

SESSION OVERVIEW

Prewitt. E., PhD, Loyola University, USA

THE DYNAMICS OF NUTRITION-RELATED HEALTH DISPARITIES

Popkin, B.M., PhD, Department of Nutrition, University of North Carolina, Chapel Hill NC, USA

Most research has shown that chronic diseases and key risk factors are inversely related to socioeconomic status (SES) in higher income countries and positively associated with chronic diseases and risk factors in lower income countries. This includes research on dietary intake, physical activity, and obesity. The gradient is increasing in the higher income countries and shifting in the lower income ones. As we show for the US, education is a major force for explaining dietary change. Important community service and infrastructure factors related to physical activity are also important. In the developing world, we present some in-depth data for Brazil along with age-standardized comparable relationships between education and obesity to show that the gradient of SES is shifting fast. Higher GNP and education are now associated with reduced obesity for many key countries throughout the developing world. The burden of women's overweight is already concentrated in the lower SES groups in most middle-income transitional economies. Furthermore, this inverse relationship is now found in a number of low-income countries such as China. In the absence of effective public actions, obesity will shift very rapidly toward the poor in most of the developing world over the next decade.

FAT AND SUGAR: THE ECONOMICS OF FOOD CHOICE

Adam Drewnowski, PhD, Center for Public Health Nutrition, University of Washington, Seattle, WA 98195-3410; Nicole Darmon, PhD, Unité INSERM 557, Centre National des Arts et Métiers ISTNA, Paris 75004, France; André Briend, Institut de Recherche pour le Développement, Paris 75010, France

Disparities in health status among US populations are linked to economic resources, education, and income. Such disparities may also be mediated by unequal access to a healthy diet. Higher obesity rates among racial/ethnic minorities and the poor may be explicable through the consumption of a low-cost energy-dense diets. One question is whether higher energy-density diets (kJ/g) are associated with lower energy costs, defined as \$/10MJ. Economic analyses of French data sets suggest that energy density and energy cost are inversely linked. Diets high in sugar (sucrose), fats, and grains were associated with lower daily diet costs (in Euros/d) after adjusting for energy intakes, gender and age. For most levels of energy intake, higher consumption of fats and sweets was associated with a net saving in daily diet costs. In contrast, higher fruit and vegetable consumption was associated with higher diet costs. So-called "prudent" diets rich in lean meats, vegetables and fruit were associated with higher diet costs. We hypothesize that low-income and food-insecure respondents will be more likely to consume energy-dense diets that provide maximum energy at minimum cost. Linear programming models suggest that imposing a constraint on daily diet costs leads to higher energy density diets with a higher proportion of added fats. Those computer models were analogous to diets selected by low income families. The low energy cost of sugar and fat has helped to reduce diet costs worldwide. The relationship between obesity, diet structure and energy costs has not been explored.

CROSS CULTURAL COMPARISONS OF SOCIOECONOMIC STATUS AND ENVIRONMENTAL SUPPORTS FOR PHYSICAL ACTIVITY

Dawn K. Wilson, Ph.D., Karen Kirtland, Ph.D., Barbara Ainsworth, Ph.D., Cheryl Addy, Ph.D. University of South Carolina, Arnold School of Public Health, Prevention Research Center, Department of Health Promotion, Education, and Behavior, and Department of Epidemiology, USA

In this presentation we compare data from a project conducted in rural South Carolina to other international studies. In our study, we examined the relationships between socioeconomic status (SES) and perceptions of access and safety for physical activity (PA). Residents of Sumter County (n=1,194; ages 18-75 years) were contacted using a random-digit-dial method. They were asked 13 questions about neighborhood supports for PA and 13 questions about community supports for PA. Objective data using a Geographic Information System were collected for presence of trails, sidewalks, public recreation facilities, and crime incidents. Using census data a cluster analysis identified 10 low SES and 11 high SES tracts. More African Americans were in the low (vs. high) SES group (66.5% vs. 25.1%). The low SES group reported engaging in less PA based on CDC/ACSM recommendations than the high SES group (sufficiently active 34.5% vs. 39.4%; insufficiently active 42.9 % vs. 45.6%; inactive 22.6% vs. 15%, $X^2=6.02$, $p<.05$). The low (vs. high) SES group also reported higher perceptions of neighborhood crime, unattended dogs, unpleasantness of neighborhoods, and untrustworthy neighbors ($p <.05$, for all). Separate multiple regression analyses for low and high SES groups showed the presence of trails predicted sufficient PA in the low SES group (OR=3.31, CI=1.38-7.93, $p<.02$; adjusted for race OR=2.81, CI=1.15-6.89, $p=.050$), but not in the high SES group. These results are consistent with Australian studies and expand on previous research by showing that access to trails is an important environmental support for PA among low SES rural communities.

THE COSTS OF A HEALTHY DIET

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The causes of food poverty are complex and multifactorial. Among relevant factors are food affordability, access and availability, as well as food selection and cooking skills. Lower-income households have lower nutrient intakes and eat less fresh fruit, whole grains, lean meat and fish than do higher-income households. People with low incomes are least likely to eat a healthy diet. They also spend a higher proportion of their income on food. There is increasing evidence that poor

nutrition due to income inequalities leads to poor health. Mothers, babies and children are particularly vulnerable to the effects of food poverty. Meeting the healthy eating guidelines is not always easy. Expenditure on fruit and vegetables are the main items which make a healthy diet more expensive in the UK. People who meet the healthy eating guidelines spend almost half of their food budget on fruit and vegetables compared with less than a third being spent on these items by people not meeting the goals³. The overall direct costs of eating a healthy diet are higher than the costs of eating less healthily, although this excess expenditure may not be inevitable. This talk will address evidence about the costs of healthy eating. Dietary patterns comparing poorer and richer households will be explored. The health implications for people who are unable to afford a healthy diet will be considered. Finally, examples of practical public health initiatives being undertaken in the UK to promote healthy eating for particular groups will be discussed.

POLICY IMPLICATIONS

Ballenger Nicole, PhD, United State Department of Agriculture, USA

The causes of rising rates of obesity in the general population is still a new area of research, and explaining disparities in obesity prevalence among socioeconomic subpopulations is even more challenging. There is an active dialogue on the issue of whether federal interventions to reduce obesity in the general population are warranted and good public policy. However, the U.S. government already intervenes in the nutritional status of low-income populations through a number of food assistance and nutrition programs, such as Food Stamps, WIC, and school meals. This presentation will discuss potential program strategies or other federal approaches to improving dietary choices and reducing obesity, and the research needed to support analyses of the effectiveness of various alternatives.

CONCURRENT SYMPOSIA

**Symposium 1 – Theoretical models of behaviour:
The gap between intention and behaviour: Why and what to do?**

Suzor-Côté

THE GAP BETWEEN INTENTION AND BEHAVIOUR: WHY AND WHAT TO DO?

Godin, G., PhD, Université Laval, Québec, Canada

During the last two decades, major gains have been made in understanding the intentions underlying the adoption of behaviours in the field of health. However, there remains an important gap between stated intention and overt behaviour. However, recent data indicate that it would be advantageous to identify the possible moderators of the intention / behaviour relationship and to verify if new theoretical constructs could improve the performance of current theories.

Four presentations will cover facets of this problematic. First, the effect of stability of intention (Mark Conner) as a key moderator is reported for nutrition behaviour. Second, the role of past behaviour (Paul Norman) as a potential moderator is explored across an array of behaviours. Third, the utility of a new theory aimed at reducing discrepancies between intentions and behaviour, that is implementation of intentions (Paschal Sheeran), is scrutinised among studies promoting the adoption of a healthy diet and physical activity. Finally, in the overall discussion (Wendy Rodgers), the extent to which intention and behaviour are differentially motivated is examined.

