Moderators of environmental intervention effects on diet and activity in youth

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CRD summary
The authors looked at studies of interventional strategies to change the environment with the aim of improving diet and/or activity in persons aged 3 to 18 years to see whether the effectiveness of tested strategies differed across specific subgroups. There was insufficient evidence to draw any conclusions.

Authors' objectives
To review existing studies of environmental interventions to encourage better diet and increased activity in young people in order to investigate whether intervention effects are moderated by other factors such as gender, age, demographic subgroup and site of intervention.

Searching
PubMed, PsycINFO, Web of Science and ERIC were searched; the search terms were reported. The reference lists of five relevant reviews were screened for additional studies. Studies published between 1990 and December 2005 were eligible for inclusion.

Study selection
Inclusion criteria were not defined in terms of the study design. The included studies were randomised controlled studies, non-randomised controlled trials and single-group pre-test post-test studies.

Specific interventions included in the review
Studies that assessed policy or environmental interventions to promote physical activity and/or good nutrition were eligible for inclusion. Studies had to describe the intervention to be included. The environment was defined as 'anything and everything outside the person', while environmental strategies were defined as those that involved changing the physical, social-cultural, economic or organisational systems to promote behaviour change. Studies that assessed educational strategies at the individual level but focused mainly on environmental strategies were eligible for inclusion. To be included in the review, studies had to report tests of interaction or moderation between the intervention studied and a second independent variable. Studies on the effects of media campaigns, determinants research, or individual-level interventions were excluded.

All of the included studies addressed interventions aimed at improving diet and/or physical activity and all were mainly school-based, although some incorporated parental involvement or home-based activities and one included workplace interventions. The interventions in the included studies were school food service changes (including pricing change and changes in foods offered), family activity packets to be completed at home, daily activities to promote healthy food choices, teacher-led sessions on healthy eating and physical activity, and physical activities. The effect modifiers assessed included gender, race, age and site. Rental involvement or home-based activities and one included workplace interventions. The interventions in the included studies were school food service changes (including pricing change and changes in foods offered), family activity packets to be completed at home, daily activities to promote healthy food choices, teacher-led sessions on healthy eating and physical activity, and physical activities. The effect modifiers assessed included gender, race, age and site.

Participants included in the review
Studies involving children or adolescents aged 3 to 18 years were eligible for inclusion. The included studies involved over 18,000 children from grades 1 through 6 (this corresponds roughly to ages 6 to 12).

Outcomes assessed in the review
Only studies measuring some behavioural outcome were eligible for inclusion. The outcomes assessed in the included studies were fruit and vegetable consumption, low-fat snack and milk sales, total energy intake, fat intake, cholesterol intake, sodium intake, and physical activity and fitness measures.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

The authors stated that studies that met initial inclusion characteristics were reviewed independently by two reviewers to determine whether a test of moderation had been applied. Any differences between the reviewers were followed by a second assessment, though it was unclear what this involved.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
How were the studies combined?
A table summarised the effects of moderators, and there was a narrative discussion of the findings.

How were differences between studies investigated?
Differences between the studies were not formally investigated.

Results of the review
Seven studies involving over 18,000 children were included.

Gender was the most frequently studied effect modifier (6 studies). Three studies found that the effects of the intervention differed according to gender. Two studies of interventions aimed at children or adolescents found that girls responded better to the intervention. A study aimed at improving parental participation found that the effects were greater in boys.

Two studies assessed race and found that children from ethnic minorities gained more from the intervention than Caucasian children.

One study found that the intervention had a greater effect in schools than in workplaces.

Two studies assessed age. One found that the intervention worked better in young children than in older children; the other reported no effect.

Authors' conclusions
Effect modifiers have only been assessed in a very small number of papers in this area, and these have only investigated a very limited number of potentially moderating factors. Given the limited available evidence, no conclusions could be reached about the effect of effect modifiers on environmental interventions and behavioural outcomes.

CRD commentary
The reviewers addressed a clear question and the inclusion criteria were defined in terms of interventions, participants and outcomes; no criteria for study design were specified. The literature search was reasonable but was limited to studies published between 1990 and 2005; it is unclear why these date restrictions were applied and also whether any...
Language restrictions were applied. The review may therefore be subject to language and publication bias. Validity was not formally assessed, so it is not possible to comment on the reliability of the primary studies. In addition, since very few details about the review process were reported, it is not possible to determine whether appropriate steps were taken to minimise error and bias. Study details were appropriately summarised in a table, and the narrative synthesis was appropriate given the differences between studies. Although this review suffers from a number of limitations, the authors' limited conclusions are sufficiently cautious that they are likely to be reliable.

**Implications of the review for practice and research**

Practice: The reviewers did not state any implications for practice.

Research: The reviewers recommend that moderators, including not only demographic moderators but also a broader range of behavioural moderators (personality, habit strength and others), should be a standard part of studies evaluating environmental interventions to improve diet and activity. They stated that it is important not to merely stratify analyses but to apply specific tests of moderation.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.