

**ISBNPA, BOSTON, 2006**  
***Reviews of Selected Sessions***  
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**Brief Review of "Symposium 6"**

**Presentations: *Using self-determination theory and intrinsic motivation to promote physical activity and weight control***



This symposium aimed at reviewing Self-Determination Theory (SDT) and related applications in the exercise domain, highlighting recent research findings and offering practical applications.

After a brief introduction by Dr. Pedro Teixeira (Technical University of Lisbon, Portugal) stressing the importance of understanding the orientation or type of motivational drive as potential mediators of physical activity (PA), Dr. Wendy Rodgers (University of Alberta, Canada) provided an overview of SDT, in which she emphasized two of the four subtheories that support the meta-theory (Organismic Integration Theory and Cognitive Evaluation Theory). Dr. Rodgers also described research findings in exercise that support SDT's basic premises, presenting cross-sectional and longitudinal studies examining relationships among different forms of regulation and patterns of change over time. Results presented generally supported the basic tenets of SDT showing that more enduring patterns of exercise and more positive psychological outcomes tended to be associated with more self-determined motivation. At the end, some questions and future directions were raised with respect to the relevance of the need satisfaction in the exercise context.

Next, Dr. David Markland (University of Wales, Bangor, UK) addressed measurement issues along the continuum of extrinsic-intrinsic

motivation, focusing on the Behavioural Regulation in Exercise Questionnaire-2 (BREQ-2), a flexible and well-validated instrument that can assess distinct regulatory styles (sub-scales) and the construct of relative autonomy. The psychometric properties of the instrument and evidence for its validity from a number of studies were discussed. In his conclusion, Dr. Markland pointed out that when subscales are combined into a single index, relative autonomy appears to mediate the negative relationship between body mass and exercise, and suggested that enhancing autonomous motivation for exercise should be a target for interventions designed to increase physical activity for weight loss.

Finally, Dr. Pedro Teixeira presented evidence for the usefulness of the Intrinsic Motivation Inventory (IMI) in the area of physical activity and weight management, as a valid and reliable instrument and also as a useful intervention check tool, while reinforcing the need for factorial validity improvement. In addition, Dr. Teixeira reviewed results from clinical trials showing that intrinsic motivation, especially as represented by the dimensions of enjoyment and interest for physical activity, predicted weight loss and physical activity level, both cross-sectionally and prospectively. These results were consistent across weight loss interventions and similar in two different cultures. Final suggestions pointed out the importance of

promoting interventions targeting (*a priori*) this and other constructs of SDT to more closely evaluate the role of motivational issues in physical activity and diet adherence, and weight control.

The session ended on Dr. Ken Resnicow (University of Michigan, USA), who provided an overview of the

*Review by Pedro J. Teixeira and Marlene N. Silva (Technical University of Lisbon, Lisbon, Portugal)*

overall symposium and its main conclusions, ending with a thoughtful summary of challenges and open questions associated with research in this area. He also hosted a number of questions from the audience, facilitating a lively discussion regarding the way to move the field forward.



Pedro Teixeira, Wendy Rodgers, Ken Resnicow and David Markland at the conclusion of their symposium.

**Mediators and moderators of nutrition and physical activity (Session 15)**

This was an excellent paper session that included presenters from Canada, the Netherlands, and the US. Maria-Cecilia Gallani examined physical activity intention stability as a moderator of the intention-behavior relationship (theory of planned behavior –TPB) among a sample of French-Canadian adults. Using the Aiken and West (1991) procedure it was found that intention stability was a moderator of the physical activity intention-behavior relationship. Gert-Jan de Bruijn also used the TPB to examine habit strength (based on the Self-Reported Habit Index) as a moderator of the intention-behavior relationship regarding fruit consumption among a sample of Dutch adults. Using structural equation modelling it was found that habit strength was a significant moderator of the intention-behavior relationship regarding fruit consumption. Among those with low and moderate habit strength, there was a significant relationship between intention and behavior. However, among those with high habit strength, there was no relationship between intention-behavior, perhaps because those with habitual behaviors engage in limited thought processes.