INTENTION STABILITY AS A KEY MODERATOR OF INTENTION-BEHAVIOR RELATIONSHIPS

Conner, M., PhD, University of Leeds, Leeds, United Kingdom

A considerable body of research has examined the predictors of intentions and the relationship between intentions and action in a range of health behaviors including physical activity and nutrition. There has been found to be considerable variation in the size of the intention-behavior relationship and a number of factors explaining this variation have been examined. A key such moderator is the temporal stability of intentions. The stability of intentions between measurement of intentions and the opportunity to act is a key assumption of the Theory of Reasoned Action/Planned Behavior. Nevertheless there have been relatively few methodologically adequate examinations of this prediction. The effect of this moderator on intention-behavior and past behavior-behavior relationships is illustrated for a nutrition behavior. In a sample of 144 adults a measure of intention stability over a period of six months is shown to moderate the intention-behavior and past behavior-behavior relationship over a period of six years for healthy eating. Individuals with stable compared to unstable intentions had intentions that were better predictors of behavior and past behavior that was unassociated with future behavior. A review of the moderating role of intention stability on intention-behavior and past behavior-behavior relationships across a variety of health behaviors will be presented to demonstrate the generality of this effect. Intention stability may tap an important component of intention strength, be a key moderator of intention-behavior relationships, and mediate the effects of other moderators. The implications for furthering our understanding of the intention-behavior relationship will be considered

EXAMINING THE ROLE OF PAST BEHAVIOR IN THE THEORY OF PLANNED BEHAVIOR

Norman, P., University of Sheffield, Sheffield, United Kingdom

Recent reviews suggest that the theory of planned behavior (TPB) provides a strong prediction of intention but only a moderate prediction of behavior. In addition, many studies report past behavior to be the best predictor of behavior, and this is explained in terms of habit. When behaviors are performed repeatedly, they become habitual in nature and depend less and less on a rational statement of intention. Thus, past behavior should moderate the intention-behavior relationship. In Study 1, 273 students completed TPB questionnaires on binge drinking. The TPB explained 20% of the variance in binge drinking at one week. The addition of past behavior led to a small, but significant, increment in the amount of variance explained ($\Delta R^2=.02$). Moreover, past behavior was found to moderate the intention-behavior relationship, which became weaker with increasing levels of past behavior. Study 2 addressed the possibility that it is

people, rather than behaviors, are under habitual control. Past behavior, intention and future behavior were assessed over a two-week period for 30 behaviors (N=207). Within-participants correlations were used to identify two groups of participants under intentionally versus habitual control. When between-participants regression analyses were conducted for these two groups, the strength of the intention and past behavior beta weights for the 30 behaviors were found to be markedly different. The additional predictive utility of past behavior in many TPB studies may therefore be due to a subset of participants who are under habitual control.

OVERCOMING THE INTENTION-BEHAVIOUR GAP THROUGH STRATEGIC AUTOMATIZATION: META-ANALYSIS OF IMPLEMENTATION INTENTIONS

Sheeran, P., PhD, University of Sheffield, Sheffield, United Kingdom; Gollwitzer, P.M., University of Konstanz, Germany / New York University, USA

Purpose: This paper presents a comprehensive meta-analysis of the utility of implementation intentions in reducing discrepancies between intentions and behaviour. Illustrative studies in relation to promoting a healthy diet and increasing physical activity levels are described as well as the findings of the quantitative review.

Background: Whereas behavioural intentions have the form "I intend to do X!", Implementation intentions are specific plans that usually take the format "As soon as situation Y arises, I will initiate goal-directed behaviour Z!" Evidence suggests that implementation intentions are effective in helping people translate their intentions into action. However, a meta-analysis is required in order to precisely determine the impact of implementation intentions on behavioural performance.

Method: Computerized literature searches and informal sources produced 86 independent tests of the relationship between implementation intentions and future behaviour.

Results: The overall effect size associated with forming an implementation intention was $d = .61$ (95% CI = .56 - .63). Implementation intentions had significant impacts on difficult-to-remember behaviours, behaviours involving short-versus long-term trade-offs, and behaviours involving deadlines or windows of opportunity. Implementation intentions were also effective in suppressing unwanted attentional and behavioural responses. There was strong support for component processes of implementation intentions especially in relation to automatization of responding.

Conclusion: Implementation intentions are highly effective in overcoming a variety of volitional problems and should be deployed.

DOES THE GAP BETWEEN INTENTION AND BEHAVIOUR RELATE TO HOW INTENTION AND BEHAVIOUR ARE PRODUCED?

Rodgers, W., PhD, University of Alberta, Edmonton, Canada

Understanding the relation between intention and behaviour is critical to the reliable prediction of behaviour: a goal of most research on health promotion and disease prevention. A number of different potential moderators and even mediators of the moderators have been presented. Another possible direction is to examine the extent to which intention and behaviour are differentially motivated. That is, different motivational factors may predict each of intention and behaviour, partially accounting for the different observed relationships between them. Although intention may be necessary to produce behaviour, the formation of the intention may be influenced by different variables than those influencing sustained behaviour. This possibility is explored in an exercise context, where the relative influences of different types of self-confidence were observed over time as behaviour developed in a sample of 100 women. Referring to social ecological models of behaviour, to the extent that behavioural intentions are an intra-psychoic phenomenon, influenced by a person's own beliefs and affect, and behaviour is extra-personal, influenced by other people and environmental features, different predictors would be expected. One would also expect, then, increased stability of intentions and closer alignment of intentions to behaviour over time with increased behavioural experience that comes, in turn, to influence future intentions. Similarly, the influence of past behaviour on the development of intra-psychoic factors in addition to its influence on behavioural intention needs to be considered.

Symposium 2 – School based environmental interventions for food choices: Primary outcomes from three randomized trials

Krieghoff

CAFETERIA POWER PLUS PROJECT: OUTCOMES OF A RANDOMIZED TRIAL TO INCREASE FRUIT AND VEGETABLE CONSUMPTION AMONG ELEMENTARY SCHOOL CHILDREN

Story, M, Perry, C, Bishop, D, Taylor, G. Division of Epidemiology, University of Minnesota, Minneapolis, Minnesota, USA

The cafeteria power plus project examined whether a cafeteria-based intervention would increase the fruit and vegetable (fv) consumption of children. Twenty-six elementary schools were randomly assigned to either an intervention or control condition. Baseline lunch observations (n=1668) of first- and third-grade students occurred in spring, 2000; follow-up was in spring, 2002. The intervention took place during two consecutive school years beginning fall 2000 and consisted of daily activities (increased fv availability, attractiveness and encouragement) and special events (kick-offs, samplings, theatre production, challenge weeks, finale meal). Students in the intervention schools significantly increased their total fruit intake. Process measures showed that verbal encouragement from food service staff was associated with outcomes. Results suggest that multi-component interventions to increase fv intake are more powerful than cafeteria programs alone in this age group.

