



Overview of existing knowledge concerning food behaviour interventions out-of-home, in the working environment and in online settings

A literature quick scan - WP1 - Food, Value, Impact

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Summary



Summary

In this deliverable of the PPS project *Food, Value, Impact* an overview is made of scientific food behaviour intervention studies with a focus on three real-life settings that have a central role in this project, namely *out-of-home*, the *working environment* and *online* (i.e., web-based food behaviour interventions through websites or apps). This deliverable provides insight into which type of behavioural interventions have been tested and are particularly effective in stimulating healthy and/or sustainable food choices in each of these three settings. The overview is based on 89 studies in total (*out-of-home*: 24; *working environment*: 33; *online*: 32), that were found by doing a literature search in the database Web of Science. Results show that in the settings *out-of-home* and *working environment* most interventions tested a type of nudging strategy to stimulate healthy and/or sustainable food choices, whereas in the setting *online* most interventions tested forms of information and/or education in order to entice consumers to make more healthy and/or sustainable food choices. Moreover, most studies focus on interventions related to healthy food choices. The large majority of the interventions that were included in the quick scan were successful in stimulating the targeted behaviour.

This overview can be helpful for researchers who are involved in the project *Food, Value, Impact* or who are interested or want to develop an intervention in one of these settings (e.g. the use cases). Note that the studies that are described in this deliverable are based on a quick scan of the literature and cannot be labelled as a systematic review. The articles described depend on the search criteria that were set for the literature search. Therefore it is possible that some relevant studies might be missing. Nevertheless, this literature quick scan gives an indication of which intervention components are particularly effective in stimulating healthy and/or sustainable food choices in each of the three settings.

Introduction



Introduction

Over the past decades a lot of behavioural interventions to stimulate healthy and/or sustainable food choices and consumption among consumers have been developed and conducted. Skov and colleagues (2013) note that many of these studies to promote healthy eating have not (yet) been conducted in natural environments, i.e. real-life settings, such as restaurants and cafeterias. Most of these studies have been conducted under conditioned circumstances (e.g., food laboratories or online experiments). The urgency for more studies in real-life settings is enhanced because research increasingly acknowledges the role of the environment in stimulating or inhibiting the 'right' food choices (Wansink, 2015). One of the aims of the project *Food, Value, Impact* is therefore to provide insights into existing knowledge about the effects of environmental interventions that lead to healthy and sustainable consumer behaviour in **real-life settings**.

In order to do so, two quick scans of the literature have been conducted. In this research, we define a quick scan as a review of the literature without strictly applying the systematic methodology that is needed in a systematic literature review. One quick scan has a main focus on promoting healthy and sustainable food choices in the three real-life settings that have a central role in this project (i.e., *out-of-home*, *working environment* and *online*), while the other quick scan was specifically aimed towards review studies that focus on environmental interventions that affect food choices. The results of the first quick scan can be found in this deliverable, which aims to provide an overview of which type of behavioural interventions have been tested and are particularly effective in stimulating healthy and/or sustainable food choices in each of the three settings.

Methodology



Methodology: Search terms

Criteria that were used to initiate the quick scan literature search were: (1) the study should involve some kind of field experiment, (2) the outcome variable of the study should be some kind of behavioural measure, (3) the study should concern the food domain and (4) the study should be applied in one of the relevant settings (i.e., *out-of-home*, *working environment* and *online*). Based on these criteria, an initial list of search terms for the quick scan for electronic searching of appropriate databases (i.e., 'Web of Science') was developed. The search covered studies in the period from 2000 to 2017. The search terms were included in the topic section of the database, and in the keywords, title, or abstract of the article being searched. For pragmatic reasons only articles published in English were included. The search terms were tested and refined through several rounds of paper identification, running the full search term in 'Web of Science', until the resulting database was manageable, while simultaneously demonstrating face validity (i.e. important key papers in the area of interest were picked up by the search string used). The search was conducted on 31 March 2017 in Web of Science, which yielded 3,440 papers for the setting *out-of-home*, 2,464 papers for the setting *working environment*, and 649 papers for the setting *online food*.

