Do implementation intentions help to eat a healthy diet? A systematic review and meta-analysis of the empirical evidence
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CRD summary
This review assessed interventions that encouraged people to plan in advance specific situations and actions for increasing healthy eating and/or decreasing unhealthy eating. The authors concluded that there was a significant positive effect of intervention that was more marked for promoting healthy eating. Weaknesses in the conduct and reporting of the review limit the usefulness of the findings.

Authors' objectives
To assess whether interventions based on implementation intentions were effective in promoting healthy eating.

Searching
The authors searched PsycINFO, PubMed and Web of Science for articles published in English up to December 2009. Search terms were reported. Reference lists of retrieved articles were searched.

Study selection
Empirical studies of the effects of implementation intentions/action plans on eating behaviour were eligible for the review. It appeared that there were no restrictions on study designs or participants. Interventions involved instructing participants to plan in advance specific situations and actions for increasing healthy eating and/or decreasing unhealthy eating.

Included studies involved different populations that included students, general population samples and people with heart disease. Time from intervention to outcome assessment ranged from immediate to nine months. Outcomes were assessed by a variety of methods, including food diaries and various single-item and multiple-item questionnaires. No further details of interventions and participants were reported.

Two reviewers selected studies for the review.

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

Data extraction
The standardised mean difference (Cohen's d) between intervention and control groups was calculated or extracted and the corresponding standard error was calculated. For cross-sectional studies, d was calculated based on the correlation between planning and eating behaviour. Data were extracted to assess the quality of the outcome measure used and the control condition (degree of similarity between intervention and control groups for aspects other than the intervention of interest).

It appears that data were extracted by two reviewers. Any disagreements were resolved by discussion.

Methods of synthesis
Studies were pooled by meta-analysis. An initial homogeneity test (Q-test) revealed significant heterogeneity, so random-effects models were used for all meta-analyses. Studies were synthesised narratively. Results for interventions to promote healthy eating were considered separately from those of interventions to reduce unhealthy eating. An overall effect size for eating behaviour was calculated. Influence of quality of outcome measure and control group was investigated by meta-regression. Publication bias was investigated by calculation of a fail-safe N (number of non-significant studies required to make meta-analysis results non-significant).
Results of the review
Twenty-three studies were included in the review. The number of participants was not reported. Most studies were described as experimental with an implementation intentions group and one or more control groups.

Across all studies, implementation intention interventions had a small to moderate statistically significant positive effect on eating behaviour (d=0.43, 95% confidence interval 0.28 to 0.57). The effect was larger for promoting healthy eating (d=0.51) than for decreasing unhealthy eating (d=0.29); 95% confidence intervals were not reported for these effect sizes although both were statistically significant. Statistical heterogeneity was significant for healthy eating and not significant for unhealthy eating. Meta-regression indicated that for promoting healthy eating, studies that included stronger outcome measures tended to show stronger effects and those that used stricter control conditions tended to show weaker effects.

The fail-safe N value was 1,479 (serious publication bias unlikely).

Authors’ conclusions
Implementation intentions were somewhat more effective for promoting healthy eating than for reducing unhealthy eating. Effect sizes for healthy eating may have been inflated by suboptimal control conditions in some studies.

CRD commentary
Inclusion criteria were broad but generally clear. The search covered a number of relevant sources. Restriction to publications in English meant that some relevant studies could have been missed. Unpublished studies were not sought. Publication bias was assessed (not by the best method) and no evidence of bias was found. Appropriate methods were used to minimise reviewer errors and bias in study selection. Study validity was not assessed, which made the reliability of the included studies and the synthesis derived from them uncertain. Some relevant details of included studies were reported. There was limited information about the interventions and how they were delivered. Details of study participants were limited. This made it difficult to assess the generalisability of the review findings. The meta-analysis was questionable in view of the high levels of heterogeneity present. A detailed narrative synthesis was provided.

The authors’ conclusions are in line with the evidence presented, but weaknesses in the conduct (particularly lack of validity assessment) and reporting of the review limit the usefulness of the findings.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that future research should concentrate on implementation intention interventions for reducing unhealthy eating. Studies should use strict control conditions and reliable outcome measures and should compare the efficacy of different types of interventions.

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