OUTCOMES FROM THE TEENS STUDY

Lytle, L.A., Division of Epidemiology, University of Minnesota, Minneapolis, Minnesota, USA

The teens study developed and evaluated a school-based intervention to increase 7th and 8th graders' consumption of fruits (f), vegetables (v), and lower fat foods to help reduce their future risk of cancer. Teens was conducted in 16 middle schools over a two year period. Baseline data collected included 24 hour recalls, student surveys, and several school-level

assessments. Schools randomized to the intervention (n=8) received 7th and 8th grade nutrition curricula, school food service intervention to increase fv in the school lunch and to increase availability of lower fat foods in a la carte areas, and school nutrition advisory committees to examine school food policies. At the end of the first intervention year, a dose response was observed, with peer leaders reporting the largest increases in fv and lower fat foods. At the end of the second year, no significant differences were observed between intervention and control schools for fv or fat intake. Trends toward healthier food offerings in the a la carte were observed in intervention schools.

TACOS: OUTCOMES OF AN ENVIRONMENTAL INTERVENTION TO INCREASE SALES OF LOWER FAT A LA CARTE FOODS AMONG SECONDARY SCHOOL STUDENTS

French, SA, Story, M, Fulkerson, JA, Hannan, P., Division of Epidemiology, University of Minnesota, Minneapolis, Minnesota, USA

Tacos evaluated an environmental intervention to increase sales of lower fat foods in secondary school cafeterias. Twenty secondary schools were randomized to intervention or control group for a two-year period. The intervention increased the availability of lower fat foods in the school cafeteria a la carte areas and implemented student-based promotions targeting the lower fat foods. Computerized cafeteria food sales data were collected continuously. Intervention schools showed a marginally significantly higher mean percent sales of lower fat foods in year one (27.5% vs. 19.6%, p= .10) and a significantly higher percent sales of lower fat foods in year two (33.6% vs. 22.1%, p = .04). A steeper rate of increase in sales of lower-fat foods was observed in intervention schools in year one (+10% vs. -2.8%, p = .002) but not in year two. Results showed that a school-based environmental intervention that increased the availability and promotion of lower fat increased purchase of these foods among adolescents.

CONCURRENT PAPER SESSIONS

Session 1 — School based programs: Nutrition and physical activity interventions

Suzor-Côté

1:30

THE RELATIONSHIP BETWEEN THE SCHOOL LUNCH SOCIAL ENVIRONMENT AND FRUIT AND VEGETABLE CONSUMPTION

Estabrooks, P. A., Dzewaltowski, D. A., Sy, O.S., Milliken, G. A., Kansas State University, Manhattan, USA
Fruit and vegetable consumption (FVC) reduces the risk of chronic disease and aids in the healthy growth and development of youth. Only 20% of school aged youth eat the recommended 5 servings per day. Over 95% of American students participate daily in the National School Lunch Program, as such this social environment may be an important channel to influence youth FVC. The purpose of this study was to determine the relationship between the social environment of school lunch areas on subsequent reporting of FVC. Participants were 1792 seventh grade students from 16 middle schools (Mage=13.37±0.40 years; 52% girls) who completed the School Lunch Social Environment Inventory (SLSEI) and three days later completed a validated food frequency questionnaire (Rockett, et al., 1997). The SLSEI assesses students' perceptions of the school lunch social environment for FVC and social interaction and their individual attractions to FVC and social interactions at school lunch. The intraclass correlation within school lunch areas was taken into account and a mixed model analysis was used to determine the relationships between the two social environment variables, two attraction variables and FVC. The students' perceptions of the school lunch social environment for FVC contributed significantly to the prediction of FVC ($F(1,1789)= 7.79$; $p<.01$). A 2 point increase on 5-point F&V social environment related to an average fruit and vegetable consumption increase of .5528 servings per day (95% CI .16462 servings/day to .94078 servings/day). We conclude that student perceptions of the normative FVC social environment were related to subsequent FVC.

1:45

FIVE A DAY; PREVALENCE AND CORRELATES IN TWO SAMPLES OF US CHILDREN

Murphy, J.M., Anderson, E.J., Kleinman, R.E., Massachusetts General Hospital, and Harvard Medical School, Boston, Massachusetts, USA, Brown, J, Collins, J.C., and Agent, M., Center for Ecoliteracy, Berkeley, California, USA

Background: Although "Five A Day" has been a large national program as well as a goal and a slogan for more than ten years, there have been few studies that report on the percentage of students who get five servings of fruits and vegetables a day and even fewer on whether those who do show better functioning.

Methods: This presentation examines the correlates of food group consumption in a 105 student sample from California and prevalence of food group consumption from a recently released report on a large (N=4298) sample of students from six school districts from around the US. For both samples, information was gathered from interviews and school records. A 24 hour food recall was collected from each student and analyzed for number of servings of fruits and vegetables and micronutrients.

Results: In the six-district sample, the average servings of fruits and vegetables per day was 3.9, below the recommended level. In the California sample, the mean number of servings was higher (4.4) but still short of the goal and students who reported eating 5 or more servings a day were significantly more likely to have excellent health (46% vs 33% vs 8%), good psychosocial functioning (90% vs 87% vs 60%) and fewer missing micronutrients (.9 vs 2.2 vs 2.8) than students who reported 2-4 or less than two servings per day.

Conclusions: Results confirm previous reports that many students from around the US are not consuming five servings a day of fruits and vegetables and suggest that there is indeed a link between eating the recommended servings and better physical and mental health and nutrition.

2:00

MEAL CHOICES AND WEEKEND SCREEN TIME ASSOCIATED WITH OVERWEIGHT AND OBESITY AMONG CHILDREN IN FOUR ASIAN CITIES

Guldan G.S., The Chinese University of Hong Kong, Hong Kong, China; Kijboonchoo K., Mahidol University, Nakhon Pathom, Thailand; Poh B.K., Universiti Kebangsaan, Kuala Lumpur, Malaysia; Milano W., Food and Nutrition Research Institute, Metro Manila, Philippines; Cairns G., Asian Food Information Centre, Singapore; Howden J., Nutrition Consultant, United Kingdom

For health communication needs assessment and cross-city comparisons, a cross sectional diet and physical activity KAP survey among 1,815 10- to 12-year-olds (50% males) from Bangkok (n=414), Hong Kong (n=463), Kuala Lumpur (n=488), and Manila (n=450) was conducted. Researchers administered questionnaires in 3 to 5 schools in each city and measured subjects' heights and weights. Overweight and obesity (international reference) were firmly established, with 18.6% overweight and 7.2% obese, with higher rates in boys than girls and in Bangkok and Manila than in Kuala Lumpur and Hong Kong. Main healthy eating information sources were family (77%), school (76%), doctor (63%) and television (56%). Although subjects knew certain favorite foods were healthier than others, and around half reported choosing their own meals and snacks, their choices were not consistent with their knowledge. Only 21% reported eating lunch with more vegetables than meat. Although favorite dinner foods were traditional Asian fare, favorite snacks included potato chips and similar snack foods. While 97% reported liking sports, much television watching (135+108 min on weekdays and 227+176 min on weekend days) and 'playing computer' (61+76 min on weekdays and 95+107 min on weekend days), was reported, with exercise mainly in PE classes, and on weekends and holidays. Some behaviors associated with overweight and obesity ($P<0.05$) were breakfast skipping, having more meat than vegetables for lunch, and longer weekend screen time. While healthy living messages reach these students, they do not deliver the skills or enhance support sufficient to adopt healthy behavior and prevent obesity.

