ± 9.6 years with a BMI = 31.7 kg/m² ± 5.0. The compliance with the aerobic and resistance training program was between 76.4% and 80.4%. Relative CRF increased 11.7% from 24.5 (0.8) mL/kg·min with exercise training and declined by 1.9% from 24.4 (0.8) mL/kg·min in the control group, resulting in a significant between group difference (p<0.001). Responses in CRF were similar when evaluated relative to lean body (p<0.001) mass. There were also significant between group differences for estimated metabolic equivalents and time on the treadmill (p values <0.001). Muscular fitness was not altered by the exercise program compared to the control (p values >0.090).

Conclusions: A community-based exercise training intervention had significant positive effects on CRF, but not muscular strength. Future research should focus on developing community-based strategies that sustain increased exercise in African American men given the cardiovascular health findings of the current study.
The utilization of GPS technology to understand the relationship between environmental contexts and active living: A systematic review

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose

As researchers and policymakers are recognizing the importance of social and physical contexts on active living (AL), innovative research methods and measurement techniques are increasingly being used to capture this relationship. The fast-evolving field of active living research (ALR) employs diverse methods resulting in eclectic evidence generation, where key gaps and opportunities have not been well studied. The purpose of this systematic review is to coalesce evidence on the usage of global positioning system (GPS)-enabled methods to understand the role of contexts in AL.

Methods

The search was conducted using Ovid Medline, Embase, PsycINFO, Web of Science, Engineering Village and SPORT Discus databases. Two reviewers screened selected articles independently and data were extracted into summary tables categorizing studies by country, context, participants, outcomes, design, methods and type of GPS tool. The search criteria were not limited to participant type or context in order to explore all cohorts and environments. Only peer-reviewed articles were included, and studies using technologies other than GPS (i.e., WiFi) were excluded. The final articles will be appraised using the GRADE method.

Results

A total of 1425 citations were identified yielding 48 studies for inclusion. The studies were predominantly cross-sectional (n = 43) and conducted with children/adolescents (n = 34). GPS data loggers combined with accelerometry was the most popular measurement option (n = 28). Moderate to vigorous physical activity was the main outcome in most studies (n = 19). Numerous studies also used diaries to obtain participants’ perceptions of environment. Environmental contexts ranged from neighbourhood built environment, urban vs. rural, outdoor vs. indoor, and work vs. home.

Conclusions

A wide range of interdisciplinary ALR is being conducted utilizing GPS technology to understand the relationship between overlapping contexts and AL. While there are some consistent patterns, a major limitation is the lack of longitudinal studies and mixed-methods approaches in understanding the relationship between changing social/physical contexts and AL. Finally, with ALR emphasizing the importance of all intensities of activity (moderate, vigorous and light) and sedentary behaviour in influencing health outcomes, future studies utilizing GPS to understand “where” activity occurs should take this evolving evidence into consideration.
**Associations of Social Media Use, Sedentary Behaviour and Body Mass Index**

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**SIG:** Policies and environments

**Awards:** No

**Purpose:** Sedentary behaviours, such as sitting, increases the risk of cardiovascular disease, diabetes, obesity, and poorer mental health status. Despite this, 70% of Australian adults sit for more than 8 hours per day. An increasing time-consuming leisure time activity is the use of social media applications (e.g., Facebook, Twitter, and Instagram). In 2014, 81% of the Australian population was able to access the Internet at home, of which 70% visited social media sites. However, few studies have explored the association of social media use with sitting time and BMI.

**Methods:** Cross-sectional self-report data on demographics, BMI and sitting time were collected from 1140 participants of the 2013 Queensland Social Survey. Generalised linear models were used to estimate associations of a social media score calculated from social media use, perceived importance of social media, and number of social media contacts with sitting time and BMI.

**Results/findings:** Social media score had a significant positive association with sitting time while using a computer (OR=1.02, SE=.00) and total sitting during non-workdays (OR=1.01, SE=.00). However, no associations were found between social media score and sitting during TV viewing, using motorised transport, working, doing other leisure activities, total workday, total sitting time or BMI.

**Conclusions:** These results suggests that interventions that aim to reduce sitting time should pay attention to social media use when using a computer or during non-work days.
Examining knowledge mobilization strategies to increase levels of physical activity in people with schizophrenia and diabetes: A scoping review

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose
Few individuals living with schizophrenia are physically active. Providing physical activity information to this population has been suggested as a strategy to increase physical activity participation and improve overall health. Despite this need for information, no research has examined how physical activity information should be delivered to people with schizophrenia. The purpose of this scoping review was to identify knowledge mobilization theories, and credible messengers and effective methods used to disseminate physical activity information to individuals with schizophrenia.

Methods
A methodological framework designed by Arksey and O'Malley (2005) was used for this review. Literature was included if it met the following criteria: 1) involved individuals with schizophrenia; 2) involved physical activity, exercise, or sport; and 3) addressed a) knowledge mobilization theories used to disseminate physical activity information, b) messengers for physical activity information dissemination, or c) methods of physical activity information dissemination. Databases included PSYCHINFO, PUBMED, CINHAL, the Cochrane Library including the Cochrane Schizophrenia Group Trials Register, and GOOGLE SCHOLAR. Both grey literature and published studies were searched.

Results
In total, 37 studies were included in this review. Most studies did not specify how information about physical activity was disseminated. Seven studies identified knowledge mobilisation theories used in disseminating physical activity information to people with schizophrenia. Theories included the Transtheoretical Model, Cognitive and Behavioural Therapy, Psychoanalysis, and Social Cognitive Theory. Messengers utilised in disseminating physical activity information were predominantly research and clinical staff. Researchers did stress the importance of relying on messengers known and trusted by participants to enhance behaviour change. Methods used to disseminate physical activity information included both verbal and written instructions and were delivered in education or counselling formats.

Conclusions
There is an absence of theory guiding physical activity information dissemination to people with schizophrenia. Few researchers explicitly rationalized why certain methods or messengers of information delivery were used. Using effective methods and credible messengers can influence participant attitudes, confidence, and motivation towards physical activity behaviour change. Future research must consider theories of knowledge mobilisation when designing and implementing studies and pay particular attention to the choice of methods and messengers used to deliver information.
‘I’m sitting here bored to tears like an ... old age pensioner’: the importance of social networks in understanding sedentary behaviour in older adults.

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SIG: Ageing

Awards: No

Purpose:

High levels of sedentary behaviour (SB) puts older adults, one of the most sedentary age-groups, at increased health risk. In order to intervene to reduce older adults’ sedentary time we need to understand what older people are doing when they are sitting or not sitting. The overall aim of this qualitative study is to investigate the relevance and meaning of sitting for older people and to identify opportunities to intervene. In this paper we present emergent findings about the importance of social networks in understanding SB.

Methods:

As part of larger interdisciplinary study examining SB in older adults (Seniors USP, http://www.gcu.ac.uk/seniorsusp/), 48 semi-structured qualitative interviews were conducted with older adults of varying age (mid 60s/late 70s/mid 80s), social class (high/low) and objectively-measured SB (high/low). The interviews were analysed using a thematic framework approach.

Findings:

Social networks were shown to play a role in breaking/reducing SB. Interviewees with high SB talked about engaging in fewer social activities: ‘I lived here 14 years and I can honestly say, I've no friends, I've nowhere to go [...] So I've nothing to do so I just sit about'. Although the social activities older adults engaged in were often largely sedentary: ‘I'm not going out, you know, playing badminton or something like that. We sit and have coffee and we chat', the routines involved in preparing for and getting to social activities may present opportunities to break/reduce SB in everyday life: ‘I'd have been making breakfast, up and down, washing your hair, having your shower, that kind of thing [...] it takes me two hours to get out'. While opportunities to reduce sitting time emerged through participating in social activities, interviewees also discussed difficulties in maintaining social networks as friends and family were often ‘gone or they died'.

Conclusion:

These findings underline the importance of expanding the focus of SB interventions for older adults beyond the individual to consider the wider social context. Drawing attention to the importance of maintaining or developing new social networks may provide older adults with opportunities to reduce or break up SB as part of everyday life.
Differences in environmental preferences towards cycling for transport among adults: a latent class analysis

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SIG: Policies and environments
Awards: Yes, for the Student Competition*

Objective
Increasing cycling for transport can contribute to improve public health among adults. The physical environment and especially micro-environmental factors (i.e. small-scaled street-setting features) may play an important role in affecting the street’s appeal to cycle for transport. Understanding about the interplay between individuals and their physical environment is important to establish tailored environmental interventions to increase cycling for transport. Therefore, the current study aimed to examine whether specific subgroups exist based on similarities in physical environmental preferences for transportation cycling. Furthermore, specific characteristics of these subgroups were identified, such as socio-demographics, transport behaviour, psychosocial determinants of cycling for transport, perceptions of their own neighborhood environment, cycling skills, concerns and preferences of the participants.

Methods
Responses of 1950 middle-aged adults (45-65 years) on a series of choice tasks depicting potential cycling routes with manipulated photographs, yielded three subgroups with different environmental preferences using latent class analysis.

Results
Results indicated that all subgroups awarded most importance to the type of cycle path concerning the street’s appeal to cycle for transport of which a good separation with the motorized traffic was preferred. Nevertheless, latent class analysis revealed three different subgroups of the middle-aged adult population with similar preferences for the physical environment. Subgroup 1 (n= 232; 11.9%) consisted mainly of men, had significantly higher cycling rates and awarded relatively more importance to stricter speed limits influencing the street’s appeal to cycle for transport compared to both other subgroups. Subgroup 2 (n=598; 30.7%) in turn, consisted mainly of women and paid more importance to aesthetic and comfort-related environmental factors instead of traffic-related environmental factors. Finally, subgroup 3 (n=1120; 57.4%) showed the least preference to cycle alone, had the highest percentages of participants that are cohabiting and had a more pronounced preference for cycle path type compared to both other subgroups.

Conclusions
These results might accommodate to interventions targeting specific at-risk subgroups or can provide information about which certain environmental changes are most effective for certain subgroups.
The relationship between neighbourhood walkability and leisure-based screen time in adults

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SIG: Policies and environments

Awards: No

PURPOSE: Sedentary behaviour is a modifiable risk factor for type 2 diabetes, cardiovascular disease, overweight and obesity, and early mortality. Research on the determinants of sedentary behaviour, including screen time, is accumulating however; little evidence exists regarding associations between the neighbourhood built environment and sedentary behaviour. Moreover, among this existing evidence findings regarding the associations between self-reported and objectively-assessed built environment characteristics and sedentary behavior are equivocal. Thus, the purpose of our study was to estimate the associations between objectively-assessed and self-reported neighbourhood walkability and leisure-based screen time behaviour in adults.

METHOD: A random cross-section of Canadian adults (≥18 years of age) provided complete telephone-interview and postal survey data (n=1967). Captured variables included daily leisure-based screen time (television viewing, computer use, and video gaming), perceived walkability, sociodemographic characteristics, moderate and vigorous-intensity physical activity, self-reported health, and weight status. Based on objectively-assessed built characteristics (i.e., walkshed area, population density, proportion of neighbourhood as green space, path/cycleway length, density of businesses, density of bus stops, sidewalk length, mix of park types, and mix of recreational facilities) participant’s neighbourhoods were identified as low, medium, or high walkable. Using multivariate linear regression, screen time was regressed on objectively-assessed and self-reported walkability adjusting for covariates.

RESULTS: On average (±standard deviation), participants undertook 1.78±1.52 hours/day of leisure-based screen time, with 39.5% undertaking ≥2 hours/day. Compared to others, residing in a objectively-assessed high walkable neighbourhood, women, having a college education, at least one child at home, a household income ≥$120,000/year, and a registered motor vehicle at home, reporting very good to excellent health and healthy weight, and achieving 60-min/wk of vigorous-intensity physical activity were associated (p<.05) with less screen time. Self-reported walkability was not significantly associated with screen time. The inclusion of all correlates in the linear regression model explained 7.6% of the explainable variance in screen time.

CONCLUSIONS: Our findings suggest that other important correlates of screen time, not captured in our study, likely exist. Nevertheless, neighbourhood walkability was associated with screen time, independent of other correlates including sociodemographic characteristics, self-reported health, weight status, and physical activity. Improving neighbourhood walkability could decrease leisure-based television and computer screen time.
Building bicycle paths and challenging expectations: the impact of a new cycleway in inner-Sydney

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Objective:
New bicycle infrastructure can generate controversy in a car-oriented society and this may influence neighbourhood engagement. In conjunction with a quasi-experimental study (findings expected early 2016) we assessed before-and-after perceptions and attitudes of local residents and businesses to a new 2.4km inner-city cycleway in Sydney.

Methods:
Longitudinal panel data from residents within the intervention area and a control area, taken at baseline, four months post construction and one year later were collected using an online travel and health survey. Semi-structured qualitative interviews were conducted pre-construction of the cycleway in December 2013, and again six months post-construction. Thirteen retail businesses located along the length of the cycleway and 20 local residents participated.

Results:
Results from the panel data showed no significant change in health indicators: physical activity or quality of life, between baseline and the first follow-up. Findings from the second wave of data collection will shed light on changes in the community over a longer period, including overall quality of life.

In the qualitative study, residents were initially in favour of the cycleway to separate cyclists from motorists and pedestrians, yet few residential cyclists said they would use it, having set preconceptions about its use. Businesses were more negative, with fear of parking restrictions a major concern. Initial objections to the cycle path were recognised as mainly due to misunderstanding or misinterpretation of the intended changes to the street. Since completion, both groups noted the improvement in the aesthetics of the streetscape, liveability of the area and the potential for new business opportunities. Cyclists reported feeling safer, more confident and found they were using the cycleway for multiple purposes. There was however much confusion and tension amongst motorists and pedestrians where their road/path came in contact with the cycleway as they learnt to interact with the new infrastructure.

Conclusions:
Cycling infrastructure can have a positive impact on communities however opposition to change can be challenging. Qualitative findings exploring initial perceptions and engagement help to explain the behavioural change process and may help to explain possible delays in use of the new cycleway by the local community.
Occupational sitting, lifestyle behaviours, and body mass index in middle-aged and older adults: Findings from The 45 and Up Study

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SIG: Ageing

Awards: Yes, for the Early Career Award**

Objective:
Sedentary behaviour is associated with a range of negative health outcomes including increased risk of obesity, cardiovascular disease, and diabetes. Work practices have become increasingly sedentary in recent decades, and occupational sitting contributes to around one-third of total sedentary time. This study aimed to examine the association between occupational sitting, lifestyle behaviours, and body mass index (BMI) in a cohort of middle-aged and older Australian adults.

Methods:
Using data from the first wave of follow-up from The 45 and Up Study, in which participants were asked to report sitting time at work, we examined the association between quartiles of occupational sitting and physical activity (PA), fruit and vegetable consumption, smoking, alcohol use, sleep, and BMI. Binary logistic regression models were used to establish the adjusted odds ratios (AOR) of meeting current recommended Australian guidelines for each variable. Participants who were employed in full-time, part-time or self-employed work, and for whom valid data on weekday sitting time at work were available, were included in the analysis.

Results:
Participants were 8,367 working middle-aged and older adults (57.5% female, 43.8% working full-time) with a mean (±SD) age of 59.37y (±5.87) and a mean BMI of 27.06kg/m² (±4.93). After adjusting for age, gender, and education, participants in higher occupational sitting quartiles had significantly higher odds of being overweight or obese (Q3 AOR=1.306, 95% CI=1.143-1.493; Q4 AOR=1.319, 95% CI=1.157-1.504) and significantly lower odds of engaging in higher levels (300 minutes or more) of PA (Q4 AOR=0.856, 95% CI=0.751-0.975). Participants reporting higher occupational sitting also had significantly higher odds of achieving recommended levels of sleep (Q3 AOR=1.202, 95% CI=1.049-1.378; Q4 AOR=1.230, 95% CI=1.075-1.407). There were no significant differences between quartiles of daily occupational sitting and meeting recommended guidelines for PA (≥150 minutes), fruit and vegetable consumption, smoking, or alcohol consumption.

Conclusions:
Being overweight or obese is a major risk factor for a range of chronic diseases. Although there were no key differences between occupational sitting and factors such as fruit and vegetable consumption, smoking or alcohol consumption, the findings suggest that sedentary workers should be encouraged to sit less and move more during the workday.
Change in motivating factors influencing commencement, adherence and retention to a supervised resistance training programme in previously sedentary post-menopausal women: a prospective cohort study

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SIG: Theories of motivation

Awards: No

Purpose: Understanding motivators for exercise participation in post-menopausal women may impact retention to exercise programmes and inform intervention trial designs. The purpose of this investigation was to assess self-reported motivational factors influencing adherence and retention to a 24-week progressive resistance training programme.

Methods: Post-menopausal females (n = 34) were passively recruited to undertake a 24-week progressive resistance training protocol, in small-group sessions, on three non-consecutive days of the week. Attendance was recorded by the researcher. Qualitative reports were sourced from the sample for four phases of the study: pre-study (prior to week 1), recruitment (week 1), during study (weeks 2 - 24), and post-intervention (beyond week 24). Responses were categorized according to ten descriptors: specific health index improvement, education, flexibility of time, social contact, conscience (loyalty to the researcher), wellness, weight management, organization parameters (pertaining to the study programme) and enjoyment of the exercises.

Results: Of the initial sample, 76.5% (n = 26) met the specified ≥80% attendance criterion. The primary findings were that motivation to volunteer for the study was driven by a perceived need for a structured exercise programme (50% of respondents). A commitment to the researcher was the primary motivator for continued adherence to the study for 50% of participants. Social contact with other participants was cited by 60% of the sample as the primary reason for adherence for the full duration of 24 weeks. A desire to maintain the "wellness" derived from the programme was cited by 60% as a reason for continuing an exercise routine post-study.

Conclusion: This study identified that routine and supervision initially attract women to exercise programmes, while social cohesion of the group setting contributes to retention over time. Understanding the changing nature of motivating factors may contribute to better overall adherence and retention to exercise programmes and interventions.
The validity and reliability of three self-report instruments for assessing compliance with physical activity guidelines amongst Irish university students.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Today's university students are our future leaders, their habits, beliefs and attitudes will be influential in shaping community norms and values. However, these future leaders and policy makers are spending a considerable time in a sedentary setting. There is a steady decrease in physical activity through young adulthood, especially in the university setting (Dinger et.al. 2014). In order to assess the levels of physical activity in a population, a set of valid and reliable measurements are needed and self-report questionnaires are the most commonly used method for population studies. The purpose of this study was to examine the reliability and validity of three separate short physical activity measurement tools for assessing physical activity guidelines in Irish students.

Participants (192; 45.8% male, 22.86 ± 5.36 years) were recruited from a high active convenience sample. A single item measure (Milton et.al. 2011), an adapted PACE+ measure (Prochaska et.al.2001), and the IPAQ-SF were presented to the participants in an online questionnaire and were completed in the presence of a research team. Physical activity was objectively measured for 4 days, 8 hours per day using the Actigraph GT1M and the GTX3. SPSS Inc., Chicago IL, version 21. Spearman Rho correlations and levels of agreement analysis between measures was used to assess validity. Test-retest reliability was performed for each self-report measure through an inter-class correlation.