Esther van Sluijs compared self-rated physical activity (eg, are you active/inactive) with self-reported physical activity in a sample of Dutch adults, and identified four groups: realistic inactive, realistic active, overestimators and underestimators. Mediators of physical activity (barriers, self-efficacy, processes of change) were examined for each of the four groups and it was found that overestimators scored more positively on the mediators than the realistic inactives suggesting an optimistic bias in the former. Shaelyn

Strachan used identity theory (Burke 1980) and social cognitive theory in relation to healthy eating. Using the Exercise-Identity Scale (Anderson & Cychosz, 1994) to assess identity as a healthy eater among Canadian adults, it was found that those with a high identity had stronger intentions and had eaten more healthily in recent weeks compared with those with low identity. The final presentation for the session was by Pippa Simpson who described the use of MPlus software to perform structural equation modelling (SEM) based on data from the National Health and Nutrition Examination Survey. She illustrated the benefits of using SEM over traditional regression models, with the former allowing specification of relationships between independent variables, intermediary variables and dependent variables such as nutrition and physical activity.

*Reviewed by Jo Salmon*

NEW INSIGHTS IN THE USE OF  
COMPUTER TAILORING AIMED AT  
PHYSICAL ACTIVITY AND DIETARY  
BEHAVIORS

The recent review of Kroeze et al. (2006) concluded that the application of computer tailoring for promoting healthy diets, and especially fat intake, is very promising. However, more research is needed to identify long-term effects, the effects on physical activity, mechanisms underlying successful computer tailoring, computer tailoring in adolescents and good implementation strategies. This symposium at the ISBNPA Boston meeting tried to give answers on these questions.

In the first presentation Ilse De Bourdeaudhuij reported on a 2 year follow-up study of a computer tailored intervention aiming at decreasing fat intake and increasing physical activity in adults in Belgium. Results showed that intervention effects remained significant 2 years post baseline. This means that a single computer-tailored session on physical activity and fat intake resulted in a decrease in fat intake and an increase in physical activity not only after 6 months but also after 2 years. At baseline the physical activity and fat intake interventions were delivered in two modes: simultaneous and sequential (3 months apart). Results showed little differences at 6 month and at 2 year follow-up between both modes suggesting that the simultaneous mode should be used from a public health perspective as it is more cost-effective. However, it has to be kept in mind that all adults participating in this study might be highly motivated to change their behaviour as they went through the computer tailored intervention at the university laboratory.

In the second presentation Willemieke Kroeze reported on a dismantling study

aiming at dietary fat reduction. She looked at the minimal required elements of a computer-tailored intervention to keep its effectiveness. About 800 adults were randomised within 4 conditions: (1) only personal feedback, (2) personal + normative feedback, (3) personal, normative and action feedback, (4) generic information. Results showed that combining personal, normative and action feedback showed most significant effects compared with the generic information as it led to a decrease in fat intake and increases in awareness. Personal and normative feedback was sufficient to improve the intention to reduce fat intake, while only personal feedback was sufficient to improve awareness at the short term and also intention. It was concluded that combining personal, normative and action feedback should be recommended for interventions aiming at reducing fat intake. In other words 'more feedback is better'.

The next presentation by Leen Haerens reported on the use of computer tailoring in adolescents. The computer tailoring program was part of a larger school based physical activity intervention in 11 to 15 year olds in Belgium. The larger program consisted of environmental changes, mainly creating enhanced physical activity opportunities in the school, and an individual component, the computer tailoring program delivered to all students at the computer room at school during a regular class hour. The evaluation of the tailored advice by the students revealed that a high percentage found the advice too long (5 to 6 pages), and there was also about 40% that reported not to have read the advice (entirely). Scores on personal relevance, credibility and interestingness were good but clearly lower than in previous adult studies. In general the results showed that the total intervention

succeeded in preventing decreases in light PA in boys and girls and in moderate to vigorous activity in boys. This was especially clear for the school related physical activity. A more specific evaluation of the computer tailored program per se is needed. If computer tailored interventions will be disseminated through the schools and including in the regular school curriculum we may have to face the problem of a group non-motivated students participating in this intervention.