2:15

STUDENT-CENTERED AFTER-SCHOOL PROGRAM FOR INCREASING PHYSICAL ACTIVITY IN UNDERSERVED ADOLESCENTS

Dawn K. Wilson, Ph.D., Joel Williams, MPH, Alexandra Evans, Ph.D., Gary Mixon, MPA, Cherie Minette, MPH, John Sirad, MS. University of South Carolina, Arnold School of Public Health, Columbia, SC and Recreation and Parks, Sumter, SC

We examined the effects of a 4-week student-centered intervention on increasing physical activity (PA) in underserved adolescents (30 females, 18 boys; ages 10-12 years; 83% African-American; 83% on free or reduced lunch). Twenty-eight students in the intervention school were matched (on race, percentage on free or reduced lunch, gender, age) with 20 students from another school who were not enrolled in after-school activities. The student-centered intervention was consistent with Self-Determination (Motivation) Theory and Social Cognitive Theory in that it emphasized increasing intrinsic motivation and behavioral skills for PA. Intervention adolescents selected PA activities that were fun, generated coping strategies for making effective PA behavior changes, and developed activities for engaging friends in PA. Five-day accelerometer estimates and measures of motivation, self-concept and social support for PA were assessed at baseline and post-intervention. Participants in the intervention (vs. comparison group) showed greater increases in moderate PA (81±34 vs. 98±27 min/day), moderate-to-vigorous PA (89±40 vs. 111±30 min/day), and vigorous PA (6±5 vs. 10±15 min/day) from baseline to post-intervention ($p<0.05$ for all). Intervention participants (vs. comparison group) also showed greater increases in PA motivation (3.8±1.3 vs. 4.5±1.1) PA self-concept (4.0±1.2 vs. 4.4±1.0), and social support for PA from friends (1.9±1.0 vs. 2.7±1.4; $p<0.05$ for all). These findings suggest that giving adolescents choice in developing strategies and activities for PA programs is effective for increasing PA in underserved adolescent populations.

2:30

RECENTY INFLUENCES REPORTING ACCURACY OF FOURTH-GRADE CHILDREN'S DIETARY RECALLS

Baxter, S.D., Medical College of Georgia, Augusta, Georgia, USA; Smith, A.F., Cleveland State University, Cleveland, Ohio, USA; Frye, F.H.A., Guinn, C.H., Baglio, M.L., Shaffer, N.M., Litaker, M.S., Medical College of Georgia, Augusta, Georgia, USA

To evaluate the effect of recency on accuracy of fourth-graders' dietary reports, each of 60 randomly selected children was observed eating school meals (breakfast, lunch) and interviewed to obtain a 24-hour dietary recall using one of six conditions generated by crossing two target periods (previous day, prior 24 hours) and three interview times (morning, afternoon, evening), with 10 children (5 males) per condition. Accuracy of the school meal portions of each recall was assessed by comparing reports to observations. Amounts eaten were observed, reported, and scored in servings. Rates for omissions (items observed but not reported) and intrusions (items reported but not observed) were calculated to determine accuracy for reporting items. A measure of total inaccuracy combined errors for reporting items and amounts. For each response measure (omission rate, intrusion rate, total inaccuracy), an analysis of variance was conducted with gender, target period, interview time, and two-factor interactions as explanatory variables. Significant effects of target period were found for omission rate ($p=0.006$), intrusion rate ($p<0.001$), and total inaccuracy ($p<0.001$); all were better for prior 24 hours than previous day with respective means as follows: omission rate (47%, 67%), intrusion rate (28%, 54%), total inaccuracy (5.5, 8.6 servings). A marginally significant interaction of target period by interview time was found for omission rate ($p=0.08$), but not intrusion rate ($p=0.15$) or total inaccuracy ($p=0.47$). This provides evidence that recency influences children's recall accuracy and demonstrates the importance of considering principles of memory when designing what are essentially memory tests for research studies.

2:45

GENERALIZABILITY OF CONCLUSIONS FROM OBSERVATION OF SCHOOL MEALS TO CHILDREN NOT OBSERVED
Smith, A.F., Cleveland State University, Cleveland, Ohio, USA; Baxter, S.D., Frye, F.H.A., Guinn, C.H., Baglio, M.L., Shaffer, N.M., Litaker, M.S., Medical College of Georgia, Augusta, Georgia, USA

We investigated whether observation of school meals influences children's dietary reporting. Of 120 volunteer 4th-graders (70% Black, 26% White, 4% Other), 60, assigned at random, were observed eating school meals (breakfast, lunch) once and interviewed to obtain a 24-hour dietary recall; the other 60 were interviewed without having been observed. For each group (observed; no-observation control [NOC]), interviews were conducted according to one of six multiple-pass protocols (about the previous day's intake in the morning, afternoon, or evening; or about the prior 24-hours' intake in the morning, afternoon, or evening), with 10 children from each group (5 male) assigned at random to each interview protocol. Interviewers were blind to observation status. Five variables were compared—interview length, number of meals/snacks reported, and (for 2 schools meals) kilocalories reported, number of meal components reported, and number of items reported. Results from a 2 group (observed; NOC) x 2 target period (previous day; prior 24 hours) x 3 interview time (morning; afternoon; evening) ANOVA indicated no significant differences between observed and NOC groups (all p 's $>.21$), and no significant interactions of group with target period or interview time (all p 's $>.38$). Target period affected significantly interview length ($p=.0008$) and number of meals/snacks ($p=.0388$); both were greater for prior 24 hours than previous day. These results suggest that observation of school meals does not affect children's dietary behavior or reporting in ways that would limit the generalizability of findings from validation studies using observation of school meals to children who are not observed.

Session 2 — Methodology and theory

Pilot

1:30

HOW TO ANNOY RESPONDENTS: MEASURING INTRAPERSONAL DETERMINANTS OF OBESITY INDUCING BEHAVIORS

Kremers, S.P.J., De Bruijn, G.J., Universiteit Maastricht, Maastricht, Brug, J., Erasmus Medical Center, Rotterdam, The Netherlands

Since both dietary behavior and physical activity are complex behaviors consisting of many distinct dimensions, problems may arise when behavioral scientists intend to study the broad range of possible social psychological determinants of obesity inducing behaviors. Especially the use of belief-based constructs causes questionnaires to be long, which may lead to low response rates and invalid data. Five data sets from cross-sectional surveys were analyzed to examine the necessity of measuring belief-based constructs to study intrapersonal determinants of obesity inducing behaviors. Based on the Theory of Planned Behavior, attitudes, subjective norms and perceived behavioral control related to fruit consumption ($n = 631$), snacking ($n = 627$), using fat sandwich filling ($n = 646$), active transport ($n = 619$) and physical activity during leisure time ($n = 626$) were assessed directly among adolescents (mean age 14.7). Further, attitudinal, normative and control beliefs were assessed for the same behaviors. Results showed high correlations between the direct constructs and the belief-based constructs. Overall, direct measures showed higher correlations with intentions to engage in the behaviors than the belief-based measures. Multiple regressions revealed that the use of belief-based measures did not result in a larger explained variance in intentions and behaviors, compared to equations that consisted of direct measures. It is concluded that determinant research regarding obesity inducing behaviors should be two-staged. In stage 1, based on direct assessments the most important determinant categories should be identified. In stage 2, the most important beliefs for these determinants should be assessed to inform intervention development.

1:45

SOCIAL DESIRABILITY BIAS IN SELF-REPORTED DIETARY, PHYSICAL ACTIVITY AND WEIGHT CONCERNS MEASURES IN 8-10 YEAR OLD AFRICAN-AMERICAN GIRLS: RESULTS FROM THE GIRLS HEALTH ENRICHMENT MULTI-SITE STUDIES

Klesges, L. M., University of Tennessee Health Science Center, Memphis, TN, USA; Baranowski, T., Cullen, K., Baylor College of Medicine, Houston, TX, USA; Beech, B., Murray, D., University of Memphis, Memphis, TN, USA; Pratt, C., National Heart, Lung, and Blood Institute, Bethesda, MD, USA; Rochon, J., Duke University, Durham, NC, USA

Purpose: Social desirability (SD) in adult samples has been shown to influence self-reported dietary intake. Children's self-reported health behaviors may also be influenced by SD bias and confound relationships with health status measures but results have not been reported. This study investigated these hypotheses among dietary, physical activity, body mass and weight concerns measures.