Any significant correlations found across all measures were low to moderate (r= 0.22 - 0.44). Agreement levels were moderate for both Bauman's single measure (49%) and PACE+ Adult measure (46%). IPAQ-SF showed higher levels of agreement (71%). Interclass correlation scores reported Bauman's measure (0.80; CI= 0.68-0.88), PACE+ Adult measure (0.76; CI= 0.66-0.83), and IPAQ-SF measure (0.52; CI 0.33-0.66).

It was observed that these Irish university students underestimated how physically active they are when using the PACE+ or the single item measure. Each of these measurement tools had questionable levels of reliability and validity. For future reference, the development of an instrument would allow us to analyse where population groups are in danger of falling out of physical activity participation for the health benefits and help develop interventions in university settings.
Netball shoots for physical and mental health in Samoa: a natural experiment

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SIG: Socio-economic inequalities

Awards: Yes, for the Early Career Award**

OBJECTIVE

The impact of physical activity on physical and mental health may be particularly important in Samoa, where almost 50% of adults are insufficiently active, the prevalence of overweight is among the highest in the world (i.e. >80%), and there is an increasing burden of mental illness. However, there is a paucity of evidence for the effect of sport programs on health in low- and middle-income countries. Our objective was to assess the impact of the One Netball Pacific program on netball participation, recreational physical activity levels, mental well-being and body composition in Samoa.

METHODS

We conducted a natural experiment on the island of Savai‘i. The intervention group (n=47) comprised women from four villages who registered for a six week netball league. Each team played one organised game per week and undertook additional training at their discretion. The control group (n=96) comprised women from eight neighbouring villages without teams in the netball league. Measurements before and after the league included: 1) Netball participation frequency; 2) Global Physical Activity Questionnaire (recreation); 3) WHO-5 Well-Being Index and Happiness visual analogue scale; 4) Body weight. The intention-to-treat analysis assessed between group differences in mean change using a univariate ANOVA and Cohen’s D effect sizes (ES) adjusted for age, village, education level and baseline.

RESULTS

Netball participation, recreational physical activity levels and mental well-being improved for both groups. The change in netball participation frequency was 2.1 times greater in the intervention group (ES=2.65, 95%CI 2.18-3.11). This corresponded to a change in moderate-vigorous physical activity levels that was 198 minutes/week higher in the intervention group (ES=3.04, 95%CI 2.55-3.54). The change in the WHO-5 well-being index was 16.5 points larger in the intervention group, which is clinically relevant (ES=1.08, 95%CI 0.71-1.45) and was accompanied by a significantly greater improvement in happiness score (ES=0.65, 95%CI 0.29-1.00). The change in body weight was 2.2kg better for the intervention group (ES=0.43, 95%CI 0.07-0.78).

CONCLUSIONS

The netball league positively influenced netball participation, recreational physical activity levels, mental well-being and body weight of participants when compared to controls. Broader dissemination and scaling-up of similar interventions appears to be warranted in Samoa.
Substituting sedentary time by light- or higher intensity activity: associations with all-cause mortality in the EPIC Norfolk cohort

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SIG: Ageing

Awards: No

Purpose: Current health guidelines vaguely recommend reductions in sedentary behaviour. The impact of such reductions on mortality risk, however, likely depends on the intensity of the activity it is replaced by, but very few studies with objective activity measures have examined this. We therefore aimed to determine the differential mortality benefits of substituting objectively measured sedentary time by light-(LIPA) or moderate-to-vigorous physical activity (MVPA), focusing on total (TST) and prolonged sedentary time (PST).

Methods: A cohort of 3,316 Caucasian, older adults (68.5±7.5years; 43.5% men), without self-reported stroke, myocardial infarction or cancer history at baseline (2006-2011), was followed up for vital status until 31st January 2015 (5.7±1.6years). Sedentary time (<100 counts/minute), LIPA (100-1999 counts/minute) and MVPA (≥2000 counts/minute) were measured by accelerometry over 7 days (hip-worn Actigraph GT1M; 5-second resolution; ≥4 valid days with ≥1 weekend day (≥10 wear-hours/day; non-wear bout: ≥90 minutes consecutive zeros)). Cox proportional hazards regression was used to estimate hazard ratios and 95% confidence intervals (HR [95%CI]), with exposures expressed in 30 minutes/day increments. Models were adjusted for age, gender, education, smoking, alcohol, medication for hypertension, dyslipidaemia or depression, diabetes history, family history of diabetes, cardiovascular disease or cancer and monitor wear time. To estimate associations for substituting sedentary time with higher intensity activity of the same duration, iso-temporal substitution modelling was implemented.

Results: One-hundred-seventy-six participants died during 18,899 person-years of follow-up. TST (1.19 [1.08-1.32]) as well as PST (only counting: >10-minute-bouts: 1.22 [1.07-1.39], >20-minute-bouts: 1.25 [1.07-1.46], >30-minute-bouts: 1.27 [1.04-1.55]) were independently associated with increased mortality hazard. Each 30 minute/day reduction in TST was associated with a reduction in mortality hazard of 39% when substituted by an equal amount of MVPA (0.61 [0.45-0.84]) and of 8% when substituted by an equal amount of LIPA (0.92 [0.80-1.04]). These associations were stronger when considering PST (>30-minute-bouts: MVPA: 0.56 [0.38-0.81], LIPA: 0.84 [0.68-1.04]). LIPA-to-MVPA substitutions were also associated with reduced mortality hazard (0.67 [0.46-0.98]).

Conclusions: In older adults, greater mortality benefit is gained when substituting sedentary time, especially PST, by MVPA. These and future findings from larger cohorts with objective activity measures will aid in further specifying health guidelines.
The impact of epoch lengths on MVPA and sedentary time estimations

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose: Physical activity is often measured in minutes of moderate to vigorous physical activity (MVPA) and minutes of sedentary behavior. When these indicators of physical activity are measured by accelerometer data, a choice needs to be made regarding epoch length (sampling period). Common cut-offs used for detecting MVPA or sedentary behavior were calibrated using 60 second epochs. However, measures based on shorter epochs might provide additional information on the changes in physical activity within a 60 second epoch. Using free-living data, this study aims to describe potential biases created by the use of shorter epoch lengths, and to explain the mechanisms leading to these biases.

Methods: Accelerometer data for participants' trips over 7 days from the RECORD GPS Study (1584 days, 227 participants) was collected with Actigraph GT3X + accelerometers and processed in ActiLife 5.10. Two MVPA cut-offs based on uni-axial counts per minute (the Freedson-1998 and the Troiano-2008 cut-offs), one MVPA cut-off based on the tri-axial vector magnitude (Sasaki-2011) and one uni-axial cut-off (150 counts per minute or less) for sedentary time were compared. Daily minutes of MVPA and sedentary time were estimated for nine epoch lengths between 1 second and 60 seconds.

Results: Using 1 second epochs, the daily MVPA for the Sasaki-2011 cut-off was estimated at 91 min, 44 min more MVPA compared to 60 second epochs. When applying the Freedson-1998 and the Troiano-2008 cut-offs, the 1 second epochs overestimated MVPA by 17 minutes. Daily sedentary time was estimated at 1311 minutes using 1 second epochs, or 148 minutes more than with 60 second epochs.

Discussion: Using shorter epoch lengths than those used to calibrate the cut-offs changes daily MVPA and sedentary time in particular cases. However, on a population level, there is a clear trend towards more MVPA and sedentary time when using shorter epoch lengths. Given the biases found in this study, a new discussion is needed to guide our future research. Should we use shorter epoch lengths for more detailed physical activity measures and recalibrate new cut-offs for these epoch lengths; or should we hold on to the longer epoch lengths?
Participation and adherence to physical exercise after completion of primary cancer treatment

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SIG: Cancer prevention and management

Awards: No

Purpose: We aimed to identify demographic, clinical, psychosocial and physical factors that are associated with participation in and adherence to a combined resistance and endurance exercise program in cancer survivors, shortly after completion of primary cancer treatment. Data from the randomized controlled Resistance and Endurance exercise After ChemoTherapy (REACT) study were used for this study.

Methods: Participants (n=277) and non-participants (n=179) completed self-reported questionnaires on demographic, psychosocial and physical factors. Relevant clinical information was extracted from medical records. Participants were randomly allocated to a high intensity (HI) or low-to-moderate intensity (LMI) exercise program. Exercise adherence included session attendance rates, compliance rates of the resistance exercises and compliance rates of the endurance exercises. High session attendance rates were defined as attending at least 80% of the sessions, and high compliance rates were defined as performing at least 90% of the prescribed exercise. Multivariable logistic regression analyses were applied to identify factors that were significantly associated with participation, high session attendance, high compliance with resistance and high compliance with endurance exercises.

Results: Participants were more likely to have higher education, non-smoking habits, higher outcome expectations, lower psychological distress, and perceive more exercise barriers compared to non-participants. In HI exercise, higher self-efficacy was significantly associated with high session attendance and high compliance with endurance exercises. Furthermore, a more positive attitude towards exercise, and lower psychosocial distress were significantly associated with high compliance with resistance exercises in HI exercise. In LMI exercise, non-smoking habits and lower education level were significantly associated with high compliance with resistance exercises. In addition, breast cancer survivors were less likely to report high compliance with resistance and endurance exercises in LMI exercise compared to survivors of other types of cancer.

Conclusion: Several demographic, clinical and psychosocial factors are associated with exercise participation and adherence. Psychosocial factors are more strongly associated with adherence in HI than LMI exercise.
The social determinants of physical activity and its association with body composition in urban South African women

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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Objective: The aim of this study was to determine the association of physical activity and body composition with education and employment status in a cohort of black South African women with a known high prevalence of obesity.

Methods: Data were collected from 702 middle-aged women from the Birth-to-Twenty study, Soweto, Johannesburg (mean age: 49.3 ± 5.3 years). Weekly physical activity and sitting time were determined using a validated self-reported physical activity questionnaire. A validated health questionnaire was used to determine highest level of education and employment status. Anthropometric data (body mass index (BMI), waist and hip circumference) were collected using standardised methods. Multivariable linear regression models were developed to determine the principle correlates of total moderate-vigorous physical activity (MVPA), sitting time, waist circumference and BMI. Independent variables were chosen for inclusion in each of the regression models based on their significant (p<0.05) association with the dependent variable in a univariate correlation analysis.

Results: A majority of the study participants had not completed high school (57.7%), while unemployment was 42.4%. The total level of MVPA for the population was 240 (60-1020) mins/week, with work-related MVPA contributing 62.3%. Sitting time was 672 (510-880) mins/week, while mean BMI was 33.4 ± 7.32 kg/m2. In the multivariable linear regression models, manual work correlated with MVPA (β=0.22, P<0.0001), age correlated negatively with sitting time (β=-0.09, P=0.03), non-manual work correlated positively with BMI (β=0.10, P=0.02), and MVPA and completion of high school each correlated negatively with waist circumference (both variables were β=-0.07, P=0.001).

Conclusions: Subjects undertaking manual labour have better physical activity profiles compared with the unemployed and non-manual workers, whereas BMI was higher in subjects undertaking non-manual labour when compared to those who were unemployed. In subjects who had completed high school waist circumference was lower when compared with those who had not. Engaging in physical activity seems to lower central adiposity, as suggested by the inverse correlation of MVPA with waist circumference.
Profiles of users of a Smartphone beginners running application: Couch to 5K

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Leeds Beckett University, Leeds, UK

SIG: E- & m-health

Awards: Yes, for the Student Competition *

Purpose:

Free physical activity (PA) applications (apps) are widely available and globally accessible. Health services are beginning to acknowledge the potential cost-effectiveness of PA apps in tackling the burden of lifestyle-related diseases. The UK’s National Health Service have commissioned a free running app for beginners; Couch-to-5K (C25K). Developing a profile of who uses this app will lead to better designed promotional campaigns for those most in need. This was the purpose to the current research.

Methods:

An anonymous online survey, reached 903 adult C25K users, based on 12 weeks of data collection. Descriptive statistics were collated in SPSS version 22. Ethical approval for this study was granted by Leeds Beckett University research Ethics Committee.

Results:

Of 903 respondents aged 19-72 (mean age 42.4; ±SD 9.89), 718 (79.5%) were female. Demographically respondents reported white British, Irish and European backgrounds (95.3%). Of these respondents;

- 62.6% were in full-time and 30.3% in part-time employment; 4.9% reported student status.
- 84.5% reported living with family, while 11.3% lived alone and 4.2% live with friends.
- 21.7% self-reported health problems, including mobility issues, type 2 diabetes, asthma, thyroid function problems, polycystic ovary syndrome, hypertension, chronic fatigue, and mental health disorders such as bipolar disorder and depression. However, only 7.3% were regularly accessing health advice services such as websites.
- Only 3.9% were over 60 years of age.

- Used C25K flexibly:
  - “Used it for over a year as I didn't do it continuously.”
  - “Dip in and out every year or so when work prevents me being able to run and I need to step back and start off at an easier pace.”

Conclusions:

C25K, a free-of-charge PA app, is predominantly used by white females and those with no self-reported health problems. Employment and residential data highlight the potential of C25K in addressing commonly identified barriers to PA engagement. The overall utility of C25K allows users to adopt it flexibly and recurrently. Future research should consider addressing how user profiles reflect indices of deprivation, while also addressing the gaps in adoption among males and older adults.
Examining physical activity knowledge exchange strategies for taxi drivers in Britain.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Purpose:

Occupationally, taxi drivers are susceptible to numerous physical and psychological health problems. Taxi drivers have been shown to have low levels of physical activity and, due to the nature of their work, prolonged periods of sitting. Receiving relevant information on physical activity may help drivers access recreational services; connect socially to family, friends, and co-workers; and help structure specific goals to become and stay active. The purpose of this study was to examine how taxi drivers would like to receive physical activity information and services to improve psychological, physical, and social health through physical activity.

Methods:

A methodological framework designed by Martin Ginis et al. (2012) was used for this study. Taxi drivers employed in Portsmouth, Chichester, and London, UK were recruited. Semi-structured interviews were conducted with drivers over the telephone. Interviews were audio recorded and transcribed verbatim. A thematic analysis was conducted to deductively analyze the transcripts.

Results:

A total of 24 drivers were interviewed for this study. Drivers had an average age of 52.5 (SD=8.8) years and an average of 16.8 (SD=12.5) years of driving experience. Participants indicated they would be receptive to receiving physical activity information to improve health and that information should be made available when drivers enter the profession. Drivers suggested that information be tailored and delivered in a number of different formats including pamphlets, emails, and websites. Several suggestions were made with respect to credible messengers indicating that drivers felt physical activity information should be delivered through their councils and healthcare professionals. Many taxi drivers believed it was their own responsibility to become active to improve health and well-being.

Conclusions:

Drivers face many occupational barriers to being active. Providing relevant and targeted information to help taxi drivers become and stay active is essential. Information should be easy to access, as well as offer tailored suggestions to help drivers become motivated and confident and set and achieve health goals. Information from this study can help researchers and government stakeholders design physical activity interventions for an at-risk occupational group. Strategies can be designed to help drivers set individualized physical activity goals to improve overall health.
**Objective**

The number of the population aged 60 and over is projected to increase from 17.4 % in 2010 to 39.2 % in 2060 within the European Union. Health Literacy contributes to a healthy lifestyle and self-efficiency (e.g. socially deprived people). GeWinn aims to promote Health Literacy in particular social integration, generic self-management competence of people with chronic illness and media competence especially concerning of using mobile devices (e.g. tablets) to search scientifically sound health information for people aged 60 years and above.

In workshops, older people get trained by an educational program to participate in community based health promotion. The meetings will be moderated by trained peers.

**Methods**

Development: The participative development of the intervention, trainings of peers to chair and moderate the workshops with older people.

Intervention: The 53-week intervention includes twelve workshops with 19 meetings for 120 older people in two test regions (six communities).

Evaluation: Pre-post comparison of effects on quality of life, Health Literacy, self-management competence of chronic illness, the integration in local development processes - round tables (two follow-up surveys).

**Results**

Good-Practice-guidelines for local authority districts as well as educational institutions regarding the reachability and involvement of older people particularly hard-to-reach subgroups in community based health promotion.

A manual for the workshop management to promote Health Literacy and generic self-management competences of chronic illness and specific teaching methods for smartphones and tablets for older people.

**Conclusions**

A sustainable establishment of GeWinn will be achieved through target agreements with the practice partners as well as counselling and support by a scientific advisory board. Two regional practice partner networking platforms will be responsible to set up additional sustainable workshops for older people.
A pedometer-based intervention in nurses who work night and day shifts: A Pilot Study

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: Nurses form the largest component of healthcare workers globally and in South Africa. They have poor lifestyle behaviours, with more than 80% physically inactive, increasing their risk for non-communicable disease. Therefore the aim of this pilot study was to determine the efficacy of a 10-week pedometer-based intervention on increasing physical activity (PA) among nurses working in public hospitals in Cape Town. Methods: Both night and day shift nurses employed in one of two hospitals participated. Randomisation into the intervention (INT) or comparison (CTL) group was at the hospital level. Nurses completed a socio-demographic survey and the Global Physical Activity Questionnaire (GPAQ). They wore the Actigraph GT3X accelerometer for 7 consecutive days, with a minimum of 4 days and 600 minutes per day required for statistical analysis. Time spent in sedentary, light, moderate and vigorous intensity PA was calculated. These measures were completed pre and post intervention. Those in the INT (n=40) received a pedometer to monitor daily steps and bi-weekly text messages to encourage increases in PA while those in the CTL (n=40) only received generic text messages. The analysis of variance with repeated measures was used to measure differences in outcomes between the intervention and control groups. Results: The mean age was 43 (SE:1.73) years and 38.7 (SE:2.1) years, p=0.04, for INT and CTL, respectively. Thirty percent of INT and 44% for CTL worked night shift. Average accelerometer wear time was 866 min/day and 5.8 days per nurse. Thirty-two nurses in INT and 17 in CTL had Pre and Post measures. There were no significant group-by-time effects for PA outcomes measured subjectively (GPAQ) or objectively (Actigraph GT3X). However, self-reported travel and leisure time PA increased in INT [Pre: 262.9 (SE:87.6), Post: 314.4 (SE:87.6) and Pre: 355.1 (SE:98.6), Post: 494.0 (SE:13.7); p>0.05] but decreased in CTL. Similarly sedentary behaviour decreased in INT but increased in CTL, p>0.05. Conclusion: A pedometer-based intervention did not result in statistically significant changes in PA, which could be due to the small sample size and high dropout rates. However the results are promising with improvements in the desired direction, thus additional research with more participants is required.
Objective measured physical activity in a multi-ethnic Asian population

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose
In Asia, rapid economic growth goes in hand with an increase in rates of obesity and non-communicable diseases. Physical inactivity is a key risk factor for the development of numerous non-communicable diseases. It is well-known that questionnaire-based assessments of physical activity overestimate population levels substantially. However, few population-based studies have objectively investigated levels of physical activity in different Asian ethnicities. Hence, this study investigates accelerometry determined levels of physical activity in a multi-ethnic Asian population.