The next presentation by Marci Campbell reported on the dissemination of tailored diet and physical activity interventions. Results from a first study in a large sample of blue-collar women showed that web and print formats need to be optimized for dissemination of interventions. The web format is preferred for reaching people, collecting data and giving instantaneous tailored feedback, whereas the print format is better for cognitive processing, lay-out of the messages, for saving the advice and sharing it with others. Web-based computer-tailored systems that build a PDF of the advice and can be printed by the participants is a good solution. A second study compared tailored print communication and tailored motivational interviews and the combination of both in an older population (mean age 66years) on effectiveness and cost-effectiveness. The combined intervention was found to be most effective and the combined and the tailored print communication were found to be cost effective. As a result the combination of tailored print communication and tailored motivational interviews will be implemented in different projects in the US.

The last presentation by Anke Oenema tried to give an insight into the 'black

box' that computer tailoring often is. It asked the question through what mechanisms computer-tailoring really works. A semi structured review of the literature was used to look at suggested working mechanisms and their evidence. The Persuasion Communication Model of McGuire and the Elaboration Likelihood Model of Petty and Cacioppo were the most cited theoretical models. The review showed that not many studies were conducted to test the suggested mechanisms. Computer-tailored information seemed to lead to central route processing, and to more attention processes. Perceived personal relevance and individualisation were found to be important aspects of the interventions in two studies. More research in this domain is certainly needed especially linking personal relevance and individualization to cognitive processing and to intervention effects. Future interventions should try to maximise perceived personal relevance and individualisation to reach good effects.

*Reviewed by Ilse De Bourdeaudhuij*

**Review of Keynote address by Dr  
S.V.Subramanian:  
Is adverse social context bad for our  
health?**

Increasingly researchers interested in understanding and promoting healthy eating and physical activity behaviours have focused on the potentially important role of 'environmental factors'. However, this focus has in recent times been primarily concerned with exposures within the physical environment. This keynote address by Dr S.V. Subramanian, of Harvard School of Public Health, also reviewed evidence relevant to the social contexts in which we live, asking whether and how living within a particular set of societal arrangements might influence our health behaviours.

One of the key societal constructs discussed was socioeconomic position, which is arguably one of the most important and influential determinants of health. Individuals of lower socioeconomic position are consistently found to be at increased risk of a vast range of health conditions, as well as being less likely to engage in health-promoting behaviours such as physical activity and healthy eating.

Beginning with an illustration of social class gradients in mortality using casualties on board the Titanic as an example, Dr Subramanian posed the such investigations. These challenges include the problem of endogeneity, in which an unmeasured 'prior' variable might impact both exposure and outcome. For instance, fast food developers place restaurants where people are more likely to eat fast foods, reflecting an unmeasured variable – preference for fast foods amongst people living in those neighbourhoods – that may explain both the environmental

question, why do these social gradients exist? As one example, evidence was reviewed that attests to the clustering of different types of food stores across neighbourhoods of varying levels of affluence, one factor which may contribute to socioeconomic gradients in healthy eating. It was pointed out, however, that *access* does not necessarily equal *utilization*, and relatively few studies have incorporated measures of both of these constructs. While findings are not completely unequivocal, limited research showing that the local food environment predicts the eating behaviours of residents suggests that budding levels of 'McDonaldization' in many developed, and increasingly, transitional countries, are a cause for concern.

Dr Subramanian is a leading international researcher and teacher of methodological issues relevant to investigating contextual influences on behaviour and health, in particular the application of multilevel modelling to understanding the relative impact on behaviour of factors within the individual, as well as within the societies and neighbourhoods in which individuals reside. In addition to reinforcing the importance of understanding societal context when investigating determinants of health behaviours, Dr Subramanian provided a thoughtful overview of the methodological challenges inherent in

'exposure', and the 'outcome' – the higher likelihood of people in these neighbourhoods consuming fast foods.