Methods: Ninety-five African-American girls aged 8-10 years old completed baseline measures as part of the GEMS intervention feasibility study. Measures of body mass index (BMI), beverage intake assessed with 24-hr recalls, and objectively measured physical activity (by accelerometer) as well as psychosocial measures of weight concerns, diet, and physical activity were completed. Partial correlations, regression models assessing SD construct bias, and change-in-coefficient analyses assessing confounding of relationships by SD were analyzed.

Results: Higher SD was related to lower objective measures of physical activity and leaner BMI. After controlling for age and BMI, overestimates of self-reported activity ($p = .02$), underestimates of sweetened beverage preferences ($p = .018$), and lowered ratings of weight concerns and body image measures (p 's $< .05$) were related to SD. Confounding by SD of relationships between self-reported behaviors with BMI and physical activity was found.

Conclusions. Bias in children's self-reported measures of physical activity, beverage intake, and weight concerns was related to socially desirable responding in GEMS participants. Confounding by SD of BMI and physical activity relationships with self-reported health behavior was demonstrated. Methods to measure and control SD bias are needed to reduce potential distortion of health outcomes.

2:00

BRANCHING OUT WITH TREES TO ANALYZE DIETARY AND BEHAVIORAL CORRELATES OF OBESITY IN COMPLEX SURVEYS

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Purpose: To show that the use of tree analysis, in conjunction with logistic regression, enables construction of better and more appropriate models to explore dietary correlates of Obesity. Background: In regression analysis, the decision about which variables to include and in which form they should be included in the model can be very difficult. Screening variables and their interactions can be very tedious. All types of variables can be included in a tree analysis, including variables with missing values and variables that are highly interrelated. Because of the tree methodology, cutpoints for variables that best optimize a function are given, so it is possible to consider new variables generated from the old variables. Trees are also useful for exploring the interaction of variables. For example, if a variable appears on one side of a tree and not on the other, it suggests that there is indeed an effect of interaction. Methods: A 24-hour dietary recall was completed in the National Health and Nutrition Examination Survey, (NHANES) 1999-2000. Healthy Eating Index (HEI) scores, composed of 10 components each representing different aspects of a healthful diet, were constructed for adults. Results: Using the HEI, demographics, income status, federal aid, obesity risk factors and behaviors, as well as their interactions, we show how trees and weighted trees shed light on the correlates of obesity. Conclusion: New statistical methodology can enhance understanding of the dietary patterns and behaviors that affect obesity.

2:15

RELATIONSHIP OF BODY COMPOSITION AND SELF-REPORTED INTAKE OF SELECTED NUTRIENTS IN OVERWEIGHT LOWER MISSISSIPPI DELTA AFRICAN AMERICAN GIRLS

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This study compared the measurement of percent body fat by skinfolds (SF) and bioelectrical impedance (BIA) to dual energy x-ray absorptiometry (DXA), and evaluated self-reported nutrient intake by BMI and percent body fat in 8-11 year old African American girls. 56 girls were recruited based on self-reported BMI >85th percentile. Subsequently, BMI, and percent body fat by 4 methods, were measured. Additionally, the girls self-reported their dietary intake for the 24-hour period of their stay at the Arkansas Children's Nutrition Center, and simultaneously their dietary intake was recorded by trained dietitians using direct observation. Foods and quantities were recorded prior to serving to the girls, and plate waste was measured following each meal and snack. Accuracy of the girls' self-reported intake was within +10% of the criterion for all nutrients. Mean % fat by DXA was 33%; for SF method 1 (SF1; triceps and calf) 36%; for SF method 2 (SF2; triceps and subscapular) 38%; and for BIA 25%. Concordance correlations (CC) for SF1, SF2 and BIA with DXA were 0.75, 0.70, and 0.36, respectively. When BMI was measured, 7 girls were \leq 85th percentile (misreported as >85th), and their mean % body fat was more consistent by all 4 methods, ranging from 19-22%. However, agreement between their reported and observed nutrient intakes were lower than for girls with BMI >85th percentile (correctly self-reported). For subjects measured to be <30% body fat (n=16), both SF methods were more highly correlated with DXA than for subjects >30% fat (n=40), and better agreement was found between reported and observed nutrient intakes.

2:30

PUBLIC HOUSING OBESOGENIC LIFESTYLE: A MIXED METHOD ANALYSIS OF FACTORS INFLUENCING EXERCISE AND DIET

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Purpose: This study combined Geographic Information Systems (GIS) technology and qualitative interviews to understand multilevel factors influencing public housing development (HD) residents' physical activity (PA) and diet. Method: We developed a GIS for neighborhoods (800 meter radius) surrounding 13 public HDs and conducted in depth interviews with HD managers. Results: Residents were predominantly African American (79%) and overweight (M=29 BMI). Neighborhoods had few freestanding PA resources (primarily parks) (M=1.8/neighborhood), and an average of 2.3 restaurants, mostly fast food (M=1.5). Six neighborhoods had at least one grocery store (M=0.7), and eight had at least one convenience food store (M=0.9). Neighborhoods had about 3 schools, of which 40% (M=1.3) had PA resources for public use. Manager interviews identified few PA resources at HDs except several playgrounds, basketball hoops and one pool table. Residents sometimes walked for transportation; however, stairs were not routinely available for use. There was little resident interest in PA; several managers had tried to implement walking or aerobics programs with little success. Managers believed neighborhoods were typically not safe, but believed that safety concerns did not affect resident PA. Interviews identified heavy reliance on fast food. Most HDs had food donation programs from local service agencies; however, residents preferred fried or prepackaged food over fresh vegetables or fruit. Conclusions: Combined data indicate that there are few PA resources and few healthful food sources within walking distance of HDs. There appears to be little incentive to maintain regular activity, and resident food preferences may contribute to obesity.

2:45

PSYCHOLOGICAL WELL-BEING AND PERSONALITY TRAITS ARE RELATED TO EATING BEHAVIORS IN POSTMENOPAUSAL WOMEN

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Psychological factors may play a role in the development of eating behaviors, but this issue has not yet been addressed among postmenopausal women. The main purpose of this study was to examine whether psychological well-being and personality traits were related to eating behaviors among a sample of 78 postmenopausal women ($27.9 \pm 5.5\text{kg/m}^2$) from

a cross-sectional design study. Eating behaviors (flexible and rigid restraint, disinhibition and susceptibility to hunger) were assessed by using the "Three-Factor Eating Questionnaire". Psychological well-being and personality traits (self acceptance, anxiety, autonomy, dynamism, interpersonal relationships and emotional stability) were evaluated with the PER Questionnaire. Since body mass index (BMI) is a significant correlate of both psychological factors and eating behaviors, Spearman's correlations between psychological factors and eating behaviors were performed after adjustment for the contribution of BMI. BMI-adjusted correlations were significant for disinhibition and susceptibility to hunger with psychological well-being ($-0.36 < r < -0.40$), self acceptance ($-0.34 < r < -0.44$) and interpersonal relationships ($r = -0.34$). Susceptibility to hunger was also negatively related to low anxiety ($r = -0.29$), autonomy ($r = -0.33$) and dynamism ($r = -0.31$), independently of BMI. Finally, a negative BMI-adjusted correlation was observed between flexible restraint and low anxiety ($r = -0.22$). In conclusion, these results suggest that psychological well-being and personality traits are related to eating behaviors, among postmenopausal women and independently of BMI. Therefore, taking into account psychological factors may improve interventions aimed at modifying eating behaviors.