Methods
Participants were recruited from the nationally representative Singapore Health Study in 2014 and 2015. They were invited to wear an ActiGraph GT3X+ and those who provided at least 4 valid wearing days were included in the analysis. Time spent in moderate, vigorous, and moderate-to-vigorous physical activity (MVPA) was determined (median, 25th-75th quartile) based on validated cut-points. Overall and stratified analysis by gender, ethnicity (Chinese, Malay, Indian, and other ethnicities), as well as by age groups (19-39 years, 40-59 years, 60-80 years) was performed. Multivariable analysis will be conducted to identify correlates of physical activity.

Results
Seven-hundred-thirty-seven participants agreed to wear an accelerometer and met the wear-time criteria (mean age: 46.0±14.8 years, female: 57.8%). Most participants were Chinese (65.3%), followed by Malay (14.3%), Indian (12.6%), and Others (7.9%). Overall, participants engaged in 250 (151-367), 2.3 (1-11), and 259 (154-378) minutes of moderate, vigorous, and MVPA, respectively. According to minutes spend in MVPA, men were more active than women (women: 226, 143-327; men: 309, 200-437; p=0.0001) and participants in younger age groups were more active than those in older age groups (19-39 years: 305, 216-408; 40-59 years: 245, 152-369; 60-80 years: 202, 105-304; p=0.0001). No significant differences between ethnic groups were observed. Overall, less than 30% of the study sample met current physical activity recommendations of 150 minutes per week with similar patterns in stratified analyses as presented before.

Conclusions
This study was conducted in a multi-ethnic Asian population living in a metropolitan area. Findings highlight that a large proportion of the population does not meet current physical activity recommendations. This study will help to further our understanding about activity patterns and their determinants in this rapidly growing population.
Effects of a new urban motorway on travel behaviour in local residents: emerging findings from the M74 study

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose: The physical environment influences behaviour and health; however, there is little evidence on how changing the environment changes behaviour. A five-mile (8 km) extension to the M74 motorway through urban neighbourhoods in Glasgow was opened in 2011. Proponents believed the motorway would encourage walking and cycling through reducing traffic on local streets. Detractors argued the motorway would promote reliance on motor vehicles. We evaluated the effects of the new motorway on travel behaviour in local residents.

Methods: This natural experimental study used data from a longitudinal cohort and two distinct cross-sectional samples recruited at baseline (2005) and follow-up (2013). 365 participants formed the cohort. The remaining 980 (baseline) and 978 (follow-up) participants together formed the repeat cross-sectional (RXS) sample. Adult residents were recruited from three study areas - one surrounding the new M74 motorway (South), one surrounding the established M8 motorway (East), and one with no comparable motorway infrastructure (North). Participants completed a postal survey, including a previous day travel record. Adjusted two-part regression models examined the relationship between motorway exposure and change in likelihood of using, or time spent using, different modes of transport.

Results: At baseline, participants had a mean age of 49 years and 61% were female. Compared to the North, cohort participants in the South were more likely to undertake travel by any mode at follow-up (odds ratio [OR] 2.4, 95% confidence interval [CI] 1.2 to 4.6), and cohort participants in the East were more likely to use the bus at follow-up (OR 2.6, 95% CI 1.2 to 5.8). Within the South study area, cohort and RXS participants living nearer to a motorway access point were more likely to use a car at follow-up (cohort OR 2.5, 95% CI 0.7 to 8.7; RXS OR 3.1, 95% CI 1.0 to 9.4), and more likely to travel (cohort OR 4.0, 95% CI 1.1 to 14.9) or increase travel time (RXS incidence rate ratio 1.5, 95% CI 1.0 to 2.4) at follow-up.

Conclusions: The new M74 motorway appeared to promote travel generally, and car use more specifically, in those living nearby, but did not influence active travel behaviour.
Shifting the physical inactivity curve worldwide by reducing gender differences

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SIG: Policies and environments

Awards: Yes, for the Student Competition*

Purpose: Gender is a known determinant of physical inactivity. Reducing gaps in the prevalence on physical inactivity among subpopulation groups might be a potential strategy to decrease physical inactivity worldwide. Thus, our purpose was to describe worldwide gender differences in physical inactivity among adults and adolescents and to analyse country-level associations between relative and absolute gender differences and Human Development Index (HDI).

Methods: The prevalence of physical activity in adults (n=146) and adolescents (n=120) for each country was extracted from the Global Health Observatory Repository. Physical inactivity was defined as less than 150 minutes per/week in moderate-vigorous physical activity, or equivalent for adults; and less than 300 minutes per week for adolescents. Data for HDI was obtained for the year 2010 from United Nations Development Program website. Gender differences were assessed by calculating relative and absolute differences in physical inactivity prevalence between females as compared to males. Pearson’s correlation between HDI, relative and absolute differences were calculated.

Results: Among adults the average of relative difference was 1.43 (95%: 1.36 to 1.50), and mean of absolute difference between females as compared to males was 7.8 percentage points (pp) (95%: CI 6.9 to 8.8). Among adolescents the average of relative difference was 1.10 (95%CI: 1.09 to 1.11) while absolute difference was 7.6 (95%: 6.8 to 8.4). There was a negative correlation between HDI and relative difference in adults (rho= -0.19; p=0.02), but there was no association between HDI and absolute difference (rho= 0.09; p=0.30). In adolescents HDI was positively associated with both, relative differences (rho= 0.44; p<0.001) and absolute differences (rho= 0.44; p<0.001.

Conclusion: Absolute gender differences among adults and adolescent were similar, although relative differences are markedly higher among adults due the lower physical inactivity prevalence. For adults, difference in prevalence of physical inactivity between females and males was higher among countries with lower HDI, while for adolescents this association was in the opposite direction.
Effects of urban motorways on physical activity in local residents: emerging findings from the M74 study

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SIG: Policies and environments

Awards: Yes, for the Early Career Award**

Purpose: The physical environment influences behaviour and health; however, there is little evidence on how changing the environment changes behaviour. A five-mile (8 km) extension to the M74 motorway through urban neighbourhoods in Glasgow was opened in 2011. Proponents believed a reduction in traffic on local streets would create a supportive environment for active travel and outdoor physical activity. Detractors argued the motorway would degrade the local environment, making it unattractive and unsafe for physical activity. We evaluated the effects of this new motorway, as well as another existing motorway, on physical activity in local residents.

Methods: This natural experimental study used data from a longitudinal cohort and two distinct cross-sectional samples recruited at baseline (2005) and follow-up (2013). 365 participants formed the cohort. The remaining 980 (baseline) and 978 (follow-up) participants together formed the repeat cross-sectional (RXS) sample. Adult residents were recruited from three study areas - one surrounding the new M74 motorway (South), one surrounding the established M8 motorway (East), and one with no comparable motorway infrastructure (North). Participants completed a postal survey, including the short International Physical Activity Questionnaire. Adjusted two-part regression models examined the relationship between motorway exposure and change in likelihood of, or time spent in, walking and moderate-to-vigorous physical activity (MVPA).

Results: At baseline, participants had a mean age of 49 years and 61% were female. Cohort participants in the East were more likely to reduce MVPA participation over time than participants in the North (odds ratio [OR] 0.4, 95% confidence interval [CI] 0.2 to 0.9). Within the East study area, participants who lived nearer to a motorway access point were more likely to reduce MVPA participation over time (OR 0.3, 95% CI 0.1 to 1.0). No other significant findings were found in either the cohort or RXS sample.

Conclusions: We found some evidence that an existing motorway (but not the new M74 motorway) had a negative impact on physical activity in those living nearby. The effects of motorways on physical activity are likely to be complex and to evolve over time.
Effects of a short-term Pilates intervention on certain physical fitness and health parameters of inactive, healthy young adult females – a pilot study.

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Purpose/Objective: The purpose of this pilot study was to investigate the health and fitness effects of a progressive Pilates program in previously sedentary young females.

Methods: Healthy, inactive females (n=17), aged 18-26 years were randomly assigned to a Pilates exercise group (PEx, n=9) or a matched control (Con, n=8). Both groups had no previous Pilates experience. The PEx group did 16 Pilates sessions over 8 weeks while the Con group did not change their activity levels. Diet was also monitored and participants were instructed not to alter their diets. Supervised classes were 60 minutes and progressed in difficulty. Fitness and health measures were taken at baseline, 4 and 8 weeks. These included anthropometric measures, muscle strength and endurance, lung function and lumbo-pelvic stability.

Results: Lumbo-pelvic stability improved significantly only in the PEx group at 4 (both legs) and 8 weeks (right leg). Body mass increased significantly in both groups (0.7% and 3.5% increase in the PEx and Con groups respectively). Waist circumference also increased significantly in both groups. These increases in mass and waist circumference were likely due to increased energy intakes which were evident in both groups. This was despite the fact that participants were instructed not to change diet. Abdominal and arm endurance, leg strength and minute ventilation increased significantly in both groups.

Discussion/Conclusion: The most important finding of this study was that lumbo-pelvic control improved significantly in the Pilates cohort only, suggesting this as an effective means of improving segmental stability of the spine through core control. This is an important consideration as improved spinal stability has been shown to decrease the risk of lower extremity injuries, particularly in females. It is evident that the increased energy intake by both samples resulted in increases in body mass and waist circumference. The fact that elements of strength and endurance increased in both groups suggests a learning effect and this must be considered as a limitation to this study.
**P2.152**

*_Negotiating the ‘sit less, stand more’ message: the experience of men on the EuroFIT health and lifestyle programme_*

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Early Career Award**

**Objective:** The health benefits of breaking up sedentary time are increasingly realised. But sitting is ingrained in the cultural frames that shape our lives and structure opportunities for standing more in everyday life. The EuroFIT programme aims to help overweight men be more physically active and stand up more. It is delivered to groups of overweight men in football clubs across Europe in 12 weekly sessions and evaluated in a randomised controlled trial with embedded process evaluation. This paper presents an analysis of how participants talk about their attempts to stand up more in the context of a ‘sitting society’. We catalogue the problems they faced and the practical solutions they found to help.

**Methods:** We are conducting observations at 24 EuroFIT sessions (in Portugal, UK and the Netherlands), writing them up as ‘thick descriptions’ and analysing them thematically, informed by grounded theory. Data are coded and analysed by researchers from each country using a co-developed code book and translated into English for final analyses.

**Results/findings:** During EuroFIT sessions, men were taught to use goal setting and action planning for sitting less, told of the health benefits this could bring and given the opportunity to discuss their experiences with other participants. Some interpreted the message with scepticism. Those who tried to make changes spoke of challenges in their workplace including feeling awkward trying to stand during meetings when the expected practice is to sit. Others shared accounts of successfully breaking up sitting time during leisure periods, specifically whilst watching TV or playing digital games. Some manual workers reported a different challenge: finding enough time to rest during working days that can include as much as 8 hours of standing time. During discussions men shared the practical solutions they found to standing more and helped each other find solutions through problem solving.

**Conclusions:** There are cultural challenges to apply the ‘sit less’ message in different social domains (work, family, leisure). Our analyses allowed documentation of the practical solutions that men, often collaboratively, implemented in their lives.
P2.153

“My confidence has been built up. I wasn’t doing anything before...I was at home, sick, and in a really dark place, which had an effect on my family. It’s just helped me turn my life around”: Exploring the Impact of The People’s Family Project on Family Physical Activity and Health

Laura Houghton, Andy Smith
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SIG: Socio-economic inequalities

Awards: Yes, for the Student Competition*

Purpose: To explore the impact of a 12-week community-based intervention (The People’s Family Project) on family physical activity, sedentary behaviour, and parental mental health.

Methods: A mixed-methods design was adopted pre-, mid- (mental well-being only) and post-intervention and at 12 months, with an additional 6-month follow-up for qualitative measures. Participants were families with children aged 3-11 years living within a one-mile radius of Goodison Park, the home of Everton Football club, an area identified as one of the most deprived nationally (IMD, 2015). All participants (N=37) were provided with a wActiSleep-BT wireless accelerometer monitor to capture PA and sedentary behaviour. Parents also self-completed the Warwick-Edinburgh Mental Well-being Scale (WEMWBS). Pre-post and pre-follow-up differences for PA were assessed using Wilcoxon Signed Rank tests, while WEMWBS scores were calculated via One-Way-Between-Groups ANOVAs (mid-post-follow-up and pre-6 month-12 month). Data from parent interviews and family focus groups (N=41) were subject to thematic analysis.

Results: The intervention had no significant impact on sedentary behaviour pre-post intervention (Z = -0.83, P = 0.41), or overall PA (Z = -0.414, P = 0.68), but bouts of >10 minutes of MVPA increased across all time-points and PA levels were above UK guidelines at all time-points. The intervention had a significant positive effect on mental health F(2, 24) = 6.107, P = 0.01). Qualitative analysis suggested the intervention led to various physical, social and psychological benefits, including improved mental health and reduced anxiety, increased light PA, progression into voluntary/paid employment, increased friendship/out-of-home activity, and improved confidence/self-efficacy. These significant changes in mental health were not maintained statistically at follow-up (F(2, 14) = 3.188, P = 0.07), but mean scores were 5.25 (pre-6 month) and 4.25 (pre-12 month) higher after the intervention. Parents also qualitatively reported they had maintained improvements in mental health which was attributed largely to improved self-confidence and self-esteem, and sustained social interaction.

Conclusion: The intervention led to improvements in parental health, particularly in relation to mental health, regardless of declines in previous improvements in PA. Suggestions for why this was the case will be examined.
**P2.154**

**An analysis of health education and physical activity profiles among students studying at two tertiary institutions in South Africa: The Biokinetic Humanitarian Project**

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**SIG:** No, this does not fit in any of the above mentioned special interest groups

**Awards:** Yes, for the Student Competition*

**Purpose:**

The epidemic of non-communicable diseases (NCDs) and its associated risk factor such as physical inactivity continues to be a major public concern. There has been an increase in public interventions globally with evidence portraying that the burden of NCDs is growing among developing countries. Therefore, it is important to create awareness and advocate interventions among such settings where there is limited research. The Biokinetic Humanitarian Project (BHP) is a unique community health intervention and flagship project of the Humanitarians (NPO 135 447) aimed at providing complimentary exercise testing, prescription and health education in disadvantaged communities. Therefore, the purpose of this study was to investigate the physical activity, health profiles and education of students from two tertiary institutions. It was hypothesised that because of the education level of these students and that they were of a younger age group, their level of physical activity and health education ought to be above average.

**Methods:**

A quantitative analysis in the form of a validated questionnaire adapted from I-PAQ (close-ended questions) was utilised to determine the physical activity and health education status/levels of students. In addition, a range of fitness and exercise tests were conducted as per the BHP intervention. Students who were studying at university from two institutions were included and those that were not studying at these universities were excluded. Chi Square analysis was conducted to determine any significant differences (p<0.05) between the two groups.

**Results:**

It was found that both groups of students had different levels of health awareness education (p<0.05), but were similar in physical activity levels, possibly due to their education, socio-economic backgrounds and lifestyles. Some of the health outcomes and exercise tests were of initial concern, but improvements were observed at the follow-up phases.

**Conclusion:**

It is tentatively contended that the BHP intervention has been shown to be effective in increasing students’ health profiles and education. This study further elaborated the misconception that young adults are healthy. It would prove useful to conduct the intervention with other populations to further show the potential effectiveness of the BHP as a mechanism to reduce the burden of NCDs.
The use of an Internet platform to evaluate survey questions on physical activity

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Early Career Award**

Objective: Accurate self-report data are vital for public health surveillance of diverse behaviors, including physical activity. Because survey responses are sensitive to question ordering and other design features, evaluation of survey elements is vital to improve measure quality. However, such evaluation typically involves costly and time-consuming methods, such as laboratory-based cognitive testing. As an alternative approach, we examined the use of an online platform, Amazon.com's Mechanical Turk for examining survey characteristics. MTurk is designed to obtain 'crowd-sourced' services from the internet community and has recently been used in for research as well. We studied survey items regarding perceptions of the walking environment, and on the frequency and duration of transportation and leisure walking from the Cancer Control Supplement of the 2015 National Health Interview Survey (NHIS).

Methods: To assess potential question order effects, 1446 respondents were randomly assigned to one of two conditions, in which the order of questions on walking behavior, versus perceptions of the walking environment, was varied. To assess test-retest reliability, 960 respondents completed the survey a second time four weeks later. Further, we embedded cognitive web-probe questions that prompted respondents to provide open-ended reports of their interpretations of the items.

Results: Respondents were 56% male, 84% Non-White Hispanic, 50% with at least a Bachelor's degree, and had a mean age of 31.8 (SD = 10.6). Item test-retest reliability was moderate (Kappa = .48-.84). Significant order effects were observed: respondents first answering about the walking environment were less likely to report any transportation walking (59%) than respondents who first reported their walking behavior (70%), p < .05. The qualitative data revealed two major themes concerning respondent interpretation of walkability: facilitators (e.g., access to quiet roads) and barriers (e.g., high speed roads). Further, 100% of respondents answered the web-probes.

Conclusions: Because of its modest cost ($750 for this study) and diverse demographic characteristics, MTurk appears to be a valuable tool for survey testing and evaluation. Given that MTurk respondents are located in over 100 countries, this type of online platform may also be a viable mechanism for international research, including multi-national and cross-cultural questionnaire development and evaluation.
Associations of the socioeconomic status with transport-related physical activity: combining a household travel survey and accelerometer data using random forests

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\textbf{SIG:} Socio-economic inequalities

\textbf{Awards:} Yes, for the Early Career Award**

\textbf{Purpose:} Socioeconomic disparities in active transport have been documented in household travel surveys. However, active transport in these studies was operationalized with self-reported measures, which poorly approximate physical activity. Unfortunately, objective accelerometer data are very expensive to obtain in large-scale travel studies. Purpose: To benefit from a large sample and objective physical activity data, this study linked a household travel survey with accelerometer data from a small sample to investigate the association between socioeconomic disadvantage and the daily level of transport-related moderate to vigorous physical activity (T-MVPA).

\textbf{Methods:} Accelerometer data for participants’ trips over 7 days from the RECORD GPS Study (7138 trips, 229 participants) were combined with information on participants’ trips over 1 day from the Global Transport Survey (Enquête Globale Transport, EGT) (82084 trips, 21332 participants). Trip-level T-MVPA data from the RECORD sample were used to train a random forest prediction model, enabling the prediction of T-MVPA for each participant’s trip from EGT. The associations between socioeconomic indicators and daily T-MVPA were analyzed with negative binomial regression models.

\textbf{Results:} An average time of 18.9 min of T-MVPA was found for these 35-83 year old adults. The education level had a positive association with T-MVPA; while household income has a negative association with T-MVPA. The availability of a motorized vehicle had a stronger negative association with T-MVPA in the lowest than in the highest income groups.

