

## Editorial

# The 'new nutrition' and physical activity

Nutritional science, the discipline, is in the midst of revolutionary change. *The Giessen Declaration*<sup>1</sup> repositions nutritional science as follows: '...the most relevant and urgent work to be done by professionals working in nutrition science and in food and nutrition policy, is in its three biological, social and environmental dimensions all together [...] this will require a broad, integrated approach'.

*Public Health Nutrition (PHN)*, the journal (under the leadership of one of the signatories of *The Giessen Declaration*), has been an intellectual leader in the 'new nutritional science' by providing a forum for representative articles. With the formal declaration, *PHN*'s role will necessarily morph to more fully reflect this broadened perspective.

Public health nutrition, the discipline, has incorporated an emphasis on physical activity (PA), in a broadened context of metabolic and behavioural influences on energy balance and obesity<sup>2</sup>. With levels of obesity increasing rapidly around the globe<sup>3</sup>, PA is an important part of the energy balance equation<sup>4</sup> and an important determinant of whether people become obese. In the light of *The Giessen Declaration*, an important issue is the relative influence of environmental versus more traditional psychosocial factors on people's PA-related choices and behaviour. This is important because the major influences become targets for formulating strategies to promote PA<sup>5</sup>.

In this issue of *PHN*, De Bourdeaudhuij and colleagues<sup>6</sup> have published an important article on the relative influences of environment and psychosocial variables on levels of PA among urban residents in two European countries. Their work is important because there has been little research on environmental influences in Europe; because the physical environments are older, differently organised, and appear to some of us Americans to be friendlier to bicycle riding than US cities; and because very few studies have combined psychosocial and environmental variables in predicting behaviour.

The predominantly low level of predictiveness obtained for most of the tested models is similar to findings in previous research<sup>5</sup> and suggests that more innovative conceptual models are needed to understand PA behaviour<sup>7</sup>. The proportionally greater predictiveness by psychosocial over environmental variables will be surprising to some<sup>8</sup>, and suggests an important role for behaviour-change campaigns, over building new physical

environments, in promoting PA. The very high predictiveness ( $R^2 = 0.41$ ) of moderate to vigorous PA in Portugal is rare<sup>5</sup> and suggests that efforts to enhance social norms for PA can have a substantial effect on increasing PA in urban Portugal. Alternatively, the high correlation between an index with only a few items (norms) and self-reported PA leads to some concern that common responsive bias might account for this correlation.

The differences in both levels and patterns of predictiveness between Portugal and Belgium deserve replication and raise important issues about possible differences in how cultures or national or local policies influence behaviour<sup>9</sup>. This area of investigation requires longitudinal research wherein the direction of causality between psychosocial and behavioural variables can be more carefully assessed<sup>10</sup>. The findings need to be replicated using more objective measures of the PA environment<sup>11</sup> and of PA itself since psychosocial variables seem to correlate more highly with self-report than with objectively assessed PA (Jago R, personal communication). An issue not generally assessed in this literature is the specificity of effect of the environment. For example, living in an area of diverse land use should influence walking for shopping behaviour but is unlikely to influence recreational activity (e.g. jogging for health, playing sports). Since psychosocial characteristics may interact with environmental characteristics<sup>12</sup>, including selected interaction terms in analyses would also be valuable. Qualitative research on how social norms manifest in the PA experience of Portuguese adults and on how to overcome normative barriers may be helpful in designing effective behavioural interventions<sup>13</sup>.

Thus, De Bourdeaudhuij *et al.*<sup>6</sup> address important issues concerning the influences on PA and in the process raise a number of other issues requiring attention, if we are going to remedy the low levels of PA among adults.

A second important article in this issue concerns PA and children. Cardon *et al.*<sup>14</sup> used cluster analysis to identify groups of boys and girls, separately, based on their responses to common psychosocial variable questionnaires. This is a substantial innovation because most research in this area has dealt with bivariate correlations or regression analyses to identify the key linear or binary correlates of PA. A cluster analysis approach emanates from the discipline of social marketing, where there is substantial concern for market segments<sup>15</sup>. Clustering of psychosocial variables has been reported with regard to

diet among adults<sup>16</sup> but has not been reported with regard to PA, or among children. The clusters identified by Cardon *et al.* approximate those found regarding diet among adults<sup>16</sup>, and raise issues of whether parents socialise their children into clusters similar to themselves.

The psychosocial variables included in these analyses were primarily cognitive. It is not clear at what age these cognitive types of variables account for the behaviour of the children. For example, children in this age range (9–11 years) have been called ‘twens’ because those at the lower end of the range are likely still under the strong influence of parents, while those at the older range are entering puberty, initiating separation from parents and starting strong influence from peers. Future research with this age group should include social norm or maturational status variables. Since there are virtually no longitudinal investigations of PA among children, hopefully these authors have plans to conduct a follow-up on this sample, include these additional variables, and assess the longer-term influences and direction of causality of the cognitive variables, especially just before and across transitions where PA declines drastically<sup>17</sup>.

Because social desirability of response may contribute to both biased responses and confounding among children this age<sup>18</sup>, future research with this age group should also control for this. In addition, since some children this age have difficulty telling time and may not wear watches (important for reporting durations of PA events), hopefully these results will be replicated with more objective measures of PA. It is not clear how these clusters related to the several components of socio-economic status (e.g. family income, parent educational attainment, occupational prestige). Multi-country research would also be valuable to elucidate cultural, national policy and other influences. Qualitative research would be valuable within the market subgroups to elucidate the factors that may encourage or discourage PA and how best to deal with them in PA-promoting programmes<sup>13</sup>.