Session 3 — Evaluation of interventions: Nutrition and physical activity

Leduc-Fortin

1:30

FOOD STAMP AND NON-FOOD STAMP PROGRAM PARTICIPANTS SHOW SIMILARLY POSITIVE CHANGE WITH NUTRITION EDUCATION

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Purpose: The Food Stamp Program was created to enable low-income households to obtain a nutritious diet by increasing their food purchasing power. To assess effectiveness in achieving this objective, this study examined the effect of Food Stamps on dietary intake and food-related behaviors of participants from Food Stamp households (FSP) vs. non-Food Stamp households (Non-FSP). Subjects included 6,969 adults enrolled in the EFNEP and 3,552 adults enrolled in the FSNEP in two southern states.

Methods: Analyses were based on data collected on participants who had completed at least six educational interventions. Twenty-four hour recalls and responses to a Food Behavior Checklist (FBC) were completed before and after intervention. Statistical analyses Repeated measures analysis of variance (ANOVA) were used to compare mean pre and post intakes of foods and nutrients. McNemar's chi-square test was used to compare change of FSP vs. Non-FSP participants on the FBC. Results: Both EFNEP and FSNEP participants made significant improvements on food groups and selected nutrients ($P \leq .001$). The FSP Group in EFNEP showed the greatest change on intakes of the Fruit Group ($P = .0002$) and vitamin C ($P = .0082$), while the FSP Group in FSNEP showed the greatest change for vitamins A ($P = .0463$) and B6 ($P = .0058$). In both EFNEP and FSNEP, improvements were made on all items of the FBC ($P < .001$).

Conclusions: EFNEP and FSNEP are similarly effective in achieving improvement among food stamp and non-food stamp participants for food groups, nutrients, and food-related behaviors. Differences between FSP and non-FSP participants for changed behavior are mixed.

1:45

SHORT TERM EFFICACY OF A WEB-BASED COMPUTER-TAILORED NUTRITION INTERVENTION

Anke Oenema & Johannes Brug, Department of Public Health, Erasmus MC, Rotterdam, The Netherlands

Diets high in saturated fat and low in fruit and vegetables are associated with an increased risk for chronic diseases. Large population groups engage in unhealthy diets. Therefore, there is a need for effective health education interventions that can reach large groups of people. Computer tailored health education is a promising strategy to motivate people to behavior change. A study was conducted evaluating the short-term efficacy of a web-based computer-tailored nutrition education intervention. The study also aimed to identify mediators for the effects of the tailored intervention. Respondents ($N = 782$) were randomly assigned to a tailored intervention, a generic nutrition information group or a no information control group. Food frequency and behavioral determinants were measured at baseline and one month follow-up. Posttest group differences were studied by means of multiple linear regression analyses. Effects of the computer-tailored intervention were found for determinants of fat and vegetable intake, for actual intake of vegetables and for determinants and intake of fruit. The test for mediation established perceived interestingness, personal relevance and individualization as mediators for some of the tailoring effects. The study provided evidence for limited short-term efficacy of the web-based tailored nutrition intervention.

2:00

THE TRIAL OF ACTIVITY IN ADOLESCENT GIRLS: CONCEPTUAL MODEL AND INTERVENTION STRATEGIES

Lytle, L.A., Neumark-Sztainer, D., University of Minnesota, Minneapolis, MN, USA; Jobe, J.B., National Heart, Lung and Blood Institute, Bethesda, MS, USA; Metcalfe, L., University of Arizona, Tucson, AZ, USA; Moody, J., San Diego State University, San Diego, CA, USA; Saksvig, B.I., University of Maryland, Baltimore, MD, USA; Saunders, R.P., University of South Carolina, Columbia, SC, USA; Strikmiller, P.K., Tulane University, New Orleans, LA, USA; Ward, D.S., University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

Purpose: This session will describe the conceptual model, planning process and intervention channels developed for the Trial of Activity in Adolescent Girls (TAAG), a multi-centered school and community intervention trial funded by the National Heart, Lung and Blood Institute, NIH.

Background: Young adolescents experience a decline in physical activity as they reach their middle school years. Reversing these trends will likely require environmental changes such as providing more opportunities, increased incentives and positive normative expectations and experiences in schools and communities.

Methods: The primary aim of TAAG is to determine if an intervention that links schools to community organizations reduces the age-related decline in moderate to vigorous physical activity in middle school girls. A socio-ecological approach was chosen to guide the TAAG intervention. Such an approach emphasizes the etiologic evidence for the behavior in question and considers predictors at multiple levels including individual behavior change, interpersonal, organizational, policy and other setting and environmental factors that comprise the context wherein behavior occurs. Formative assessment and pilot work are essential in designing intervention strategies that are feasible and acceptable to adolescent girls. The TAAG intervention channels include: TAAG Partners for Physical Activity, Physical Education, Health Education with Activity Challenges, and TAAG Promotions.

Conclusion: Developing effective health promotion interventions are very challenging. Using a program planning approach, behavioral theory that addresses the multiple levels of influence, and a conceptual framework that guides the development of creative and appropriate intervention strategies that actively involve school and community resources will enhance our chances for success.

2:15

USING GROUP DYNAMICS AND INDIVIDUAL ATTENTION TO INCREASE PHYSICAL ACTIVITY OF RURAL CONGREGATE MEAL SITE PARTICIPANTS

Doerksen, S. E., Estabrooks, P.A.(1), King, A.C.(2), Fox, E. H., & Bradshaw, M.(1)

1. Kansas State University, Manhattan, USA; 2. Stanford University, Stanford, USA

Participants at rural congregate meal-sites for older adults are typically poor and at risk of institutionalization from the onset chronic diseases and disabilities which could be delayed or prevented through regular physical activity (PA). Purpose: To test the effectiveness of a low-cost intervention to promote PA for congregate meal-site users. A group-mediated social cognitive intervention that included weekly group sessions and 3 supportive telephone contacts over a 3-month period was compared to standard care PA education. Methods: Four meal-sites were randomly assigned to the intervention (n=22) or standard care (n=17). Participants (Mage=77.0±7.1; 78% women) completed the CHAMPS PA questionnaire and measures of PA related social cognitions prior to and at the completion of the program. Results: Repeated measures ANOVAs were used to determine if differences existed between the control and intervention groups. A significant condition by time interaction ($F(1,37)=4.39, p<.05$) was found for weekly caloric expenditure in all PA. Intervention participants increased caloric expenditure in these activities from 1620.25 (SE=372.8) to 2746.55 (SE= 427.3) while control participants did not (1597.64, SE=424.1 to 1317.09, SE= 486.1). A condition by time interaction also approached significance ($F(1,37)=2.89, p<.10$) for weekly caloric expenditure in moderate intensity PA (Intervention 928.92[SE=264.9] to 1594.33[SE= 299.0]; Control 886.56[SE=301.3] to 618.18[SE=340.1]). Mediation tests using social cognitions as potential mediators were not significant. Conclusion: Congregate meal-sites are prevalent in North America, providing service to hundreds of thousands of high-need older adults. This study highlights an effective low-cost strategy for increasing PA in this population.