\textbf{Conclusions:} This study developed a methodology applying precise sensor-based knowledge to a large survey sample to shed light on population-level socioeconomic disparities in transport-related physical activity.
Describing family physicians' experiences with prescribing physical activity in writing to their patients: A 1-year longitudinal qualitative study

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

PURPOSE: Recent reports suggest that formal physical activity (PA) prescriptions provided by family physicians can promote increases in PA among patients. However, although most physicians recognize the many health benefits associated with PA, the majority do not provide their patients with written PA prescriptions. Knowledge of family physician-reported barriers and facilitators to providing patients with written PA prescriptions is needed to ensure PA prescriptions become a standard component of physicians’ practices. The objective of this study was to describe family physicians’ experiences as they transitioned from a practice that did not implement PA prescriptions to one that does.

METHODS: Family physicians (N = 11) with no prior experience prescribing PA in writing, but who expressed interest in changing their practice to use PA prescriptions were recruited for this longitudinal qualitative study. Each participant was interviewed four times over 12 months. After their first interview, they were provided with tools to facilitate prescribing PA. In each interview, questions focused on participants’ intentions, attitudes and experiences related to writing PA prescriptions. Data were analyzed independently by four researchers using content analysis.

RESULTS: Initially, all participants exhibited confidence in their ability to write PA prescriptions in the future, but data from the follow-up interviews showed that it was not consistently practiced, and that the rate of implementation was lower than anticipated by participants. Also, initially, participants expressed a lack of conviction regarding the value of PA prescriptions and a lack of comfort with its implementation. However, these two barriers dissipated over time. Other barriers such as the absence of PA prescription pads and that current electronic medical records are complicating PA prescriptions remained. Observing changes in patients’ PA behavior motivated physicians to continue writing PA prescriptions.

CONCLUSION: Based on the current findings, education sessions tailored to physicians interested in implementing written PA prescriptions in their practice should seek to enhance physicians’ belief that writing PA prescriptions is important and worth the time and effort, and their belief that they have the ability to write PA prescriptions. Also, given the increasing shift toward electronic medical records, new features to enter PA data are warranted.
The Number of Best Practice Physical Activity Policies and Environmental Supports in Kansas Worksites Increase One-Year Following WorkWell KS Workshop

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SIG: Policies and environments

Awards: No

Objective: The purpose of this study was to assess the degree to which Kansas worksites that participated in a comprehensive worksite wellness workshop, WorkWell KS, implemented changes to worksite policies and environments to support physical activity in the 12 months following their workshop participation.

Methods: The WorkWell KS baseline assessment was administered to 276 worksites across 29 communities in Kansas prior to their attendance at a WorkWell KS workshop. The 1 ½ day workshop addressed "best practices" regarding several topics, including physical activity. One year following the workshop, 88 of the worksites completed the same assessment, identifying which of the recommended practices that worksites had implemented. Five items addressed physical activity policies and nine items addressed physical activity through environmental strategies. A paired t-test was conducted to compare the average number of physical activity policy and environment strategies implemented at each worksite at baseline and follow-up.

Results: There were significant differences between baseline and follow-up measures for physical activity policy and environment strategies implemented at worksites. At baseline, the average worksite had 0.76 policies supporting physical activity, which increased to 1.06 policies at follow-up, t(87)=-2.042 p = 0.044. At baseline the average worksite had 2.45 environmental supports in place, which increased to 2.89 at follow-up, t(84)=-2.366 p=0.020. These significant increases represented a 39% increase in the number of physical activity supportive policies in place at worksites and an 18% increase in the environmental supports for physical activity at worksites.

Conclusions: The significant increases in the number of physical activity policies and environmental supports at worksites from baseline to one-year follow-up suggest that WorkWell KS is successfully delivering best practices to participating Kansas worksites. Furthermore, this suggests that WorkWell KS can prompt policy and environmental changes to improve physical activity in the workplace.
Physical Activity Interventions For The Management Of Chronic Disease In Low Income Populations: A Systematic Review.

Smart Mabweazara¹, Lloyd Leach¹, Clemens Ley²

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SIG: Socio-economic inequalities

Awards: Yes, for the Early Career Award**

S.Z. MABWEAZARA, L. L. LEACH AND C. LEY

Abstract

Objectives: To conduct a systematic literature review examining the specific intervention techniques in an updated taxonomy of behaviour change techniques that were included in successful interventions to change physical activity behaviour in low income individuals and to assess and examine the relevant behaviour change theories that underpinned the interventions and the relationship between behaviour change theory and intervention content.

Design: The study was a systematic review by narrative synthesis examining studies from 1980 to 2014.

Data Sources: A computer search of the relevant published literature was done using Medline, PubMed, and Google Scholar databases.

Eligibility Criteria for selected studies: RCTs and cluster RCTs; interventions targeting physical activity; low income adults; reporting of behavioural outcomes.

Main outcome measures: The main outcome measures for the review were physical activity, physical activity adherence, and fitness for the management of chronic diseases.

Results: Eleven studies met the inclusion criteria. ‘Providing feedback on performance’, using ‘goal setting (behaviour)’, and ‘planning social support/social change’ were the most frequently used behavioural change techniques. The transtheoretical model of behaviour change and the social cognitive theory were the common theoretical frameworks to form the basis of most study interventions.

Conclusions: Behaviour change interventions in low income persons had positive effects on changing physical activity behaviour. Policy makers and physical activity practitioners should engage effective and context-sensitive behavioural change techniques and advocate for theoretically grounded interventions in order to increase physical activity behaviour in low income populations.
Patterns and bouts of sedentary behaviour in South African adults of variable fitness

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective

Sedentary behaviour (SB) has been identified as a risk factor for non-communicable disease, and thus becoming more important to quantify. There are limited studies looking at the relationship between cardiovascular fitness and SB, as well as patterns of SB. The aim of this research was to examine and analyse patterns and bouts of SB in South African adults, according to levels of cardiovascular fitness.

Methods

A convenience sample (n=122) was recruited following a health risk assessment (HRA). The HRA included a 12-minute sub-maximal step test to estimate VO\textsubscript{2}max. Using the American College of Sports Medicine guidelines, participants were classified as either low- or high-fit (LF and HF, respectively). Participants wore an ActiGraph GT3X accelerometer during waking hours for 7 days. SB was classified as accelerations of <100 counts/minute, with vector magnitude rules (using all three axes, squared and summed) applied in the analysis. SB was reported as total SB, as amount of sedentary bouts of at least 20min in duration, and as well as time spent in bouts of SB. Vector magnitude counts per minute were used to compare patterns and breaks of SB between the LF and HF participants throughout the day.

Results

Ninety-six adult participants (aged 39.1±12.5y, n=42 men) completed the HRA and had valid accelerometer data. Average VO\textsubscript{2}max values for the HF and LF groups were 43.47ml.kg.min\textsuperscript{-1} and 30.1ml.kg.min\textsuperscript{-1}, respectively. Time in SB per week, even when adjusted for total wear time, was not significantly different between the HF and LF groups (p>0.05). Time spent in bouts (>20min in length) of SB was 863.7±570.3minutes per week. The average amount of SB bouts for a week was 26±15 bouts. There were no significant differences between the LF and HF group for any data pertaining to bouts of SB (p>0.05). This is despite HF participants showing a pattern of less SB and more SB breaks than the LF participants.

Conclusions

Despite daily patterns of SB and breaks in SB showing that the HF participants are more active than LF participants, there are no differences in SB bout behaviour or time in SB bouts between the fitness groups.
Health-related quality of life and sedentary behaviours and among Canadian adults

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Purpose: While health-related quality of life (HRQL) is generally positively associated with physical activity, less is known about associations with sedentary behaviour (SED). The aim was to assess the associations of multiple indicators of HRQL with various SED modalities. Methods: Cross-sectional data from the 2011-2012 Canadian Community Health Survey included 95,912 participants aged 18-75+ years, representative of 23M Canadian adults. HRQL indicators included self-rated health (SRH), self-rated mental health (SRMH), life satisfaction (LS) and perceived life stress (Stress). Self-reported SED outcomes included TV/video, computer, video game and reading time. Associations between HRQL indicators and SED modalities were assessed by multivariable logistic regression adjusted for potential confounders. Results: About 11% of Canadian adults reported fair or poor SRH, 6% reported fair or poor SRMH, 8% reported sub-optimal LS, and 24% reported high levels of Stress. Further, 31% of men and women reported >2 h/d TV viewing, while 47% of men and 41% of women reported >5 h/wk computer use, 24% of men and 12% of women reported >1 h/wk video game playing, and 33% of men and 46% of women reported >5 h/wk reading time (p<0.001 for all). Individuals reporting fair or poor SRH had greater odds of reporting higher TV viewing time (OR 1.37; 95% CI 1.30-1.43), and those reporting fair or poor SRMH had greater odds of both higher TV viewing time (1.26; 1.18-1.34) and computer time (1.16; 1.09-1.24). Individuals reporting sub-optimal LS had greater odds of reporting higher video game playing time (1.15; 1.06-1.24) and higher TV viewing time (1.16; 1.09-1.22). Finally, those reporting high levels of Stress had lower odds of reporting high TV viewing time (0.75; 0.73-0.78), computer time (0.89; 0.86-0.92), video game time (0.90; 0.86-0.94) and reading time (0.85; 0.82-0.88). Conclusions: Self-rated health, mental health and life satisfaction are positively associated with various SED modalities, while perceived life stress is inversely associated to all SED modalities. The strongest associations were with TV viewing time. Future studies should investigate the causal direction of these relationships.
Brief behavioural counseling for physical activity by biokineticists (BBC for Bios): Preliminary results of training using the I Change 4 Health Protocol

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: No

Objective: More than half of all South African adults are insufficiently active and not meeting guidelines for physical activity. The over-arching aim of the study is to test the effectiveness of a brief behavioural change counseling intervention, based on the 5As (Ask, Alert, Assess, Assist, Arrange), incorporating principles of motivational interviewing and adapted to specifically address the risk behaviour of physical inactivity. The study is set to take place in public sector, primary care clinics, in patients presenting with controlled hypertension and/or diabetes, against the standard-of-care. The objective of this pilot study was to evaluate the effectiveness of training biokineticists in implementing the 5A’s Protocol for physical activity. A biokineticist is an allied health care professional, for whom exercise prescription is the primary therapeutic modality.

Method: Five biokineticists/interns took part in 2 day training course for brief behavioural change counselling, based on materials developed for this purpose (http://www.ichangeforhealth.co.za/). After training, 5 volunteers were recruited and underwent taped interviews, which were subsequently coded by a post-graduate student. She identified whether or not the components of the 5 A’s were incorporated into interviews (adequately done, partially done, not done) , and whether motivational interviewing (MI) skills such as: open questions, reflective listening, expressions of empathy, eliciting change talk, and supporting patient autonomy, were used.

Results: Average interview time was just over 18 minutes. In all cases, biokineticists remembered to use the 5A’s, beginning with the Ask step. However, 4 began to Alert and Assess their patients, before completing the Ask step. In terms of MI components, 3 used open questions adequately, and 2 used them only partially. Reflective listening was partially used by 3 biokineticists and only two used expressions of empathy. The other MI constructs of “eliciting change talk” and “supporting patient autonomy” were not used widely. Patients’ feedback on counseling was positive, with most remembering content, finding it credible and understandable.

Conclusion: Biokineticists and similar health care professionals may be trained to incorporate brief behavioural counseling techniques into patient interviews for physical activity. It is likely that more practice is required to adequately incorporate motivational interviewing components into the counseling.
Assessing physical activity in Guanajuato, Mexico through systematic observation in public gathering places

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards: Yes, for the Student Competition*

Objective: Parks and jardins (gardens) in Guanajuato, Mexico are common gathering places for both socializing and exercise, but the impact these settings have on physical activity levels has not been examined. The goal of this study was to systematically observe individuals in a public park and a jardin in Guanajuato, Mexico, and to see how these two locations compare in terms of physical activity levels and characteristics of the people utilizing them.

Methods: Data was collected in 13 target areas at 2 sites (one park and one jardin) in Guanajuato, Mexico. Observations were made four times per day on three days, following the System for Observing Play and Recreation in Communities (SOPARC) protocols. Frequencies were calculated for age groups, gender, and activity levels (sedentary, walking, vigorous). Other park characteristics and conditions were also recorded and analyzed.

Results: Approximately equal numbers of males and females were observed in both sites. People in the park were observed to have higher levels of moderate and vigorous physical activity (49.6%) than those in the jardin (39.2%). More children and teenagers were observed in the park (61.5%) than the jardin (45.2%).

Conclusions: Although social gathering places, such as the jardins in this study, offer an additional avenue for opportunities for physical activity, parks appear to draw more young people and those who are more active. Understanding who frequents each location is important for developing targeted interventions using these settings, and for planning outreach events in these types of locations.
Comparison of self-reported and objectively assessed physical activity-related energy expenditure in normal weight, overweight and obese South African women

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Weight excess is associated with lower levels of physical activity-related thermogenesis. Moreover, recent studies show over-reporting in survey- vs accelerometry-measured physical activity (PA) to be more common among overweight and obese persons, and particularly in female populations. This degree of physical activity misreport has, however, not yet been studied in South African women.

Methods: A convenience sample of 51 healthy women living in a South African city were characterized for body mass index (BMI) and body composition, and were allocated to 1 of 3 groups: lean (BMI ≤ 24.9 kg/m²), overweight (BMI 25 - 29.9 kg/m²) or obese (BMI ≥ 30 kg/m²). Subjective eating behaviour and PA data were collected via self-report surveys. Objective measures included basal metabolic rate (BMR), predicted VO2max (submaximal treadmill walk test), and habitual PA (accelerometry). PA-related energy expenditure was extrapolated via multiples of BMR using the 24-hour physical activity level (PAL) method.

Results: By design, all groups were different for BMI (normal weight = 21.8 kg/m²; overweight = 26.7 kg/m²; obese = 36.5 kg/m²; p < 0.001) and % body fat (normal weight = 26.8%; overweight = 35.2%; obese = 46.7%; p < 0.001). While all groups over-reported total daily PA-related energy expenditure (normal weight = 775 kcal/d; overweight = 946 kcal/d; obese = 1119 kcal/d), over-report indices were significantly elevated for overweight women (p = 0.016) and for obese women (p = 0.002) as compared to their normal weight controls. Notably, PA over-report (kcal/d) correlated positively with self-reported dietary disinhibition (r = 0.35, p = 0.011) and objectively assessed % body fat (r = 0.388, p = 0.005), and associated negatively with measured fat free mass adjusted VO2max (r = -0.476, p = 0.005).

Conclusions: Our data reveal two important points. First, there is a greater mismatch between self-reported and accelerometer measured PA-related energy expenditure in overweight and obese South African women compared to their normal weight peers and, second, PA-related energy expenditure associates with various dietary and health-related fitness measures. This work underscores the importance of the development of a PA over-report correction paradigm for the treatment of overweight and obesity.
Association Between Psychosocial and Organizational Factors and Objectively Measured Sedentary Behavior in Desk-dependent Office Workers

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Cross-sectional analysis of data from the Recharge@Work study was used to assess behavioral, social, and organizational correlates of objectively-measured sedentary time in desk-dependent office workers at two hospitals located in the Pacific-Northwest United States.

Methods: Respondents were recruited from the population of desk-dependent administration hospital workers. Analyses included 70 adults (~49.2 years old), with three behavioral, three social and one organizational variable assessed using computerized questionnaires. Sedentary activity was assessed by accelerometry and expressed as prolonged sedentary bouts (60 min blocks ≤ 150 cpm).

Results: No significant associations were found between age, gender, BMI, outcome expectancy, or self-efficacy and sedentary behavior. In individuals with low perceived senior management support of active breaks, direct supervisor support of active breaks and enjoyment of active breaks were strongly associated with prolonged sedentary behavior (OR=13.6, OR=16.3 respectively). Individuals with high perceived senior management support of active breaks showed no association between enjoyment of active breaks and direct management support of active breaks and sedentary behavior. In individuals with low direct supervisor support of active breaks, enjoyment of active breaks was significantly associated with prolonged sedentary behavior (OR=12.2), but not associated with individuals with high direct supervisor support of active breaks.

Conclusions: The results from this study suggest manager support and enjoyment may be important targets for developing effective intervention strategies to incorporate active breaks into the workday of sedentary office workers.
Recharge@Work: An Novel, Theory-based Intervention to Reduce Sedentary Behavior in Desk-Dependent Office Workers

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: Desk-dependent office workers exhibit high levels of prolonged sedentary behavior, and theory-based interventions to break up sedentary time within this population are needed. This study examined the effectiveness of Recharge@Work: a 12-week, theory-based intervention to decrease overall sedentary time and prolonged (>60min) sedentary time during the workday in desk-dependent hospital administrative staff.

Methods: Two hospitals were matched, with one serving as the comparison site (N=26) and the other serving as the intervention site (N=39). The intervention consisted of personalized feedback on sedentary behavior and individual toolkits. Toolkits included items to improve self-regulation in taking short 2-3min active breaks every 60 minutes (timers, activity log, activity examples). Data were collected at baseline, mid-intervention (6wk) and post-intervention (12wk).

Results: Relative to the comparison group, the intervention group significantly reduced the percent of workday spent in sedentary time (p<.001; partial eta-square=.09) and the percent of workday spent in prolonged (>60min) sedentary bouts (p<.001; partial-eta square=.12). No changes in mediating variables were observed between the two groups.

Conclusions: This study provides support for the short-term effectiveness of a multicomponent intervention to support active breaks in desk-dependent office workers.
Controlling Emotions During Sports Events

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UNIQUE ULTIMATE SPORT & ACADEMY, Lagos, Nigeria

SIG: Theories of motivation

Awards:

INTRODUCTION

Sport is an emotional experience for many athletes and fans. Researchers found the increased causes of athletes and fans to react negatively physically and mentally in a manner that may negatively affect their performance abilities and the games.

BACKGROUND

1.1 Control: Control will probably improve training and games: a.) attitude, b.) body language, and c.) work ethic.
1.2 Concentration: This is the mental quality to focus on the task in hand. If the athletes lack concentrations then their athletic abilities shall not be effectively or efficiently applied to the task.
1.3 Confidence: Confidence results from the comparison an athlete makes among the goal and their ability.
1.4 Commitment: Sports performance depends on the athlete being fully committed to numerous goals.

COMMON CAUSES

2.1 Perfectionism: when your team does not perform perfectly you loses composure because you become frustrated and then focus too much on your errors or lost instead of the tasks needed to perform well.
2.2 Irrational Beliefs: Irrational beliefs cause you to stay stuck in old, ineffective patterns of behavior. “Thinking that my team mates may blame me or everyone may hate me.”
2.3 Fear of Failure: Fear is based on your intense need to win and causes you to worry too much about losing or failing. This may led to you playing defensive and tentative instead of composed and play freely. It becomes easier to get frustrated and lose emotional control, that may not help you stay composed after failure.
2.4 Emotional threat also causes anxiety and all sorts of the negative physical symptoms.

METHODS

3.1 With these practices, Athletes can become more aware of their emotions and able to use psychological strategies to manage their performances.