Despite such methodological challenges, important advances in research on social context and health behaviours have occurred. Dr Subramanian discussed, for instance, the findings of the innovative and ambitious 'Moving to Opportunity'

project, a randomized housing mobility experiment in which individuals from impoverished areas in five US cities were provided with vouchers to help them move to private housing in less impoverished neighbourhoods. Significant effects on weight loss, as well as mental health benefits, were observed. While such findings require further confirmation and exploration, they are striking and extend observational evidence of the potentially important role of social context in relation to obesity-protective behaviours, physical activity and healthy eating.

The keynote presentation ended on a positive note – Dr Subramanian reported that a google search of key terms around ‘initiatives to improve nutrition and physical activity environments’ recently revealed around 5.5 million hits. Clearly research questions around social environmental contexts remain critically important and topical.

Reviewed by Kylie Ball



Kylie Ball and Dr. Surumanian following his keynote address.

**Exploring adolescent eating behaviours : The role of parents, peers, and self-perceptions** – oral presentation by Catherine Sabiston.

Several social psychology theories incorporate subjective norm as one of the determinants of behaviour. However, the mechanism underlying how this social component influences behaviour is not clearly understood. This study tested the utility of a recent expectancy-value framework (Eccles & Wigfield, 2002) to predict and explain eating behaviour among adolescents. Interestingly, this model suggests that competence beliefs and values are mediators of parents and peers influence on eating behaviours. This view was supported by the data both for boys and girls. Future studies are nonetheless still needed to replicate these observations for other behaviours (e.g., physical activity) and different segments of the population.

*Reviewed by Gaston Godin.*

**Hans Brug and Ken Resnicow: Order or Chaos?**

This was a spirited debate over whether current theories can account for health behaviours and whether it's better to consider behaviour as orderly -says Hans Brug - or chaotic – says Ken Resnicow.

Hans opened the debate noting that currently, theories can account for only about 50% of the variance in health behaviours, and determinants have limited effectiveness. He went on to question whether we can improve the extant theories or whether we need a new paradigm. He says he's optimistic – and thinks the glass is half full – and

that well planned theory based interventions have the potential to be effective in changing behaviour. He proposes that doing action-oriented research will be more effective than continuing to do problem-oriented research. By this he means there is a tendency among researchers to focus on current behaviour rather than on changing behaviour. He specifically proposes addressing the weaknesses in current research (in terms of the production of effective interventions) by focusing on theory testing, people (not the environment), on meaningful clusters of behaviours as targets in consideration of competing behaviours, and more closely examining potential moderators of behaviour change - such as intraindividual factors like personality - in longitudinal experimental studies.

On the other hand, Ken Resnicow suggests that chaos theory is a better approach to the understanding of health behaviour. He pointed out the basic properties of theory: parsimony, falsifiability are not demonstrated by most theories of behaviour change, and suggested that they are really only frameworks and that they don't work that well. He suggested that there is a "100% variance trap". He pointed to examples of experts really being no more exact in their predictions than random processes. He used the entertaining example of stock experts being unable to outperform monkeys throwing darts at the charts. He proposes that behaviour change occurs as an "epiphany" or a quantum change – that is not planned – and therefore we are unable to predict behaviour in a linear way. He cited other examples of "chaotic systems" including epidemics, weather patterns, mixing of colour dyes, and health behaviour. He says that it is not that there is no pattern in these

things – only that they can't be predicted linearly – a major weakness in current theory. He proposes that life-altering epiphanies are not planned, are not rational, and are sudden – meaning that we can't account for 100% variance with current theories. What we want to do is to encourage chaotic events. We want to pull away from persuasion – use more technology – combining tailoring and motivational interviewing. He used a ping-pong balls stuck to the brain

analogy to represent beliefs. He suggests doing things to 'spin the balls', to give opportunities for "the perfect storm" to occur, to pay attention to irrational approaches – to focus on the process, not the outcome – and this will change our typical approaches to interventions and the models we use to explain them.

*Reviewed by Wendy Rodgers*



Ken (left) and Hans (right) being inundated with discussion following their debate.