2:30

HEALTH OPPORTUNITIES WITH PHYSICAL EXERCISE (HOPE) TRIAL: 12-MONTH COMPARISON OF PEER VS PROVIDER INTERVENTION

Coday, M., Klesges, L. M., Garrison, R., University of Tennessee Health Science Center, Memphis, TN, USA; Ma, J., University of Texas Health Science Center, San Antonio, TX, USA; O'Toole, M., St. Louis University; St. Louis, MO, USA; Morris, S., Church Health Center, Memphis, TN, USA

High rates of sedentary behavior in the U.S., especially among urban socially disadvantaged adults, suggest the need for targeted physical activity interventions. This study reports findings from a 12-month randomized controlled trial of 361 low-income sedentary adults comparing a Control (C), Peer mentor (P), or Health provider (H) intervention condition to change in physical activity behavior. At baseline, participants averaged 37kg/m² with 25% at BMI>40 (i.e., morbid obesity) averaged 47 yrs age, 72% were African American, 88% were women. Major outcomes included change in physical activity behavior with secondary outcomes including nutritional variables. The Kaiser Physical Activity Survey indicated increased activity from baseline to 12 months in Sports Exercise Index (SEI), Active Living Index (ALI), and Occupational Index (OCU) (all $p's<.05$). Significant increases in ALI and SEI indices were found in each condition ($p<.001$) while significant increases in OCU were found for each of two conditions, namely H and P ($p<.04$ and $p<.003$). Longitudinal changes at 6 and 12 months from baseline, showed P (Peer mentors) significantly increased OCU scores over that of C controls ($p<.02$). Lastly, % energy consumed from fat significantly decreased from baseline to 12 months ($p<.001$). Results suggest that for participants enrolled in a supportive physical activity program, to include regular participant contact, it is possible to increase physical activity levels in sedentary, overweight persons who begin an exercise program. It appears possible to achieve change after one year of intervention in workplace activities that is greater than that of standard care intervention.

2:45

BODY AND SOUL: AN INNOVATIVE PARTNERSHIP FOR DISSEMINATING CANCER CONTROL INTERVENTIONS

Resnicow K(1), Campbell MK(2), Williams A(3), Doyle C(3), Stables G(4), Wang T(1), Carr C(2)

1. Emory University/University of Michigan; 2. University of North Carolina-Chapel Hill; 3. American Cancer Society; 4. National Cancer Institute

Body & Soul is a collaborative effort to disseminate efficacious cancer prevention and control programs under real world conditions. The American Cancer Society (ACS) developed Body & Soul based on two successful NCI-funded research studies conducted among African Americans (AA): The Black Churches United for Better Health Project (North Carolina) and the Eat for Life Study (Emory University). Both interventions showed positive effects in increasing fruit and vegetable (F & V) consumption (approximately 1 daily serving increase), when implemented under efficacy conditions. Components deemed essential to these interventions were combined, and in partnership, ACS, NCI, UNC and Emory conducted a randomized effectiveness trial among approximately 1000 members drawn from 14 AA churches in three ACS regions.

A key component of the intervention is the use of lay church health advisors, trained by project staff, to deliver a telephone intervention based on Motivational Interviewing. Baseline survey data indicate the study sample that is 73% female, 98% AA and the majority were married and at least a high school education. At 6-month follow-up, surveys were obtained from approximately 80% of the baseline sample. Preliminary outcome analyses indicate a significant net increase in F & V intake among the intervention group of approximately _ serving. This effect, though weaker than that achieved under efficacy conditions, is encouraging, and suggests that research interventions can be effectively implemented under real world conditions and at reduced cost. In addition to the final study outcomes the presentation will explore nuances associated with disseminating interventions through Black churches and health voluntary agencies.

Session 4 — Family influences on physical activity and nutrition

Krieghoff

1:30

SOCIO-ECONOMIC DIFFERENCES IN FAMILY ENVIRONMENTS AND THEIR RELATIONSHIP TO CHILDREN'S EATING Campbell Karen and Crawford David, Deakin University, Melbourne, Australia

There is some evidence that children of lower socio-economic status (SES) consume diets higher in fat and energy than those in higher SES groups, yet few studies have considered those aspects of a child's environment that might explain these differences. The aim of this study was to describe family food environments and dietary intakes of 5-6 year old children across a range of SES. This involved the random selection of 28 schools across three distinct SES regions in metropolitan Melbourne. A total of 550 families provided detailed self-reports of their family environments and dietary intakes of their 5-6 year old child. The exposure to television and rules regarding its use in the home provide one example of the differences in family environment across SES. In this sample, dietary intakes and television exposures varied by SES, with those children in lowest SES environments watching more television and consuming more high energy drinks, savoury and sweet snacks than those in higher SES groups. Further, these dietary habits and total energy intakes were associated with total television viewing. Parental attitudes to television use also differed, with those in lower SES reporting the frequent use of television during evening meals, and more liberal access to television for children. An understanding of family environment differences across SES may provide useful levers for nutrition interventions and obesity prevention efforts.

1:45

THE HOME ENVIRONMENT AND CHILDREN'S PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR

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From a contextual perspective, the family or home environment is extremely important to a child's development. However, few studies have examined how it may relate to children's sedentary behaviour and objectively-measured physical activity. This study examined associations between the home environment and children's physical activity and sedentary behaviour. Children aged 5-6 (n=291) and 10-12 (n=919) years were recruited from 19 primary schools in high and low socio-economic areas of Melbourne. Parents were surveyed about their children's sedentary behaviour (TV, electronic games, and computer use), and were also asked to complete an audit of their home environment. Children's physical activity was assessed by accelerometry over a one-week period. Children with a highly sedentary home environment (e.g., high number of TVs, computers, electronic games) were 60% more likely to watch television more than 2.5 hrs/day, were three times more likely to spend more than 25 mins/day using the computer, and were 50% more likely to play electronic games for more than 34 mins/day. Conversely, children with a highly physically active home environment (e.g., presence of sporting equipment and facilities) were 50% more likely to be in the highest tertile for physical activity as measured by accelerometry, and 30% more likely to be active if they had a large yard to play in at home. This study enhances our understanding of physical activity and sedentary behaviours in the home environment, and will inform the development of intervention strategies.

2:00

MOTHERS' DISINHIBITED EATING STYLE AND RESTRICTION IN CHILD FEEDING, AND DAUGHTERS' EATING IN THE ABSENCE OF HUNGER AT AGE 9

Francis, L. A., and Birch, L. L., The Pennsylvania State University, University Park, PA, USA

Eating in the absence of hunger (EAH) in young children, or overeating in response to the presence of palatable foods, is influenced by restrictive child-feeding practices, and current research provides some support for EAH as a behavioral phenotype for overweight. To assess the extent to which EAH is influenced by family environmental factors, we examined relationships among mothers' weight status, disinhibited eating style and restriction in child feeding when daughters were 5 years old, and their associations with daughters' EAH at age 9. Participants were 78 overweight, and 81 normal weight mothers and their daughters, assessed longitudinally when daughters were ages 5 and 9. Similar relationships between maternal restriction when girls were 5 and daughters' EAH at age 9 were noted for normal and overweight mothers. However, in the case of normal weight mothers, mothers who were more disinhibited were more restrictive in child feeding, and had daughters who had higher EAH scores at age 9. In contrast, for overweight mothers, maternal restriction predicted daughters' EAH and there were no relationships with mothers' disinhibited eating style. Among normal weight mothers, a disinhibited eating style may mediate the relationship between restriction and daughters' EAH, providing evidence for a similar eating style between mothers and their daughters, and suggesting that modeling may be important in the intergenerational transmission of EAH. In contrast, EAH in daughters of overweight mothers was influenced by mothers' early attempts to restrict daughters' intake, not by mothers' eating style.