3.2 By developing a relatively stable warm-up routine, including mobility work, stretching and increasing deep muscle temperature, and uncertainty can be reduced and the athlete’s attention directed to appropriate cues, such as quality technique and body awareness.

CONCLUSION

The aim of this paper has been to use cognitive, motivational and relational theory as a basic to outline the basic techniques that may be useful for emotional control.
Exploring the role of acceptance and commitment in physical activity motivation and behaviour

Matthew Jenkins, Elaine A. Hargreaves, Ken Hodge
University of Otago, Dunedin, New Zealand

SIG: Theories of motivation

Awards:

Regular physical activity (PA) is vital to one’s health, and has been prioritised by the World Health Organisation (2014) as a key behaviour for improving global public health. Understanding the factors influencing maintenance in PA behaviour is crucial, and Self-Determination Theory (SDT; Deci & Ryan, 1985) is one lens through which to explore such factors. SDT predicts that autonomous motivation (i.e., that which emanates from oneself rather than external sources) is positively associated with long-term PA behaviour, and this prediction has been consistently upheld by research. SDT-based interventions, which aim to facilitate autonomous motivation by supporting the satisfaction of the three basic psychological needs of autonomy, competence, and relatedness, have been shown to be effective in increasing PA behaviour. Recently, researchers have highlighted the potential positive influence of mindfulness-based processes on autonomous motivation. In particular, the mindfulness-based intervention known as Acceptance and Commitment Therapy (ACT; Hayes et al., 1999) aims to foster and support extrinsic forms of autonomous motivation by developing certain psychological skills, which collectively contribute to ‘psychological flexibility’. In turn, this is theorised to increase an individual’s willingness to accept discomfort in the service of, and commitment to, valued behaviours such as regular PA.

Members of the New Zealand general population (N = 456; male n = 120, female n = 336; mean age = 40.69 years old) were recruited for a cross-sectional study. Participants were asked to complete a battery of questionnaires, measuring PA-related acceptance and commitment (PAAQ; Butryn et al., 2014), autonomous extrinsic motivation (BREQ-2; Markland & Tobin, 2004), and self-reported PA behaviour (IPAQ; Craig et al., 2003). Results demonstrated positive associations between PA-related acceptance and commitment, autonomous extrinsic motivation for PA, and physical activity behaviour itself. Furthermore, autonomous extrinsic motivation partially mediated the positive association between PA-related acceptance and commitment and PA behaviour, suggesting that acceptance and commitment may influence behaviour via its effect upon individuals’ motivation.

This study represents the first of a three-study PhD research project, culminating in the development of a PA-promoting intervention that will incorporate components of ACT into an SDT-based intervention designed to increase regular PA in the general population.
Knowledge of Physical Activity Recommendation and Stages of Physical Activity Behavior Change: Based on Trans-theoretical Model

Kahaerjiang Abula
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SIG: Policies and environments

Objective: Based on Trans-theoretical Model, the current study aimed to investigate the association between an individual’s knowledge of PA recommendation and PA behavior change.

Methods: Three separate studies were conducted: in the first study, Physical Activity Stage of Change Questionnaire was translated and validated among 304 Chinese university students; in the second study, Chinese university students’ knowledge of international PA recommendation, PA stage distribution and self-reported PA level were surveyed with a large sample of 10022 students and the association among knowledge, PA stages and PA level were explored in a cross-sectional design; in the third study, the effect of knowledge of PA recommendation on PA behavior change was tested in a randomized controlled experimental design with a sample of 308 students.

Results: It was found that Chinese version Physical Activity Stage of Change Questionnaire has good psychometric properties; Only 4.31% of the students correctly recalled the international PA recommendation; only 20.30% of the students meet recommended level of PA, with 10.8% of them in the stage of Pre-contemplation, while 33.6%, 25.9%, 10.2% and 19.5% are in the stages of Contemplation, Preparation, Action and Maintenance respectively. Non parametric Mann Whitney U test result indicated that those with the knowledge of PA recommendation have significantly higher PA stage of change than those without knowledge. Conclusions: Knowledge of PA recommendation is significantly associated with PA stages of change and knowledge of PA recommendation is able to bring about significant positive shift in PA stages. But subsequent further analysis illustrated that the degree of change depends on the baseline stage of an individual, those in their earlier stages such as Pre-contemplation benefit more from the exposure to the recommendation compared with those in their higher stages.
Effects of Music Tempo on Exercise Performance, Physiological Demand, and Perceived Emotional State: A Cross-Over Study Using POP Songs

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Purpose: Most prior research regarding music and exercise did not utilize POP songs, to which individuals often listen in daily life. Hence, this study aims to determine the effects of music conditions on objectively assessed exercise performance, perceived emotional state, and salivary stress biomarker.

Methods: A total of 39 college students (mean age=21.4±1.4 years, male=66.7%) performed exercise sessions on a treadmill for at least 20 minutes under five separate, randomly-assigned music conditions (no music, fast, medium, slow, and mixed tempo). Participants exercised on the treadmill until reaching voluntary physical exhaustion. Exercise performance was assessed objectively using multiple devices including tri-axis accelerometers, pedometers, chest strap heart rate monitors, and treadmills. Self-reported physiological demand and emotional states included perceived exertion, fatigue, alertness, sleepiness, affect, and mood. Salivary cortisol was collected as biomarker of psychological stress. Repeated-measures analyses of variance were conducted to assess the effect of music condition on exercise performance and emotional state; covariates included percent body fat, gender, physical fitness level, and age.

Results: Compared to the no music condition, fast-music and slow-music conditions resulted in longer exercise endurance time (p=0.007-0.01), longer distance (p=0.003-0.009), greater number of steps (p=0.004-0.02), greater number of aerobic steps (p=0.003-0.02), and greater levels of moderate-to-vigorous physical activity (p=0.02-0.04). Fast-music resulted in the greatest increase in perceived exertion and positive mood. Interestingly, exercise distance were higher for slow-tempo music than for medium-tempo music (p=0.03). Moreover, listening to medium-tempo music leads to a decrease in emotional arousal and pleasantness. No difference in fatigue, alertness, and sleepiness across music conditions were found. All music conditions reduced the level of salivary cortisol, except for slow-tempo music.

Conclusions: Music selection during exercise could influence short-term exercise performance, physiological demands, and emotional states. Listening to POP songs with fast tempo and slow-paced music during exercise both improve indoor treadmill exercise. On the other hand, listening to medium-paced music may not lead to the expected beneficial effects in emotional states. Studies with larger sample sizes are needed to investigate how music tempo affects trajectory of exercise performance over the course of exercise.
**Feasibility and preliminary efficacy of a web-based computer-tailored physical activity intervention for pregnant women.**

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**SIG: E- & m-health**

**Awards:**

**Purpose:**
This study assessed the feasibility and preliminary efficacy of a computer-tailored web-based intervention designed to promote moderate-vigorous physical activity (MVPA) among pregnant women.

**Methods:**
57 pregnant women were randomised into either (1) a tailored intervention group (TIG) that received tailored MVPA advice based on Social Cognitive Theory and access to a resource library consisting of articles relating to MVPA during pregnancy (e.g., exercise during pregnancy guidelines and instructions, safety advice); or (2) a standard information group (SIG) that only received access to the resources library. Participants were assessed at baseline and two months post-baseline. Outcome measures included self-reported MVPA (mins), website usage (page views, number of visits, minutes spent per visit), website usability (SUS Scale), and process evaluation data. Standard errors for means were calculated using non-parametric bootstrapping. Treatment effects (group and time) were assessed using the Wilcox rank-sum test.

**Results:**
Retention was 75%, with no between-group difference (p=0.067). Both groups significantly increased MVPA. The mean increase in MVPA was higher in the TIG (115min/week, 95%CI: 65.70;186.66) than the SIG (85minutes/week, 95%CI:50.58;136.62), however this difference was not significant (p=0.74). The TIG viewed significantly more web-pages than the SIG (Mdiff=45.97, CI:19.64;72.31, p<0.001). Average number of sessions (Mdiff=1.36, 95%CI:0.88;3.6) and time on site (Mdiff=1.34, 95%CI:-2.07;4.74) were also higher among TIG participants, however these differences were not significant. Overall, usability of the website was ranked as good-excellent (75/100) and participants perception of the website were positive (e.g., 74% found the website credible, 74% indicated they thought it was interesting and 83% found it easy to understand), with no significant between-group differences observed.

**Conclusions:**
Feasibility was demonstrated in terms of recruitment and retention of participants. Participation in MVPA improved in both groups, and website evaluations were overall positive, indicating that web-based interventions are a promising physical activity promotion tool for this group. Engagement with the website was highest in the TIG. Previous research suggests that this may be a predictor of intervention efficacy. While there were no MVPA between-group differences, there was a trend in favour of the TIG. To explore this future, a fully powered trial using objective MVPA assessments is warranted.
Introducing Physical Activity Behaviour in Adult Qatari Population: Pedometer based Lifestyle Intervention

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SIG: Theories of motivation

Awards:

Introduction: Strong evidence confirms the association between active healthy behavior and disease prevention. The impact of physical activity (PA) on public health promotion is well recognized and there is growing interest in PA as preventive measure to attain active healthy living. Pedometers are found to be effective motivational tools to promote walking behavior. A target of 10,000 steps per day is considered an indicator for good health. A population-wide intervention was established to increase walking behavior among adult residents in the State of Qatar.

Purpose: This study aims to assess the trends of physical activity behavior among the Qatari national adult population in Qatar over a three-year period.

Methods: This cross-sectional longitudinal study, based on the daily step count, was conducted from January 2013 to December 2015. "Step into Health" is a community based program launched by Aspire in December 2012 as an approach to improve physical activity across the population of Qatar. The program involves distribution of pedometers to registered members which is supported by a self-monitoring online account and linked to a web database. Daily step counts were measured through the Omron HJ-324U pedometer (Omron Healthcare Co., Ltd., Japan). Analyses were done on the data extracted from the database.

Results: A total of 20,967 Qatari nationals registered in the program were included in this study. Out of the total population, 56% were males compared with 44% females. The average steps/day during the three years follow up, 2013 to 2015, were found to be 4000,7000 and 4000 respectively. Younger adults (18-30 years) show increasing trends of PA during the first two years, 5749 to 13606 steps/day, followed by dramatic drop at the third year. On the other hand, adults above 46 years maintain a gradual increase in their PA. The study has shown that women are more active than men. Their average steps between 2000 -6000 steps/day compared to 500-1300 steps/day taken by men.

Conclusion: This study indicates that pedometer-based lifestyle intervention was effective in increasing the daily physical activity of participants. a recommendation for future studies to examine the impact of individual behavioral on daily physical activity.
Associations between active commuting to work and socio-demographical, personal, environmental and behavioral factors in a cross-sectional study of Norwegian adults.

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SIG: Children and families

Awards:

Objective

Active commuting to work represents an opportunity to incorporate suitable moderate- to- vigorous physical activity (MVPA) into daily routine among adults, and therefor might be more easily adopted and maintained than other forms of physical activity. In addition, walking and cycling for transport could be important, inexpensive and accessible sources of physical activity among socioeconomically disadvantages families. The purpose of this study was to report prevalence of commuting to work among a group of adult parents with regard to socio-demographical, personal, environmental and behavioral factors.

Methods

Cross- sectional questionnaire data from the Fruit and vegetables Make the Marks project collected in September 2008, including 709 adults parents with children aged ten to twelve-years-old from two counties in Norway. The associations between different modes of commuting to and from work and potential correlates were analyzed by multivariate logistic regression.

Results

Most adults (70%) were categorized as car commuters to and from work, 12% was categorized as a cyclist and 7% as a walker. The multivariate analyses showed that active commuters were more likely to have a shorter distance to work, to perceive the traffic as more safe, to regard active commuting as a way to obtain health benefits and a way to reduce CO2 emissions. They also considered weather to be an obstacle to active commuting.

Conclusion

Most adults reported that they were car commuters to and from work. Association between socio-demographical, personal, environmental and behavioral factors was observed.
Physical Activity and Social Influence associations among Mexican-American Adolescents

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SIG: Children and families

Awards:

Background: Physical activity and sedentary behaviors are factors associated with obesity and overweight, especially among Hispanics. Hispanic parents know that increasing physical activity can be a way to prevent obesity. However, even with this knowledge, data demonstrates low levels of physical activity among children.

Methods: Aim was to determine the cross-sectional association among household members' weekly physical activity behavior and Hispanic adolescents', ages 13-20 years, physical activity behavior. Hypothesized that adolescent physical activity behavior would be higher among those individuals whose household members demonstrate higher levels of weekly physical activity. Using MATCh (Mexican-American Tobacco Use in Children) Study data, age-eligible participants were identified from the Mexican American Cohort Study (MACS) database and parents/legal guardians were approached to assess interest in enrolling their adolescents into a cohort study. 1,002 adolescents completed follow-up in 2010-11. Social Network data was used to evaluate social influence questions. Analyses were stratified by gender.

Results: Adolescents' physical activity behavior was higher among adolescents' whose household members demonstrated higher levels of weekly physical activity. The associations found were gender-specific. Both girls and boys physical activity behavior was higher among same-gender parents and same-gender siblings who had higher levels of weekly physical activity. Both girls and boys were encouraged by same-gender parents to be physically active. Gender-specific relationships influence adolescents to be physically active through encouragement. Both girls and boys were encouraged by same-gender parents to be physically active. Both girls and boys were also encouraged by their best friends to be physically active. Adolescents also indicated not having anyone to encourage them, reporting they often exercised alone or with same-gendered individuals.

Conclusion: Results reported indicate members of an adolescent's social network can be a way to facilitate physical activity through encouraging and supporting adolescent's physical activity. Parents and best friends were found to encourage adolescent's physical activity among both boys and girls.
Physical activity of young adults in Dhaka city, Bangladesh

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective
Physical activity (PA) offers physical and psychosocial health benefits that are important during young adulthood, a transitional phase of life. However, little is known about PA of young adults in Bangladesh. The study aimed to assess the prevalence of PA in Bangladeshi young adults.

Methods
A convenience sample of 573 young adults (age: 20.71±1.35 years, female 45.2%) recruited from six universities based in Dhaka city, Bangladesh participated in a survey (response rate: 91.6%). PA was assessed using the Global Physical Activity Questionnaire (GPAQ), which asks about time spent in moderate and vigorous intensity PA in work, transport, and leisure domains in a typical week.

Results
Data indicated that 17% of the participants were meeting the World Health Organization’s (WHO) PA recommendation of 150 mins/wk, with a higher proportion of males than females meeting the guidelines (27% vs. 6%). The median time spent in physical activity was 100 mins/wk (IQR: 60, 130) with males more active [120 mins/wk (80, 190)] than females [90 mins/wk (50, 120)]. One-third (33%) of the participants reported work-related PA, the median time was 40 mins/wk (20, 50) [male: 45 mins/wk (30, 50), female: 40 mins/wk (15, 50)]. Just over half (53%) the participants reported engaging in active transport [90 mins/wk (60, 120)] with males doing more [90 mins/wk (60, 135)] than females [80 mins/wk (20, 100)]. Half of the participants (51%) reported doing leisure-time PA (LTPA), the median time was 90 mins/wk (60, 135) with longer times for males [100 mins/wk (60, 180)] than females [80 mins/wk (60, 120)]. Jogging/running was the most commonly reported LTPA (excluding walking), with 20% of males and 12% of females reporting doing this at least once a week. Other frequently reported types of LTPA were cricket (16%), gym (13%) and bicycling (11%) for males; and yoga (6%), stationary exercise and playing badminton (3% each) for females.

Conclusions
Four out of five Bangladeshi young adults living in Dhaka city are insufficiently physically active. Additional population-based studies, including regional and metropolitan areas, and using objective measurements, are needed to better understand the PA patterns of young adults.
Antecedents, mediators, and consequences of controlling vs. need-supportive motivational strategies used by exercise professionals

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SIG: Theories of motivation Awards:

Purpose
Research into the factors that might influence the use of different motivational strategies by exercise professionals is of empirical and practical utility as it might influence their wellbeing but also their efficacy when working to promote exercise. Grounded in Self-Determination Theory (SDT), the purpose of this study was to analyse antecedents, mediators, and consequences of different motivational strategies used by exercise professionals.

Methods
Participants were 366 exercise professionals (193 males; experience=7.7±5.8 years). Questionnaires assessing psychological need satisfaction (PNS) and frustration (PNF), self-determined work motivation (SDWM), use of motivational strategies [i.e., autonomy-supportive (AUTS) vs. controlling-supportive behaviors (CONTS)], emotional exhaustion, and professional efficacy were completed online. Exploratory and confirmatory factor analyses were used to identify the factor structure for each variable, and then factor scores were computed and saved. Structural equation modelling (SEM) was used to test a model describing the associations between antecedents (PNS, PNF), mediators (SDWM, AUTS, CONTS), and consequences (professional efficacy, emotional exhaustion).

Results
A path model with good fit [χ²(5)=9.174, p>.05; CFI=.984; TLI=.936; RMSEA=.048; SRMR=.022] showed that PNS was positively associated with AUTS (β=.399), professional efficacy (β=.267) and emotional exhaustion (β=.145). PNF was negatively associated with SDWM (β=-.315) and professional efficacy (β=-.176), and positively with CONTS (β=.195) and emotional exhaustion (β=.226). Furthermore, AUTS (β=.134) and SDWM were positively associated with professional efficacy (β=.184), whereas CONTS were negatively associated with emotional exhaustion (β=-.178). No other hypothesized associations were significant (p>.05).

Conclusions
Findings have theoretical implications as they provide evidence that need support and need frustration are differentially associated with work related motivation and behavioral (type of strategies used) and emotional outcomes, as predicted by SDT. Findings also have practical implications since support and frustration of psychological needs are inversely associated with use of adaptive vs. controlling motivational strategies, emotional exhaustion, and efficacy reported by exercise professionals. Organizational focus and policies in the exercise and fitness settings should emphasize supporting competence, autonomy and relatedness in professionals but simultaneously minimize the frustration of these same needs.
Antecedents and consequences of susceptibility towards insufficient exercise - an eye-tracking study

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University of Amsterdam, Amsterdam, The Netherlands

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Antecedents and consequences of message processing in the exercise domain - an eye-tracking study in undergraduate students.

Objective: Sufficient exercise is protective of diseases. For students, sufficient exercise is also predictive of academic success. To enhance exercise levels, understanding what makes a persuasive message effective is needed. A first step for a persuasive message to be effective is that an individual processes a message, yet individuals tends to disengage from message processing when that message is threatening. Evidence on this issue is very limited for exercise, so we sought to identify the antecedents and consequences of message processing through the application of eye-tracking techniques.

Methods: 111 undergraduate students (Mage=20.7, 80.0% female) in this study. At baseline, susceptibility and severity towards various consequences (CVD, overweight, depression, and academic success) of insufficient exercise was assessed. One week, participants were randomly exposed to either a gain-framed message (stressing benefits of sufficient exercise for these consequences) or a loss-framed messages (stressing drawbacks of insufficient exercise for these consequences) that was presented on a computer screen. A calibrated eye-tracker recorded attention measures, such as dwell time, fixation count, and fixation time. After message exposure, message-related affect was assessed. After this, intention and resolve towards sufficient exercise was assessed.