Methodology: Screening process

Round 1

The retrieved papers were screened based on their title. The titles provided a first indication whether a paper is relevant or not. For example, papers that were clearly outside the behavioural domain (e.g., medical articles, microbiological articles, etcetera) as well as papers targeted at specific diseases or specific groups that were outside the scope of this project (e.g., children) were excluded. Furthermore, we excluded studies that evaluated specific health campaigns in specific countries/regions. Based on this screening 101 papers for the setting *out-of-home*, 157 papers for the setting *working environment*, and 197 papers for the setting *online* were selected. The selected papers were stored in EndNote.

Methodology: Screening process

Round 2

The remaining papers were further screened for inclusion/exclusion in the quick scan based on the paper abstracts. In including the relevant studies, we categorised the papers into relevant studies that describe field experiments and relevant non-experimental papers. The following *exclusion criteria* were used to identify papers that were relevant to the quick scan:

1. Interventions executed among specific 'niche' target groups (e.g., people with certain diseases or syndromes, specific ethnic minority groups). This also includes interventions focused on children (e.g., on schools, kindergartens, etcetera). More general target groups, like low socio-economic status families were included.
2. Interventions aimed at specific diseases (e.g., cancer, coronary heart diseases, nutritional deficiencies) or specific health aspects (e.g., dental health, obesity).
3. Interventions executed in developing countries, since these countries have their own dynamics that do not allow to 'translate' the results to a western context.
4. Interventions that do not focus on food (e.g., focused on alcohol, smoking, physical activity, gardening).
5. Interventions that focused on other aspects of food instead of food consumption (e.g., food safety, contamination).
6. Interventions that focused on evaluations of specific programmes or campaigns (e.g., national school programmes on fruit and vegetables or specific nutrition education programmes).
7. Papers that contain no interventions (i.e., qualitative studies, correlational studies, cross-sectional studies or trend analyses). If these papers appeared to be relevant for the project (e.g., systematic reviews or literature overviews that contain relevant information), they were separately stored in a group in EndNote (labelled Non-experimental papers).

Methodology: Screening process

Round 3

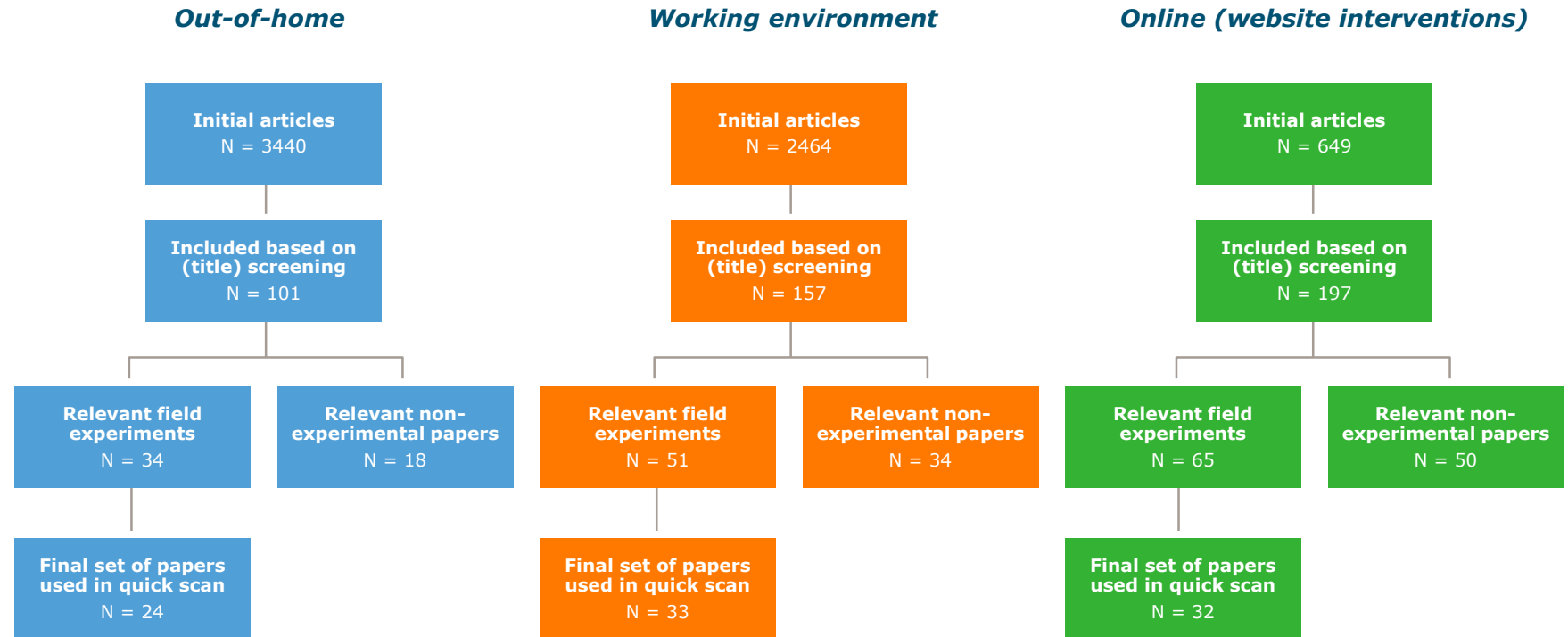
The papers with relevant field experiments were retrieved and the abstracts were screened for incorporation in the quick scan. Although the dropout rate was significantly smaller than in the previous rounds, also in this round some papers were dropped from further analysis.