2:15

DEVELOPMENT OF A PRIMARY CARE FAMILY BEHAVIOURAL INTERVENTION TO REDUCE CHILDHOOD OVERWEIGHT
McCallum Z (1), Wake M (1), Gibbons K (1), Naughton G (2) Riess C (3), Harris C (1), Gerner B (1) Gunn J (4), Sanci L (1), Foster S (1), Waters E (1) Baur L (5)

1. University of Melbourne and Murdoch Children's Research Institute, Royal Children's Hospital, Melbourne; 2. Institute of Sport's Medicine, Children's Hospital at Westmead, Sydney; 3. La Trobe University, Melbourne; 4. Dept of General Practice, University of Melbourne; 5. Dept of Paediatrics and Child Health, University of Sydney, Australia

PURPOSE: There is a global need for effective management of childhood overweight in the primary health care setting. We present the development of a general practitioner (GP) delivered intervention to reduce overweight in children aged 5-10 years. **METHODS:** Intervention mapping, using a behavioural epidemiology framework, was used to identify modifiable behavioural determinants of childhood overweight. The derived materials were piloted with families attending a weight management clinic. 34 GPs were trained to use the materials and conduct solution focused behaviour change consultations. **RESULTS:** Target behaviours identified to increase: access to equipment, time spent outdoors, water drinking, regular meals and healthier snacks and parent support of and child preference for physical activity. Target behaviours to decrease: fat intake, sedentary behaviour and perceived barriers to physical activity. Family materials (tip sheets, work sheets and a shopping guide) aimed to promote a whole family approach towards behaviour change. Ten pilot families rated the materials as useful and identified specific, relevant topics for behaviour change. 100% of the GPs attended at least two of the three education sessions and 85% reported good/ very good relevance to general practice. GP confidence in management of childhood overweight rose after education. **CONCLUSION:** A GP intervention for childhood overweight was successfully developed. Piloting supported the use of the family materials by GPs to assist them in working with families to make sustainable healthy behaviour changes. Efficacy is currently being tested in a randomised, controlled trial. If effective, this intervention would be applicable in a wide range of primary care settings.

2:30

ANALYSIS OF MEDIATORS OF PARENT FRUIT AND VEGETABLE INTAKE USING STRUCTURAL EQUATION MODELING
Shewchuk, Richard M., Harrington, Kathy F., Franklin, Frank A., University of Alabama at Birmingham, Birmingham, Alabama, USA

Although intervention efficacy is evaluated by testing for mean differences in an outcome for groups assigned to different experimental conditions, this provides little insight about what generated the observed differences. In the present study a latent variable structural equation modeling approach was used to examine constructs hypothesized as mediators of the significant ($p < .05$) effects found in the Hi 5+ intervention: parent FV intake. For this analysis, baseline measures were specified as exogenous latent constructs reflecting: family style, FV barriers, facilitators, availability, and intake. Follow-up endogenous constructs were specified in an identical fashion with each having its corresponding baseline construct as a predictor and as predictors of follow-up intake. Condition was specified as an exogenous dummy construct that was correlated with the other baseline constructs and predicted each follow-up construct with the exception of intake. This model permitted us to examine the mediated effects of the intervention on intake after controlling for baseline measures and correcting for attenuation due to measurement error. This model provided a good fit to the data [$\chi^2(161, N=663) = 324.5, p < .001, gfi = .96, RMSEA = .038$] and indicated that the intervention effects were transmitted primarily through the facilitator construct. A second model was specified to include a direct path from the intervention construct to intake. Inclusion of a direct effect resulted in a small but significant ($p < .05$) improvement to the model. This suggests the effects of the intervention on intake occurred partly through intervention targeted at facilitators and partly through mechanisms not specified in the model.

2:45

IMPACT OF A FAMILY FRUIT AND VEGETABLE INTERVENTION ON INTENTION TO IMPROVE FV-RELATED BEHAVIORS

Susan Davies, PhD, Richard Shewchuck, PhD, Kathy Harrington, MPH, Frank Franklin, MD, PhD University of Alabama at Birmingham, Birmingham, AL, USA

Hi5+ was developed as a peer-led home-based intervention with the goal of increasing fruit and vegetable (FV) intake among 4th graders and their families. Based on cognitive and behavioral theory, intervention methods (e.g., skill building, goal setting, modeling, feedback, reinforcements) and strategies (planning forms, tear-out grocery lists, simple recipes with tasks for children to do, peer guide motivational calls, testimonials) were designed to improve parental mealtime planning practices and subsequently behavior related to FV intake. 1650 families from 33 schools in the greater Birmingham, Alabama area participated in a randomized trial to evaluate the efficacy of a tailored intervention program. Using the Theory of Planned Behavior, a 6-item scale (Cronbach's $\alpha = .77$) was developed to measure intention to improve mealtime planning behaviors that were targeted in the intervention. It was hypothesized that the intervention would lead to improved mealtime planning behaviors, which in turn would lead to increased FV availability and FV intake. Results from an analysis of co-variance (ANCOVA) showed that, after controlling for baseline mealtime planning behavior scores, parents in the experimental group had significantly higher mealtime planning behavior scores ($p < .05$) at the 1-year follow-up than parents in the delayed intervention group. Furthermore, higher mealtime planning scores at follow up were related to greater FV availability and higher total FV intake. Findings indicate that interventions that focus on instrumental strategies to enhance meal planning and FV serving capability can contribute to greater FV availability and FV intake among parents of 4th graders.

WHY COMBINE DIET AND PHYSICAL ACTIVITY IN THE SAME PROFESSIONAL RESEARCH SOCIETY?**Tom Baranowski, Ph.D., Baylor College of Medicine, USA**

Nutrition and exercise physiology have developed separate professional organizations, with few researchers combining both factors in their research. In contrast, most of the chronic disease problems that our society faces have both diet and physical activity among the few modifiable risk factors in their etiology. For example, it appears unlikely that the current epidemic of obesity will be solved without attention to both the diet and physical activity aspects. At a more fundamental level, there are reciprocal relationships between diet and physical activity in several physiological phenomena. For example, substantial interest has been expressed in the energy balance equation, which proposes relationships between dietary energy intake and primarily physical activity related energy expenditure in regard to adiposity. While these relationships are highly complex (including nutrient specific balances) and imperfectly known, it is useful to think in terms of energy balance and obesity. Diet to physical activity interactions have also been identified in regard to brain functioning, emotional regulation and perhaps cognition; immune function; syndrome X (including lipids, blood pressure, glucose and insulin); oxidative stress, heart diseases and cancer; and other physiological phenomena.

In behavioral domains, diet and physical activity may complement one another as well. Diet and PA variables have clustered in cross sectional factor analyses. Recent analyses reveal that those who are more active tend to eat healthier (lower fat, more carbohydrates), and those who increase physical activity also tend to more positively change diet. And what might happen if we don't include both diet and PA? For example, there is anecdotal evidence that children may compensate for increased physical activity during experimental sessions by either decreasing physical activity outside of the experimental sessions, or increasing their consumption of high fat high sugar intake after the exercise sessions. If we don't at least measure the other behavior, we may never know why our interventions are having minimal effects.

There are also things we can learn from each other. The approaches to behavioral measurement, study of correlates, and intervention have been remarkably similar between the disciplines. Developments have been uneven between these fields, holding the potential for each discipline to learn from advances made by the other in specific domains. There are many reasons why we will benefit from combining these issues and working with each other, and many more ways in which we will benefit society from doing so.