Data were analyzed using structural equation modeling.

Results: Good fit indices were obtained. In the loss-framed condition, participants who believed they were more susceptible to the negative academic-related outcomes of insufficient exercise spent less time attending to the negative academic-related outcomes of insufficient exercise (rs between -.25 and -.27). Less time attending these outcomes was related with increased feelings of fear, discomfort, and sadness (rs between -.20 and -.38) and these increased feelings lead to lower intentions and resolve towards sufficient exercise. These effects were not found for either the gain-framed condition or health-related negative outcomes of insufficient exercise.

Conclusions: For undergraduate students, no positive effects for gain-framed messages were found. In contrast, loss-framed messages increased feelings of fear and discomfort and lower intentions and resolve. These effects occurred only for school-related outcomes and in those already believing they were susceptible towards negative school-related outcomes of insufficient exercise.
Awareness and benefits of Qatar National Sports Day: population based study

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Abstract

Purpose: Qatar National Sports Day (QNSD) is a national day for sport which recognizes the importance of physical activity (PA) and sports. The aim of this study is to explore public awareness about QNSD benefits and identify opportunities for promoting PA among the Qatari population.

Methods: Four focus groups were conducted after the QNSD 2015. A total of 26 adults were randomly selected, Qatari and Non-Qatari, aged between 18-55 years. Groups were stratified based on age, gender, and nationality. Discussion was facilitated through guided questions. Recorded data were audiotaped and transcribed; themes were generated and analyzed.

Results: Majority of participants were males (54%), half of them (50%) were Qatari nationals. All participants are well-aware of QNSD event date. Majority (81%) stated being aware through public media channels, 69% through circular at workplace, 61% complied with the Emiri Decree, and 54% informed by friends. All participants agree that social media channels are effective in reaching younger generation; however, older population can be reached through television and newspapers. Moreover, 85% of the participants mention that QNSD encourages a healthy lifestyle; followed by (73%) who believe that it strengthens the community social bond. More than half of the participants (69%) believe that QNSD creates a healthy environment. The majority (92%) confirmed that such event would support a collective behavioral change. In addition, 85% of participants mention that more marketing campaigns are needed for more PA involvement. Others (54%) stated that including recognized icons or social figures would increase people's PA engagement, where 77% of participants think PA should be fancy and trendy. Majority (69%), however, stress on the importance of refined policies and regulations in supporting PA at organizational and national levels. Finally, 96% of them believe that sports friendly atmosphere is needed, taking into consideration both climate and cultural environments.

Conclusion: This study gives insights about QNSD awareness and PA promotion opportunities. Future studies required to better understanding benefits and opportunities for QNSD to promote PA at population level.
Perceived barriers to leisure-time physical activity during pregnancy: a literature review of quantitative and qualitative evidence.

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Awards:

Purpose: A full understanding of barriers preventing women from being physically active during pregnancy is a crucial step to guide the design and implementation of effective interventions to promote physical activity among pregnant women. The purpose of the present study is to identify perceived barriers to leisure-time physical activity during pregnancy including evidence from both quantitative and qualitative research.

Methods: PubMed/Medline and Web of Science databases were systematically searched using a reference period between 1986 to January/2016. A comprehensive search strategy was developed combining the following key words: (barriers OR constraints OR perceptions OR attitudes) AND (physical activity OR exercise OR motor activity) AND (pregnancy OR pregnant women). Original research studies were included if they had reported perceived barriers to LTPA among pregnant women as their primarily or secondary outcomes. Thematic synthesis was conducted to analyze the data. A socioecological model was used to categorize the reported barriers.

Results/findings: Twelve quantitative studies and 14 qualitative studies were included in the review. Barriers belonging to the intrapersonal level of the socioecological model were the most reported in the studies and were coded in five themes as follows: 1) Pregnancy-related symptoms and limitations; 2) Time constraints; 3) Perceptions of already being active, 4) Lack of motivation and 5) Safety concerns. At the interpersonal level, barriers were coded into two descriptive themes: 1) Lack of information and 2) Lack of social support. Two other themes were used to summarize Environmental, Organizational and Police barriers: 1) Adverse weather and 2) Lack of resources. Pregnancy-symptoms and limitations were the most reported barriers to leisure-time physical activity participation among pregnant women, regardless of the nature of the data. On the other hand, the mother-child safety concerns, lack of advice and lack of social support were barriers more reported and emphasized in the studies using a qualitative methodology.

Conclusions: Health care professionals involved in the prenatal care should encourage leisure-time physical activity among healthy pregnant women by addressing the unique barriers experienced by them, increasing women’s knowledge about the mother-child health benefits of physical activity engagement during pregnancy and providing reassurance about its safety.
Exercise Motivational and Emotional Processes: An Exploratory Study of the Moderation Role of Basic Psychological Needs Satisfaction

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SIG: Theories of motivation

Purpose: Motivational processes potentially affect exercise emotional responses, which in turn may affect long-term exercise adherence. This study aims to explore if the level of basic psychological needs satisfactions (BPNS) exerts a moderation effect on the relationship between motivational regulations and emotional response to exercise, following Self-Determination Theory framework.

Methods: This was a cross-sectional study with 495 health club members (M=40.50 years; SD=13.54). Of these, 186 were women and 309 men with an average attendance of 2.61 sessions per week (SD=1.29). BPNS (composite variable), motivational regulations (autonomous - AUTO - and controlled - CONT - composite variables) and emotional response (Positive/Negative Affect (PA/NA); Psychological Well-Being/Distress (PWB/PD)) were measured through self-report. Tertiles were calculated to create a level of BPN variable (1 - low satisfaction to 3 - high satisfaction). ANOVA (and post-hoc Tukey analysis) and bivariate correlations were used to explore the potential moderation effect.

Results: Scores of AUTO and PWB were significantly lower on low BPNS, than on average BPNS, which in turn were lower than on high BPNS group (p<.001). NA and PD were significantly higher on low and average BPNS when compared with high BPNS group (p<.05). Finally, PA was significantly higher on average and high BPNS when compared with low BPNS group (p<.05). Three separate correlational analysis (by BPNS group) showed that the associations between AUTO and positive emotional response variables had an U-shaped pattern, i.e., low and high BPNS groups presented higher correlations (p<.05). On the other hand, a inverted U-shaped pattern was observed in CONT and NA, i.e., low and high BPNS showed the lowest correlations with NA (p<.05). Finally, a negative linear correlation pattern was observed on CONT with PD, i.e., low BPNS had the higher positive correlation, decreasing to the smallest positive correlation in high BPNS (p<.05).

Conclusions: These exploratory results show that BPNS moderation might be in place in the association between motivational processes and emotional response to exercise. This ongoing study will engage in more complex analytical procedures to further study this possibility.
MAP-IT: A practical tool for planning complex behavior modification interventions

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective
The ultimate goal of health research is to prevent non-communicable diseases and to improve individual and public health by discovering interventions strategies effective to change risky behavior and health detrimental environments. This is a complex task encumbered by typical translational obstacles. Results of original research must be transferred into real world interventions. Unfortunately, interventions often failed to overcome this translational block and fail to sustainably change individual's lifestyles or the risky environments they live in. Developing theory-driven and evidence-based interventions in the real world is a complex task. Existing implementation frameworks and theories are often still too vague for the challenging situations that practitioners are confronted with.
The purpose of this paper is to synthesize existing frameworks and to provide a tool, the Matrix Assisting Practitioner's Intervention planning Tool (MAP-IT), helpful to compose multi-component interventions addressing different behaviors and age groups, here exemplified on older adult's physical activity.

Methods
Five experts familiar with health promotion in research and practice independently selected mechanisms for older adult's physical activity. Each expert independently nominated ten mechanisms, which (s)he denotes as important for a physical active lifestyle of older adults. The fifty mechanisms were discussed afterwards and valued by the whole group. Only a mechanism that at least three of the five experts agreed upon was included. This resulted in 15 mechanisms important to be addressed to change inactive behavior of older adults. To place Behavioral Change Techniques (BCTs) into the matrix, the five researchers independently ascribed the BCTs to the cells of the matrix. Different ascriptions between the researchers were discussed in a round table. Consensus was reached when at least three out of the five researchers agreed to an ascription.

Results
MAP-IT lists relevant mechanisms of physical activity and links BCTs to these mechanisms and to intervention components. In addition to psychological mechanisms, the tool lists environmental mechanisms relevant for older adult's physical activity.

Conclusion
MAP-IT is a tool to help practitioners in developing theory-driven and evidence-based interventions aiming to change physical activity of older adults. The matrix offers a practical, timesaving tool for designing and evaluating complex interventions.
**Physical Activity of Chinese Adolescents and their Caregivers Measured in Multiple Domains**

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: This Chinese Children and Families Cohort Study project developed a physical activity questionnaire (PAQ) suitable for Chinese adolescents and their caregivers and explored the feasibility of using the PAQ, pedometers and hand grip dynamometers in a sub-sample of the Community Intervention Program (CIP), a large (n = 247,000) Chinese-U.S. CDC collaborative project conducted in 1993 - 1995. CIP examined risk of neural tube defects and folic acid supplementation (400 μg/day) during the peri-conception/first trimester of pregnancy.

Methods: Data were collected in 2013 from 93 CIP adolescent/caregiver (>90% mothers) pairs from a rural (n = 41), and an urban site (n = 52). Respondents wore a pedometer (Omron HJ-151; Seven Days), used a Takei Digital Grip Strength Dynamometer on each hand; three trials; two separate days), and completed a 39 item 8 domain PAQ covering the past year. Self-reported PA was linked to MET scores. Compliance was high in this measurement protocol administered by trained study staff during a series of home and hospital visits. Step counts per day were greater in children (Mean = 8028 SE = 165) than caregivers (7368 SE = 165) and greater in rural (8164 SE = 174) than urban (7234 SE = 155) areas. Maximum grip strength was greater in adolescents (36.5 SE = 0.8) than caregivers (28.8, SE = 0.8)) and greater in urban (34.0.0 SE= 0.8) compared to the rural (31.0 SE = 0.9) community. These differences were statistically significant (p < 0.05). Respondents reported a median of 22 hours/day of diverse activities with a mean of 105 (SE = 5) minutes in light activity, 33 (4) in moderate, 19 (4) vigorous, 150 (6) sedentary activity, and 451 (4) of sleep. Correlations between grip strength, step counts and measures of time spent in different activities were low (< 0.10).

Conclusion: Device and question based measurement of PA and strength were readily accepted in this population. Because these measures appeared to address different dimensions of physical activity, future studies should consider measurement of PA with multiple approaches.
Implementing self-regulation techniques in e- and mHealth targeting type 2 diabetics

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SIG: E- & m-health

Background: Estimates are that by 2035 one in ten adults will be diabetic. The exponential growth of diabetes is mainly driven by type 2 diabetes (T2D), representing 85-95% of the disease. Adopting a healthier lifestyle (i.e. increasing fruit and vegetable intake, being more physically active and reducing sitting time) has shown to be critical in the management of T2D. E- and mHealth interventions encouraging a healthier lifestyle offer several advantages: they can reach large populations in a cost-effective way, continuous support can be offered and the feedback can be adjusted to the patients’ specific needs. Our aim is to create a website (eHealth) and app (mHealth) motivating type 2 diabetics to a healthier way of living.

Methods: The creation of the website and app will be based on the self-regulation framework. Self-regulation is a goal-guidance process that helps people make autonomous decisions about their health behaviours. There are several reasons to implement self-regulation techniques in an online intervention targeting type 2 diabetics. First, research shows that an autonomous instead of controlled regulation of self-care results in a higher quality of life in type 2 diabetics. Second, previous studies indicate that self-regulation techniques can be effectively implemented in an online intervention focused on altering adults’ health behaviours.

Results: The poster will present how self-regulation techniques can be implemented in a website and app created to support type 2 diabetics in altering their lifestyle. For example, realistic and attainable goal setting is reached by guiding patients through a range of tailored questions about what activity they would like to do and how, when and with whom they would like to do this. Patients are also prompted to do problem solving by making them elaborate on barriers they might face and how they want to overcome these barriers. Also, monitoring will be supported by letting patients track their activities via the app.

Conclusion: By implementing self-regulation techniques in an e- and mHealth intervention, we aim to develop an effective intervention to promote a healthy lifestyle in T2D patients.
Associations between the physical activity environment and area-level deprivation and obesity: a cross sectional study of English adults

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SIG: Policies and environments

Awards:

Objective: This study aims to investigate if park availability and quality are associated with area-level deprivation and obesity.

Methods: Individuals residing within Rotherham, England were extracted from Wave 1 of the Yorkshire Health Study (n=27,806) resulting in 4,723 participants. Body mass index (BMI) was calculated using self-reported height and weight; obesity was defined as BMI ≥30. Rotherham Local Authority (LA) provided park locations which were mapped as polygons within ArcGIS V10.2. Home postcodes were geocoded and neighbourhoods were defined as the lower super-output area (LSOA) the postcode fell within (LSOA: an administratively defined geographical area that typically contains at least 1000 and a mean of 1500 individuals). Area-level deprivation was represented by The Index of Multiple Deprivation 2015 (IMD) and LSOAs were split into three tertiles (low deprivation (4.71, 18.93); medium (18.94, 28.97); high 28.98, 70.89]) such that each tertile contained an equal number of parks. Separate multi-level logistic regression models estimated associations between park availability and quality and obesity adjusting for age, gender and ethnicity. Linear and logistic regression then modelled associations between deprivation tertiles and park quality and availability respectively, adjusting for LSOA population density and area.

Results: Compared to the least deprived tertile (T1) the moderately (T2), and most deprived tertile (T3) had a greater availability of parks (T2 OR=5.24 [4.36, 3.75]; T3 OR=3.75 [3.19, 4.40]). Parks within moderately and highly deprived tertiles also had a higher overall quality (T2 B=1.99 [1.43, 2.57]; T3 B=3.93 [3.46, 4.41]) compared to those within the least deprived tertile (T1). Finally, although deprivation was associated with obesity, there was no association between park availability and obesity (OR=1.03 [0.89, 1.19]) or park quality and obesity (OR=1.00 [0.99, 1.01]).

Conclusion: It is clear parks remain important community health assets with areas of greater deprivation experiencing a greater availability and quality of parks. However, contrary to current policy proposals, this study provides little support for the notion that the availability of parks or the quality of parks are associated with obesity. Findings presented within this study can usefully inform planning efforts for future modifications of the environment relative to deprivation and obesity.
The design of e- and m-health interventions using gamification

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SIG: E- & m-health

Background/objectives: Chronic diseases are the principal cause of morbidity and mortality worldwide, representing 60% of all deaths. Research has indicated that chronic diseases can be prevented by changing lifestyle behaviours. However, the reach and the effect of preventive health interventions is often limited. New ways for delivering health behaviour change interventions on a cost-effective manner are imperative. There is emerging evidence that e- and m-health interventions can be effective in changing people’s behaviour. Though these interventions seem very promising, the problem of engaging participants remains. Gamification, or the use of game design elements in non-game contexts, might keep people motivated to participate in e- and m-health interventions. Our aim is to create an engaging digital intervention to promote physical activity and to prevent sedentary behaviour in adults, using gamification elements.

Methods: The active content of our intervention will be based on self-regulation theory. Self-regulation theory is considered as the preferential theory for promoting behaviour change by selecting and setting a goal, planning actions to pursue the goal and monitoring and evaluating the behavioural changes. Furthermore, it is important to offer people choices during this whole process. The content will be delivered in a comprehensive e- and m-health intervention (i.e. website + app). In order to engage people in this intervention, each self-regulation behaviour change technique will be incorporated using gamified features (such as offering challenges, providing feedback, etc.).

Results: The poster will present how behaviour change techniques can be linked with gamification elements in order to engage participants in this online intervention to increase physical activity and to decrease sedentary behaviour. For example, ‘goal setting’ can be guided by the gamification tactic ‘challenge’. This can be done by offering specific challenges to complete each week.

Conclusion: By integrating gamification principles in an e- and m-health intervention, we aim to develop an effective and engaging intervention to promote a healthy lifestyle in adults.
Changes in physical activity and sedentary behaviour in patients with osteoarthritis after total knee arthroplasty - A pilot study

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SIG: Ageing

Awards:

Purpose: There are no published data on objectively measured physical activity and sedentary behaviour of knee osteoarthritis (OA) patients after total knee arthroplasty (TKA) in South Africa. The aim of this pilot study was to assess changes in patterns of physical activity (PA) and sedentary behaviour (SB) before and after unilateral primary TKA in patients with knee OA.

Methods: Eighteen OA patients, scheduled for primary TKA at a hospital in Johannesburg, were recruited. PA and SB were measured two weeks prior to TKA (baseline) and six weeks post-TKA (post). PA and SB were assessed with an ActiGraph GT3X+ accelerometer. The ActiGraph was strapped around each participant's waist, and worn for seven days (24 hours/day), removing only for showering, bathing or swimming. Total volume and patterns of accumulation of physical activity and sedentary behavior data were processed using a custom built SAS program.

Results: Body mass decreased significantly (p=0.02) from baseline (84.8 ± 24.9 kg; mean ± SD) to six weeks post-TKA (83.6 ± 24.7 kg). After adjusting for change in body mass, there were no significant changes in the total volume of time spent in physical activity and sedentary behavior six weeks post-TKA. Breaks in prolonged sedentary time (> 20 min bouts) tended to be lower (p=0.08) post-TKA (1.2 ± 1.5 breaks/day) compared to baseline (1.6 ± 1.6 breaks/day). Time spent in bouts of sedentary behaviour lasting between five and 10 minutes tended to be higher (p=0.053) post-TKA (99.2 ± 26.7 min/day) than at baseline (88.6 ± 25.0 min/day). Likewise, the number of sedentary bouts lasting between five and 10 minutes tended to be greater post-TKA compared to before TKA (p=0.094: 12.4 ± 3.6 vs. 11.0 ± 3.3 bouts/day). Time spent in bouts of light activity lasting between 10 and 20 minutes tended to be lower (p=0.075) post-TKA (48.6 ± 32.7 min/day) compared to baseline (57.6 ± 36.2 min/day).

Conclusion: This pilot study highlights the importance of assessing patterns of habitual physical activity and sedentary behavior after TKA as no changes in total volume of activity were observed, however, changes in the way the activity is accumulated may be different.
Preventive behaviour change in Dutch skiers and snowboarders through a nationwide intervention: a prospective cohort study

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SIG: Theories of motivation

Awards:

Purpose: Purpose of this study was to evaluate the effectiveness of a nationwide intervention on relevant behavioural determinants of helmet use, and actual helmet use in Dutch recreational skiers and snowboarders (DRSS). As current policy in Europe is to leave the decision to wear a helmet to the individual adult, effective implementation strategies should focus on behavioural change.