The intervention research trying to capitalise on psychosocial variables has generally employed ‘tailoring’, i.e. providing motivational or related messages to participants based on their responses to individual psychosocial questionnaire items<sup>19</sup>. Very little such work has been reported with children. Identifying subgroups of children based on responses to a variety of questions offers promise of designing strong interventions for internally homogeneous groups. The challenge, alternatively, is to find settings where the homogeneous subgroups congregate and thereby make it feasible to deliver programmes targeted to them<sup>20</sup>. For example, children participating on school sport teams (the ‘positives?’) may already be getting substantial PA in season; activity-promoting programmes for them might be for when their sport is not in season. Children who do not engage in after-school programmes and live in unsafe neighbourhoods, and so cannot play outside (the

‘negatives?’), may need programmes on how to be active in their homes (which may be useless to the children on the sports teams). As with all good research, these findings raise as many new issues as answered old issues, with the usual admonition: ‘More research is necessary’.

The ‘New Nutrition’ broadly expands nutritional science beyond its original biological foundations. Including environmental and psychosocial dimensions in research offers promise for designing programmes or social policies that can remedy the biological problems already clearly defined (e.g. obesity, metabolic syndrome, some cancers, etc.). PHN exults in the broadened perspective and will continue to contribute to building the knowledge base for effective programmes and social policies.

Tom Baranowski  
Associate Editor  
tbaranow@bcm.tmc.edu

## References

- 1 The Giessen Declaration, *Public Health Nutrition* 2005; **8**(6A): 783–6.
- 2 Yngve A, Warm D, Landman J, Sjostrom M. A European master’s programme in public health nutrition. *Public Health Nutrition* 2001; **4**(6A): 1389–91.
- 3 Mendez MA, Monteiro CA, Popkin BM. Overweight exceeds underweight among women in most developing countries. *American Journal of Clinical Nutrition* 2005; **81**(3): 714–21.
- 4 Brown WJ, Williams L, Ford JH, Ball K, Dobson AJ. Identifying the energy gap: magnitude and determinants of 5-year weight gain in midage women. *Obesity Research* 2005; **13**(8): 1431–41.
- 5 Baranowski T, Anderson C, Carmack C. Mediating variable framework in physical activity interventions. How are we doing? How might we do better? *American Journal of Preventive Medicine* 1998; **15**(4): 266–97.
- 6 De Bourdeaudhuij I, Teixeira PJ, Cardon G, Deforche B. Environmental and psychosocial correlates of physical activity in Portuguese and Belgian adults. *Public Health Nutrition* 2005; **8**(7): 845–54.
- 7 Baranowski T, Cullen KW, Nicklas T, Thompson D, Baranowski J. Are current health behavior change models helpful in guiding prevention of weight gain efforts? *Obesity Research* 2003; **11**(Suppl.): 23S–43S.
- 8 Humpel N, Owen N, Leslie E. Environmental factors associated with adults’ participation in physical activity: a review. *American Journal of Preventive Medicine* 2002; **22**(3): 188–99.
- 9 Bruss MB, Morris JR, Dannison LL, Orbe MP, Quitugua JA, Palacios RT. Food, culture, and family: exploring the coordinated management of meaning regarding childhood obesity. *Health Communication* 2005; **18**(2): 155–75.
- 10 Nigg CR. Explaining adolescent exercise behavior change; a longitudinal application of the transtheoretical model. *Annals of Behavioral Medicine* 2001; **23**(1): 11–20.
- 11 Jago R, Baranowski T, Zakeri I, Harris M. Observed environmental features and the physical activity of adolescent males. *American Journal of Preventive Medicine* 2005; **29**(2): 98–104.
- 12 Cullen KW, Baranowski T, Owens E, Marsh T, Rittenberry L, de Moor C. Availability, accessibility and preferences for fruit, 100% juice and vegetables influence children’s dietary behavior. *Health Education & Behavior* 2003; **30**(5): 615–26.
- 13 Vastine A, Gittelsohn J, Ethelbah B, Anliker J, Caballero B. Formative research and stakeholder participation in

- intervention development. *American Journal of Health Behavior* 2005; **29**(1): 57–69.
- 14 Cardon G, Philippaerts R, Lefevre J, Matton L, Wijndaele K, Balduck A, *et al.* Physical activity levels in 10- to 11-year-olds: clustering of psychosocial correlates. *Public Health Nutrition* 2005; **8**(7): 855–62.
- 15 Williams JE, Flora JA. Health behavior segmentation and campaign planning to reduce cardiovascular disease risk among Hispanics. *Health Education Quarterly* 1995; **22**(1): 36–48.
- 16 Glanz K, Basil M, Maibach E, Goldberg J, Snyder D. Why Americans eat what they do: taste, nutrition, cost, convenience and weight control concerns as influences on food consumption. *Journal of the American Dietetic Association* 1998; **98**(10): 1118–26.
- 17 Baranowski T, Cullen K, Basen-Engquist K, Wetter D, Martineau D, Prokhorov A, *et al.* Transition out of high school: a time of increased cancer risk? *Preventive Medicine* 1997; **26**(5 Pt 1): 694–703.
- 18 Klesges LM, Baranowski T, Beech BM, Cullen KW, Murray DM, Rochon J, *et al.* 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 (GEMS). *Preventive Medicine* 2004; **38**(Suppl.): S78–S87.
- 19 Brug J, Oenema A, Campbell M. Past, present, and future of computer-tailored nutrition education. *American Journal of Clinical Nutrition* 2003; **77**(4 Suppl.): 1028S–34S.
- 20 Stephens KK, Rimal RN, Flora JA. Expanding the reach of health campaigns: community organizations as meta-channels for the dissemination of health information. *Journal of Health Communication* 2004; **9**(Suppl. 1): 97–111.