Methods: A prospective cohort study was used to evaluate the effectiveness in a real-world sport context during the 2010/2011-winter sport season. A random sample of 363 active Dutch skiers (aged 18-65 years) and snowboarders (aged 18-24 years) from an existing representative Dutch panel participated in this study. Inclusion of participants was a priori stratified by winter sport activity, age and gender to ensure a representative sample of DRSS. Data were collected using online questionnaires prior to the start of the intervention (December 2010), and immediately after the season (April 2011) measured in the same subjects. Outcome measures were self-reported risk perception, knowledge and attitudes related to head injury risk and helmet use, and actual helmet use. Secondary outcome measure was intervention reach. The Intervention Mapping protocol was used to develop and implement an acceptable and evidence-based intervention, with indoor ski halls as the main setting. Regression analyses were used to assess individual changes in the outcome measures over the 2010/2011-season, corrected for self-reported exposure to the intervention.

Results: Intervention reach was 28.1%, with differences found between winter sport activities. Intervention exposure proved effective in increasing helmet use ($\beta=0.23; 95\% \text{ CI}: 0.017-0.44$). However, no overall (positive) effects were found on any of the behavioural determinants. Subgroup analyses revealed that intervention effects on helmet use were only found in female DRSS, young skiers, and in intermediate skiers. Intervention effects on behavioural determinants were only found within specific subpopulations.

Conclusions: Exposure to this nationwide intervention was associated with a preventive behaviour change, i.e. increased helmet use. Intervention reach is an essential part of intervention effectiveness. Subgroup analyses yielded relevant information about intervention effectiveness between specific subpopulations, taking reach into account. Such information can be used to improve the effectiveness and implementation of interventions.
**LP2.191**

**Association between Attendance at Brownsville CycloBias and Community Member Physical Activity**

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SIG: No, this does not fit in any of the above mentioned special interest groups

**Awards:**

**Objective:** An open streets initiative, CycloBias, encourages residents to be physically active. Selected city streets are temporarily closed to motorized traffic to allow biking and walking. We examined the duration and intensity of physical activity (PA), particularly walking behavior, among event attendees and community residents.

**Methods:** Intercept surveys (n=1,203) and System for Observing Play and Recreation (SOPARC) methods adapted for ciclovias were used to determine primary modes of PA and sociodemographic factors of attendees. Randomly sampled households and community members within households located within a one mile radius of the route were surveyed pre (n=91) and post (n=60) for three CycloBias events.

**Results:** Estimated attendance per event ranged from 2,145 - 7,880. Primary modes of PA at the event were bicycling (73.6%) and walking (23.0%). A significantly larger proportion of females (30.3%) were walkers when compared to men (17.6%; p < .000), and a significantly larger proportion of seniors (41.3%) were walkers when compared to children (16.6%), teens (21.5%), and adults (28.6%; p<.000). Attendees self-reported an average of 112.3 minutes of PA, expending an average of 487.1 MET minutes. The average time spent in PA at CycloBias by walkers was 96.2 minutes, expending an average of 287.5 MET minutes. Of those surveyed in households a higher proportion met PA guidelines at post-test (34.8%) versus pre-test (19.7%), but difference was not significant (p = .08). Most commonly reported barriers to PA were lack of time (37.7%) and safety concerns (30.5%). A significantly higher percentage of individuals reporting safety concerns did not reach PA guidelines (52.0%) versus those not reporting concern (44.6%; p=.002).

**Conclusions:** Results indicate CycloBias is associated with positive PA behaviors for attendees and could contribute to increased walking behavior after the event. Among those living within a one mile radius of the route, a single CycloBias does not appear to be associated with a significant improvement in meeting PA guidelines but could provide intermittent options for a safe PA environment. We will discuss how CycloBias events in a lower resource community are a feasible element of an overall initiative to promote safe options for PA.
Pedometer-assessed physical activity and its comparison with the International Physical Activity Questionnaire among adults in peri-urban and rural eastern Uganda

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective

Accurate assessment of physical activity (PA) is essential for assessing trends of PA levels over time and evaluating effectiveness of PA interventions in preventing non-communicable disease. However measurement accuracy hinges on the precision of assessment tools. Few studies have assessed the level of agreement between self-reported questionnaires and step-based data from pedometers. The objective of the study was to assess the validity of the International Physical Activity Questionnaire – long form (IPAQ-LF) in adults in rural eastern Uganda.

Methods

A population-based study of 1,208 adults aged ≥ 18 years was conducted in the Iganga-Mayuge Health and Demographic Surveillance Site in eastern Uganda. Physical activity was assessed using both an accelerometer-pedometer and the IPAQ-LF. Physical inactivity was defined as accumulating < 52,500 steps/week or < 600 metabolic equivalent (MET)-minutes/week for IPAQ-LF. Percent agreement scores and kappa statistic were computed. Linear regression analysis was also conducted.

Results

Using the IPAQ-LF, 3.6% of the participants were physically inactive compared to 37.3% defined by the pedometer over a week. With the pedometer step counts as the reference, percent agreement scores with their corresponding kappa statistics between IPAQ-LF and pedometer in classifying PA for the study sample, men and women were (64.1%, kappa = 0.06), (72.6%, kappa = 0.09) and (55.5%, kappa = 0.05), respectively. Percent agreement scores and their corresponding kappa statistics among overweight and/or obese persons, peri-urban and rural residents were (52.3%, kappa = 0.10), (49.3%, kappa = 0.05) and (68.9%, kappa = 0.05). Pedometer total steps/week significantly correlated poorly with IPAQ-LF MET-minutes/week ($R^2 = 0.054$, $p = 0.00$).

Conclusions

The IPAQ-LF poorly identifies individuals who are physically inactive as defined by the weekly step counts threshold. Marked disparity in the prevalence of physical inactivity in a week highlights the need for development of context specific cut offs of PA and more validation studies using both subjective and objective assessments of PA in low-income settings.
“Sitting is deeply ingrained in our culture”: perceptions of barriers to moving more and sitting less

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SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

Objective: To understand perceived barriers of working aged adults in Australia to moving more and sitting less.

Methods. The ‘Move More Sit Less’ initiative of Bluearth, a national health promotion charity in Australia, is underway. To inform this initiative, Bluearth undertook a survey of adults across Australia aimed at assessing issues concerning the reduction of sitting and the promotion of more movement. One element of the survey was an open-ended question asking participants “what would it take to get more people to change their sitting habits and move more?” Australian adults (n=636) provided open-ended responses. Data were analysed using inductive content analysis, with the coding of qualitative responses performed using NVivo 11 software. Two researchers coded all statements independently. This paper focusses on responses that were categorised as perceived barriers to behaviour change.

Results: The theme of ‘barriers’ was grouped into five sub-dimensions, comprising: ‘perceived lack of alternatives’ (e.g., workplace restrictions to sit less; drive to work); ‘organisational culture’ (e.g., lack of organisational culture to support movement, and a sub-theme of ‘lack of employer support’); ‘excuses’ (the perception that people provide excuses rather than real barriers); ‘skeptics’ (e.g., reflecting problems with wearable devices; intractable attitudes); ‘education’ (ignorance of health problems of too much sitting).

Conclusions: The Move More Sit Less survey highlighted a multitude of barriers to sitting less and moving more, often in the workplace, and shows that a multifaceted approach is required to facilitate Australian adults to move more and sit less.
A comparison of sedentary behavior in patients with knee osteoarthritis compared to healthy controls

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SIG: Ageing

Awards:

Purpose: It is known that physical activity is beneficial in patients with knee osteoarthritis (OA). Detailed, objective data on sedentary behavior (SB) patterns will therefore also help to inform targeted interventions in people with knee osteoarthritis. The purpose of this study was to measure patterns of SB in knee osteoarthritis (OA) patients and to compare these patterns to a healthy age matched control group (CON).

Methods: Participants (CON n=15; OA n=24) were males and females between the ages of 50 and 85 years. SB was measured using an activPAL accelerometer in patients diagnosed with knee OA and in age matched control participants. The activPAL was taped to the anterior part of the thigh and was worn seven days for 24 hours a day. Sleep time, recorded using a sleep questionnaire, was removed in order to calculate wear time for each participant.

Results: Total daily time spent in sedentary behavior was significantly greater in patients with OA (587.8 ± 183.9 min/day) compared to CON (494.0 ± 46.2 min/day; p=0.002). Time spent in upright activities tended to be greater in the CON (496.4 ± 92.9 min/day) than in the OA patients (354.8 ± 143.7 min/day; p=0.053). There was no difference in the number of breaks in sedentary time per day between the groups (CON: 50.7 ± 15.9 breaks, OA: 42.9 ± 14.2 breaks; p=0.566).

Conclusion: This study used the activPAL accelerometer for the first time in OA patients to investigate differences in sedentary behavior compared to healthy controls. Patients with knee OA spent a greater amount of time in sedentary behavior and less time in upright activities compared to a healthy control group. The fact that there were no differences in the number of breaks in sedentary time leads us to believe that further investigation into the patterns of sedentary behavior is required in this patient population.
The effectiveness of mobile health behaviour change interventions for physical activity and sedentary behaviours: systematic review and meta-analysis of randomised controlled trials

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SIG: E- & m-health

Awards:

Purpose: Mobile health programs offer great potential for practical, effective, and cost-efficient delivery of interventions capable of reaching large numbers of individuals. This systematic review aimed to: 1) compare the effectiveness of mobile health (mHealth) interventions to affect physical activity (PA) and sedentary behaviour (SB) with a comparator group exposed to usual care or minimal intervention in free living individuals; 2) conduct a meta-analysis to determine whether, and to what extent, such interventions affect PA and SB levels; and 3) use the behaviour change techniques taxonomy to describe which techniques are used in the interventions.

Methods: Electronic database searches (Cochrane Central Register of Controlled Trials, CINAHL, Embase, MEDLINE, PsycINFO, ISI Web of Science and PubMed from inception to January 2015), reference lists of included studies and relevant review articles were sourced to identify randomised controlled trials (RCTs) of individual-level physical activity promotion interventions involving young people and adults. Total PA, moderate-to-vigorous physical activity (MVPA), walking, and SB outcomes were extracted. In addition, intervention content was independently coded according to the 93 item taxonomy of behaviour change techniques (BCTs).

Results: Twenty-one RCTs, involving 1701 participants, met eligibility criteria and were included in the review. SB decreased more following mHealth interventions than after usual care (standardised mean difference (SMD) -0.26, 95% confidence interval (CI) -0.53 to -0.00). Summary effects across studies were small and non-significant for total PA (SMD 0.14, 95% CI -0.12 to 0.41), MVPA (SMD 0.37, 95% CI -0.03 to 0.77), and walking (SMD 0.14, 95% CI -0.01 to 0.29). More BCTs were employed on intervention groups (mean = 6.9, range 2 to 12) than on the comparator groups (mean = 3.1, range 0 to 10). Among 93 BCTs, only 31 were employed in the intervention groups.

Conclusions: mHealth PA/SB interventions have little effects on total PA, MVPA, walking, and SB. Technological advancements will enable more comprehensive, interactive and responsive intervention delivery. Future mHealth PA intervention studies should ensure that all the active ingredients of the intervention are reported in sufficient detail.
Development of a mobile health program for physical activity and sedentary behaviour change using the intervention mapping and behavioural intervention technology frameworks

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SIG: E- & m-health

Awards:

Purpose

Most interventions designed to promote levels of physical activity do not adapt dynamically to changes in the individual's behaviour. While there is no consensus on how to apply theory, interventions that target determinants of behaviour and behaviour change are linked with increased effectiveness and should reflect changes in behaviour over time. We describe the application of two frameworks to assist in the development process of an adaptive smartphone-delivered intervention aimed at influencing physical activity and sedentary behaviours.

Methods

The Intervention Mapping conceptual framework was used to identify the determinants influencing uptake of physical activity recommendations and optimal behaviour change techniques. The Behavioural Intervention Technology technological framework was used to translate and operationalise the intervention components into developer aims.

Results

The intervention developed (TODAY - TailOred Daily ActivitY) targeted the proportion of daily time spent in physical activity and being sedentary (termed activity profile), focussed on nine determinants and consisted of 33 behaviour change techniques. The intervention included three main components: 1) automated capture of daily physical activity and sedentary behaviour via an existing smartphone application, 2) classification of the individual into an activity profile according to their physical activity and sedentary behaviour, and 3) behaviour change content delivery in a tailored (according to the activity profile) and dynamic fashion via a proof-of-concept application. Steps for developing the TODAY intervention are illustrated.

Conclusions

Two frameworks were used in a complementary manner to inform the development of a smartphone-delivered intervention to promote physical activity and reduce sedentary behaviour. The steps illustrated may help in the development of future mHealth-based behaviour change programs. An evaluation of the TODAY intervention is currently underway.
The effects of a 12 week aerobic and resistance exercise intervention on body composition and sedentary behaviour in obese black South African women.

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SIG: No, this does not fit in any of the above mentioned special interest groups
Awards:

Purpose:

Black South African (SA) women have a high prevalence of overweight and obesity. Furthermore, overweight and obese black SA women are more sedentary compared to normal weight women. This study examined the effect of a 12 week exercise intervention on changes in body composition and sedentary behaviour (SB) in obese black SA women. We hypothesise that 12 weeks of exercise training will reduce whole body fat, central body fat, SB and increase moderate to vigorous physical activity (MVPA).

Methodology:

Participants aged between 20-35 years and a body mass index (BMI) between 30-38 kg/m², were recruited from an urban area in Cape Town, South Africa. All participants were randomly assigned to either an exercise or control group. Dual energy x-ray absorptiometry was used to measure whole body composition and the GT3X+ accelerometer to measure PA intensity. The cut points in counts per minutes were: sedentary: 0-199; light: 200-2689; moderate: 2690-6166; hard: 6167-9642 and very hard >9643.

Results:

The mean age and BMI (n=8) was 24±2 years and 33±3 kg/m². There were no differences between groups in all baseline variables (p>0.05). At baseline, time spent in SB and MVPA in both groups was 493 (441-567; upper – lower quartile) min/day and 61 (45-80; upper – lower quartile) min/day, respectively. At 12 weeks there was a significant group by time interaction in weight, BMI, fat-free soft tissue mass and central fat mass (% and kg) (p<0.05), such that they all increased significantly in the control group (p<0.05), but did not change in the exercise group (p>0.05). There was a significant group by time interaction for SB and MVPA (p<0.05). There was a significant decrease in sedentary time (p<0.05) and an increase in MVPA (p<0.05) in the exercise group.

Conclusion:

These findings suggest that an increase in MVPA and a decrease in SB helped prevent weight gain in the exercise group. However, continued SB and low levels of MVPA might have contributed to the significant increase in body composition variables in the control group. Accordingly, exercise training maybe a suitable approach for preventing and managing weight gain in obese black SA women.
The objectively measured stepping and sleeping in obesity university students by using innovation health device technology

Yu-Ching Lan, I-Ju Cheng, Ho Huang, ShuYa Cheng, Wen-Dien Chang
China Medical University, Taichung City, Taiwan

SIG: E- & m-health
Awards:

Background

Nowadays, a lot amounts of researches are using wearable health devices as an objectively measurement of physical activity and daily patterns. Overweight and obesity are always a big issue in the field of public health. Low levels of physical activity, cardiopulmonary fitness and sedentary lifestyles have been associated with increasing risks for health-related problem with overweight and obesity. Understanding these patterns by using innovation health device technology may identify daily activity for health promotion.

Methods

A sample of university students (n = 30) residing in Taiwan were fitted with health devices, Mi band, were worn 24 hours a day for 7 consecutive days and sleeping. Daily amounts and patterns of time spent in sleeping, stepping, step counts and time per period of sleeping recorded by the Mi band were reported. Physical activity data were assessed using the Global Physical Activity Questionnaire(GPAQ) and Cardiorespiratory Index of fitness for validation.

Results

For those BMI>=24 students, total step count was a little higher than those normal BMI students (10307.05± 3999.62; 9599.26± 2489.02). In the other hand, total sleep minutes was less than the normal group (353.23± 41.99; 389.15±57.55). Among non-over-weight group, the correlation between GPAQ with cardiorespiratory index results in a Pearson’s correlation of 0.5 (p<0.05). But, GPAQ in over-weight population had strongly negative correlation with average sleep time (-0.89; p<0.05). The correlation between Cardiorespiratory index with average steps counts and walk time present the highly positive correlation (0.94 and 0.97; p<0.05).

Conclusions

This study provides preliminary evidence of using the wearable health device to capture physical activity and sleep duration better among over-weight university students. With the features of the device, it may be suitable for measuring the over weight population daily activity for health promotion.
Web-based risk communication strategy for university students on screening, brief intervention, and referral to treatment (SBIRT) for substance use and health promotion

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China Medical University, Taichung City, Taiwan

SIG: E- & m-health

Awards:

Background

A Web program and mobile health intervention was feasible and acceptable to young generation. This study builds up a Web-based multimedia risk communication tools for university students in screening, brief intervention, and referral to treatment (SBIRT) for unhealthy use of alcohol, tobacco, and other drugs.

Method

The Web Screening Questionnaire (WSQ) was generate by using 10-items Drug Abuse Screening Test (DAST). A total of 1031 subjects answered the WSQ on the Internet by introducing from social network program (FACEBOOK) through their mobile phone. After finished the WSQ, the multimedia health education website which including physical activity and health promotion would present if the participant without substance use risk. Further, the medical accessibility google map would referral the nearest medical facility which can provide the professional health advise for those high risk cases after identified by the WSQ.

Result

The advertisement of this risk communication and SBIRT screen tools was transmitted effectively through Facebook and boost by the peer educator which like 'superstars' in campus. This strategy would increase 5% of survey completed rate per day. Among 1031 online subjects, 3.4% male and 1.2% female university students with the risk of substance use and referral to the health service through google map. Among this high risk population, 10/19 were under 20 years old.

Conclusion

This multimedia risk communication and information transmitted through social network was more likely to be accepted by the young population.
GPS-based exposure to neighborhood walkability and objectively measured physical activity

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SIG: E- & m-health

Awards:

Objective: Physical inactivity is a major behavioral risk factor for chronic disease that is influenced by environmental factors. Features of neighborhood walkability for transport, such as nearby destinations and well-connected streets, may create opportunities for higher levels of routine, non-recreational physical activity. Global positioning systems (GPS) and accelerometry provide objective, unobtrusive measures that are sensitive and specific, and may enable new insights into the environments in which physical activity takes place. The current study explores the association between minute-level GPS-based walkability exposure and time-matched objectively measured physical activity.

Methods: A sample of 369 adult women (mean age = 55.38 ±9.89 years; mean body mass index = 27.74 ±6.12) was recruited from different regions of the U.S (recruited from studies in Philadelphia, St. Louis, San Diego, and nationwide study). Participants wore a Qstarz BT1000X GPS device and ActiGraph GT3X+ accelerometers on the hip for 7 days to assess location and physical activity at minute-level epochs. GPS data were linked to US Environmental Protection Agency (EPA) Smart Location Database (SLD) data on nationwide Census block group-level Z-scores of population density, street connectivity, and land use mix. Z-scores were summed to create a walkability index for each Census block group, and each GPS point was linked to a block group to create a minute-level exposure to neighborhood walkability. Accelerometer-based physical activity was measured in steps and accelerometry counts. Minute-level generalized additive mixed models were conducted to examine the nonlinear relationship between GPS measures and physical activity, accounting for clustering of data within participant. We created natural splines to examine the nonlinear relationship between walkability and the physical activity outcomes.

Results: Participants provided 593.3 minutes of data per person on average. We observed a nonlinear J-shaped relationship between walkability and physical activity (minute-level steps and counts), where higher physical activity occurred in very low walkability areas, as well as very high walkability areas.

Conclusions: Our results suggest that higher levels of physical activity occur in areas with very low or very high transportation-oriented walkability, indicating that planning and design policies should focus on these environments to optimize opportunities for routine physical activity.
GPS-based exposure to greenness and objectively measured physical activity

Peter James, Jaime Hart, J. Aaron Hipp, Jacqueline Kerr, Philip Hurvitz, David Berrigan, Karen Glanz, Francine Laden

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SIG: E- & m-health

Awards:

Objective: Physical inactivity is a major behavioral risk factor for chronic disease that is influenced by environmental factors. Access to green, natural environments has also been associated with increased physical activity, likely because these settings reduce exposure to noise, pollution, and extreme temperatures; are aesthetically pleasing; and provide opportunities for physical activity on paths/trails, social interactions, and psychological restoration. However, most studies have used self-reported methods. Global positioning systems (GPS) and accelerometry provide objective, unobtrusive measures that are sensitive and specific, and enable new insights into the environments in which physical activity takes place. The current study explores the association between minute-level GPS-based greenness exposure and time-matched objectively measured physical activity.

Methods: A sample of 369 older adult women (mean age = 55.38 ±9.89 years; mean body mass index = 27.74 ±6.12) was recruited from different regions of the U.S (participants recruited from studies in Philadelphia, St. Louis, San Diego, and nationwide study). Participants wore a Qstarz BT1000X GPS device and ActiGraph GT3X+ accelerometers on the hip for 7 days to assess location and physical activity at minute-level epochs. GPS data were linked to nationwide MODIS normalized difference vegetation index (NDVI) data at 250m resolution to record exposure to vegetation. Physical activity outcomes included minute-level steps and accelerometry counts. Minute-level generalized additive mixed models were conducted to examine the nonlinear relationship between GPS measures and physical activity, accounting for clustering of data within participant. We created natural splines to examine the nonlinear relationship between greenness and the two physical activity outcomes.

Results: Participants provided an average of 593.3 minutes of data per week. We observed a nonlinear relationship between NDVI and physical activity (minute-level steps and counts). In general, increasing NDVI was associated with higher physical activity, especially at NDVI >0.60.

Conclusions: Our results suggest that higher levels of physical activity occur in areas with higher greenness, indicating that planning and design policies should focus on these environments to optimize opportunities for physical activity.
Exploring a Multi-component Approach to Physical Activity Assessment: Comparison of Cancer Survivors to the General Population

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SIG: Cancer prevention and management

Awards:

Purpose: Despite growing evidence that physical activity (PA) is a multi-faceted construct, many interventions use a single PA measure (e.g., MVPA) or fail to combine measures in PA assessment, limiting opportunities to customize interventions for cancer survivors or other adults. The aims of this study were to: 1) examine associations of several relevant behavioral (MVPA and sedentary time) and performance measures (fitness and grip strength) with self-rated health and 2) compare combined PA scores in survivors and the general population to understand potential benefits of a multi-component approach in PA assessment.

Methods: Data from the 2011-2012 National Health and Nutrition Examination Survey were analyzed (n=4,586 adults), including 398 survivors. Multiple logistic regression analyses (adjusted for covariates) were used to assess associations of MVPA, sedentary time, fitness, and grip strength with self-reported health. Results were stratified on cancer history and odds ratios compared across quintiles. We calculated combined scores by creating individual scales for behavioral (0-8) and performance (0-8) measures which were then added together for an overall PA score (0-16).

Results: Survivors that achieved 22.5 MET hours/week were more likely (OR=2.81, CI 1.13-6.97) to report very good/excellent health, as were adults without cancer history (OR=1.97, CI 1.54-2.51). Fitness was a strong predictor of very good/excellent health for both survivors (OR= 7.13, CI 2-25) and other adults (OR=2.52, CI 1.49-4.27). In combining scores, adults with and without cancer history had a similar result for mean performance measures (approximately M=4, SE .07), but survivors scored lower for behavioral measures (M=2.71, SE .16) than adults without cancer history (M=3.51, SE=.11). Overall scores were also lower for cancer survivors (M=6.64, SE .22) compared to adults without cancer history (M=7.51, SE .17).

Conclusions: Positive associations with self-rated health were observed in several individual PA components in adults with and without cancer history. Scores that combined behavioral and performance measures revealed that survivors may have unique needs from the general population, especially relative to PA behaviors (MVPA and sedentary time). Using a multi-component approach to PA assessment could be informative in planning exercise programs and may be especially useful in designing interventions for cancer survivors.
The Effect of Residential Context and Fear of Outdoor Participation on Physical Activity among Older Adults in Missouri, USA

Eileen Bjornstrom, Joan Hermsen, Braden Leap, J. Sandy Rikoon, Katelynn Towne-Arnold, Sonja Wilhelm Stanis
University of Missouri, Columbia, MO, USA

SIG: Ageing

Awards:

Purpose: Previous work suggests that both residential context and fear of participation are important correlates of physical activity (PA) among older adults. In this study we move beyond a dichotomous measure of urban versus rural context to examine how both the main and interactive effects of a more finely graded measure of residential context and fear related to participating in outdoor activities are associated with PA among older adults in Missouri, USA.

Methods: Data are from a 2013 Missouri Department of Conservation survey and the 2010 decennial census. We use a sample of adults aged over 64 (N=774). The outcome is moderate and vigorous PA minutes per week. We integrated block level census data to create six variables that capture residential context: urban central city, suburban, small town, rural metropolitan (exurban), rural micropolitan, and remote rural. Fear is coded one if the respondent responded that fear of wildlife, getting lost, getting hurt, sexual violence, racial harassment or random violence are an obstacle to participation in outdoor activities and zero otherwise. We control for gender, income, marital status and self-rated health. Because the outcome is a count variable and the conditional variance is greater than the mean, we estimate negative binomial regression models.

Results: The main effect of fear did not significantly predict PA. The main effects of geographic context were significant such that residents of rural metropolitan (exurban), rural micropolitan and remote rural blocks had significantly higher levels of PA than both urban central city and small town residents, but did not differ from suburban residents. Although the main effect of fear was not significant, it interacted with residential context such that fear among rural micropolitan residents is significantly different than it is for central city, suburban, small town and exurban residents.

Conclusion: Results suggest finely graded measures of residential context are important predictors of PA among older adults. Moreover, they interact with fear of outdoor participation to predict PA, suggesting the effect of fear on PA is not uniform across residential context for this group.
Comparison of Postural Classification between the thigh worn Actigraph GT9X and activPAL Accelerometers Under Laboratory Conditions

Jeremy Steeves1, Michael Chait1, Alexander Montoye2, Scott Conger3

1Maryville College, Maryville, TN, USA, 2Ball State University, Muncie, IN, USA, 3Boise State University, Boise, ID, USA

SIG: No, this does not fit in any of the above mentioned special interest groups

Awards:

PURPOSE: To understand the health impacts of time spent in different postures and to advance the field of sedentary and light intensity activity research, these behaviors need to be assessed accurately. Waist worn accelerometers are limited in differentiating between sitting (sedentary) and standing (light activity) postures. The activPAL3, a thigh-worn accelerometer, has previously been validated for assessing posture (sitting, standing, stepping). A new triaxial accelerometer-based activity monitor (ActiGraph GT9X Link [Link]) offers 9 component motion sensing, and also purports to assess posture when worn on the thigh. This study compared sitting, standing, and stepping classifications from these two thigh-worn accelerometers under laboratory conditions.

METHODS: Wearing the Link and activPAL on the right thigh, 24 adults (10 male; age 26±7 years) engaged in a scripted series of 11 sitting, 10 standing, and 8 stepping behaviors that required 28 total postural transitions. The protocol involved spending 30 seconds in each posture before transitioning to a different posture. Second-by-second postural output from the monitors were compared to direct observation (DO) of time spent in postures. Percent of time correctly classified as sitting, standing or stepping were assessed by calculating percent agreement and weighted kappa for each posture and overall. Repeated-measures analysis of variance was used to compare percent time in sitting, standing, and stepping postures during the entire protocol between monitors and DO.

RESULTS: Both the Link and the activPAL had excellent agreement with the second-by-second DO posture (95.5%; weighted k = 0.94 vs. 95.1%; weighted k = 0.93, respectively). Compared to DO, the Link and activPAL, respectively, correctly classified sitting (98.4% vs. 95.4%), standing (90.6% vs. 97.3%), and stepping (97.4% vs. 92.1%) postures with high accuracy. Mean percent time sitting (37.8%, 38.5%, 38.2%) standing (36.5%, 31.4%, and 34.3%), and stepping (25.7%, 30.0%, and 27.5%) were all statistically different between the Link, activPAL, and DO (P < 0.05).

CONCLUSION: The Actigraph GT9X Link and the activPAL appear to have equivalent abilities for assessing sitting, standing and stepping postures.
Workshops
Translation and Implementation of Evidence-Based Interventions into Policy and Practice

Presenters: Dawn K. Wilson, Sally Wyke, Tracey Naledi, Vicki Lambert, and Stefanie Vandevijvere

Schedule (to be confirmed): June 8, 12:30-16:30

This interactive workshop will address translation and implementation of evidence-based health policies and practices across several countries. Dr. Sally Wyke will discuss policy work at the Institute of Health and Well-being in the UK; specifically the EuroFIT lifestyle programme to attract men to be more active through the loyalty that they feel to the top flight professional soccer clubs. Dr. Tracey Naledi, Director of the Health Programmes, Department of Health in Western Cape Province, will present on local policies to improve health and prevent chronic disease in this region. Dr. Vicki Lambert, University of Cape Town, will present on developing the National Physical Activity Plan throughout South Africa. ISBNPA policy coalition leader Dr. Dawn Wilson and SIG leader Dr. Stefanie Vandevijvere will lead an interactive discussion to address issues of comparing and contrasting different approaches to policy implementation across countries. Future objectives for policy work within ISBNPA will be discussed.
The art of evaluating the effect of changes in the built environment on physical activity behavior

Presenters: Jasper Schipperijn, Stef Kremers, and Dave van Kann

Schedule (to be confirmed): June 8, 8-12; 13-16

Evaluating the impact of changes in the built environment on physical activity behavior is challenging and it is not an exact science with set formats and methods. During this workshop we will introduce participants to the art of evaluating the effect of changes to the built environment on physical activity behavior, whilst ensuring that the many choices that will have to be made have a sound scientific basis. Participants will be introduced to different studies designs, working with the conceptualization of the expected causal relations, sampling and recruitment of participants, exposure definitions, data collection, and analytical strategies. Both experienced researchers as well as researchers new to the field will gain from attending this workshop. Because there is no single best way of evaluating changes in the environment and each decision will have a ripple effect, there will be plenty of room for discussion.
**HomeStyles: A Case Study in Developing a Childhood-Obesity Prevention Intervention**

**Presenters:** Jennifer Martin-Biggers and Carol Byrd-Bredbenner

**Schedule (to be confirmed):** June 8, 8-12

HomeStyles is a comprehensive, in-home intervention that enables and motivates parents to shape home environments and lifestyle behavioral practices (diet, exercise, sleep) to prevent excessive weight gain in preschool children. It is delivered via home visitation or online/web-based. This workshop traces the application of best practices in the development, implementation, evaluation, and dissemination of HomeStyles including:

1. advisory board formation and maintenance;
2. intervention development and formative testing (e.g., fidelity to theoretical underpinnings and community-based participatory research principles, parent focus group interviews to guide intervention materials development, cognitive testing and iterative refinements of materials, in-culture translations for Spanish-speakers), creation of equivalent control intervention;
3. assessment instrument development/refinement [e.g., child BMI, home food and physical activity environment, dietary intake, parental policies/modeling related to diet, exercise, and sleep];
4. intervention staff training; 5. participant recruitment and retention; 6. data management and analysis; and 7. intervention dissemination. This workshop is a must for anyone planning, implementing, evaluating, or disseminating obesity prevention interventions.

Workshop participants will be able to:

- Describe best practices for obesity prevention intervention development.
- Summarize the importance of using behavior change theory and models to guide intervention development.
- Create, implement, evaluation, and disseminate interventions using best practices.
Navigating Cape Town: Using GPS in behavioral nutrition and physical activity research

Presenters: Maartje Poelman, Monique Simons, Marijke Jansen, and Emely de Vet

Schedule (to be confirmed): June 8, 8-12; 13-16

Where you live, eat and play are important contributors to health. Research to understand the role of neighborhoods in obesity prevalence and prevention has burgeoned in recent decades; however much of this research has focused on relationships between the residential environment and physical activity (PA) or food consumption. This focus, primarily on residential areas, has several drawbacks as health behaviors occur in multiple locations and contexts (e.g., along routes to destinations). The emergence of low-cost and accurate Global Positioning Systems (GPS) devices has enabled researchers to objectively track the location of an individual. GPS has become a powerful tool for individual environment exposure assessments. Researchers with no (or little) prior experience using GPS are invited to take part in this interactive workshop to become more familiar with the use of GPS in PA and behavioral nutrition research. By navigating Cape Town, attendees will gain first-hand experience in the use of GPS and interpretation of the data.
Quantifying and Visualising Physical Behaviour: An alternative to Energy Expenditure Estimation

Presenters: Malcolm Granat and Douglas Maxwell

Schedule (to be confirmed): June 8, 12:30-16:30

It has been suggested that physical activity is about “the relationship between human beings and their environment” and the “strengthening of that relationship”. However the primary physical activity outcome has invariably been energy expenditure, with definitions of different aspects of physical activity based on levels of energy expenditure. It is proposed that the pattern of robustly defined activities, Physical Behaviour, can provide an alternative construct to energy expenditure estimation.

The main goal of this workshop is to demonstrate how we can develop person-centred outcomes from the pattern of the individual’s activity and how from these patterns it is possible to derive detailed information on Physical Behaviour.

Interactive features of this workshop will include: a structured discussion on derivation of outcomes based on the patterns of activities, data analysis showing how we can derive new outcomes of lying, cycling and car travel from body-worn accelerometer data and group working analysing sample data.

Excessive sitting in prolonged bouts is associated with poor health, even when physical activity guidelines are met, making sedentary time a new health behaviour change target. This has led to an increase in the number of interventions to change sedentary behaviour. Crucial to the evaluation of these interventions is the choosing the most appropriate measure of sedentary behaviour.
Measuring sedentary behaviour in an intervention context

Presenters: Paul Gardiner, Sebastien Chastin, and Manon Dontje

Schedule (to be confirmed): June 8, 12:30-16:30

This workshop brings together experts in sedentary behaviour interventions and measurement of sedentary behaviour. Participants will be involved in didactic sessions as well as undertake interactive exercises. During the workshop participants will consider:

- Components of sedentary behaviour: total volume and patterns
- Properties of sedentary behaviour measures: reliability, validity and responsiveness to change
- Existing self-report measures of sedentary behaviour
- Existing objective measures of sedentary behaviour
- Measures to improve compliance with measurement protocols
Social media and strategic communications for researchers and institutions

Presenters: Steven Kelder and Brooks Ballard

Schedule (to be confirmed): June 8, 12:30-16:30

This workshop will explain the role of institutional social media and communications efforts, and how individuals can utilize these same tactics to increase the impact of their research. This “hands-on” learning experience is designed to allow participants to develop and/or refine their organizations' strategic social media communications. Participants will learn methods to translate and disseminate research to targeted audiences to improve decision-making and program planning. We will review evidence-based and popular communications methods, including: social media, email marketing, blogging, webinars, infographics, online videos, and more.

The workshop goals are:

1. Define social media and strategic communications in a public health research context
2. Review social media technologies, evidence-based and state of the art methods, and gaining institutional support
3. Present case studies in social media strategic communications planning
4. Define measures for success and review available analytic tools
5. Provide hands-on opportunities to develop a institutional social media strategic plan
Early Career Researchers workshop

Presenters: Various (To be defined)

Schedule (to be confirmed): June 8, 8-12; 13-16

The Early Career Researchers workshop will give you an opportunity to learn from experienced researchers on a range of topics such as: career guidance, developing collaborations, grant-writing tips, mentoring, time management and building your CV. The workshops will offer several opportunities for networking with other participants and senior researchers, including round-table discussions. Sessions will include both lecture-style, information sharing and small group discussions. Numbers will be limited so register early!
Move Well, Move Often' - The practical application of fundamental movement skills for youth physical activity promotion.

Presenters: Wesley O'Brien, Bronagh McGrane, Johann Issartel, and Sarahjane Belton

Schedule (to be confirmed): June 8, 8-12

This workshop will critically discuss and actively explore the thematic area of ‘fundamental movement skills’ (FMS), specifically for childhood physical activity promotion. Participants will practice basic observable patterns of movement through prescriptive tasks and a variety of assessment strategies. The workshop is designed to improve the critical eye of the participant towards the observation of FMS (both within and outside of the school environment). During the course of the workshop, participants will execute skills such as running in a straight line (locomotor) and/or performing a two-handed catch (object-related) etc. From these episodes of basic movement practice, participants will further their knowledge by critically assessing and monitoring levels of skill proficiency from the workshop delegates. This workshop will be particularly suited to those interested in the fields of childhood physical activity promotion, motor development, skill development, human movement, physical education and intervention implementation.

Presenters: Janetta Harbron, Marianne Senekal, Nelia Steyn, and Sharmilah Booley

Schedule (to be confirmed): June 8, 8-12

Research indicates that behaviour change interventions are more effective when guided by the understanding and application of behaviour change theories. The Theory of Planned Behaviour (TPB) is a beliefs-based model designed to predict behaviour. TPB-based interventions are expected to improve intention to change and lead to successful execution of the target behaviour. During this workshop the comprehensive application of the TPB, including the specific steps that are recommended for designing a TPB-based intervention will be explained using interactive sessions covering practical and hands-on applications of each step. The steps involve: 1) Formative assessment to identify underlying beliefs relating to a given behaviour e.g. fruit and vegetable intake. For these purposes, illustrations of how to conduct focus group discussions/in depth interviews will be covered. 2) Compile a TPB-questionnaire from the data collected in step 1 and interpret the results to identify modal (most commonly held) beliefs. 3) Attendees will learn how to develop belief targeted messages for a TPB-based intervention.
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IDEFICS and I.Family consortia, on behalf of the

Ikwuagwu, Dominic Uzodimma

Ioakeimidis, I

Ip, Edward

Isgor, Zeynep

Issartel, Johann

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