Reasons for exclusion were:

1. The full paper was not retrievable.
2. The paper presents no empirical results but merely a protocol/description of the empirical study.
3. It appears from screening the paper that the paper still met one of the exclusion criteria as formulated in the previous (second) round.
4. Specifically regarding the studies in an online setting: only studies with website interventions were included. There were a lot of articles describing text-messaging interventions. We decided to exclude these articles because these were not really environmental interventions (i.e., using the online environment to steer behaviour), but in these studies the focus was on the evaluation of these text messages and an online context was used as the medium to present these messages.

See Figure 1 for an overview of the number of papers in each of the rounds of the quick scan process. The final number of articles that were incorporated in the quick scan was relatively equally distributed over the different settings: 24 articles for *out-of-home*, 33 for *working environment* and 32 for *online*.

Figure 1: Paper selection flow chart for inclusion into quick scan



Results



Results: Introduction¹

Type of intervention

Rothschild (1999) distinguishes three classes of behavioural intervention tools, namely education, marketing, and law. In the current literature review, we structure the type of intervention according to this tripartite classification, with an emphasis on education (or information provision) and marketing (or nudging/environmental interventions), since we found only one study that focused on regulation/law. Education can be seen as one end of the intervention spectrum, as it is completely voluntary and seeks to empower consumers to make their own choices once they are equipped with accurate information. Regulation can be considered the other end, as the intervention is coercive and punishment is imposed for noncompliance. Marketing falls somewhere in between these two: behaviour is reinforced, induced by environmental changes (i.e, choice architectures) or (financial) incentives, but consumers keep free choice.

To further disentangle the interventions that apply some type of nudging, we use an existing framework developed by Wilson et al. (2016, Table 1, p. 49):

- *Priming nudges*: altering the visibility, availability and/or accessibility of food and beverages in the environment to nudge a particular choice.
- *Salience nudges*: increasing the salience of healthier or sustainable options, for example by different types of labelling, but also by tastings or altered portion sizes.
- *Default nudges*: a particular choice is pre-set, which makes it the easiest option.
- *Incentive nudges*: incentives are used to either reinforce a positive choice, or to punish a negative choice.
- *Commitments and ego nudges*: consumers make a commitment or promise, and their desire to feel good about themselves will nudge them to make choices consistent with their commitment or promise.
- *Norms and messenger nudges*: other people (of status) are used to establish a norm, as consumers are influenced by comparing themselves to others or by whom they receive information from.

¹ It is possible that the amount of studies assigned to the different intervention types is bigger than the amount of studies that are included in the overview. This is because in some cases a study can have multiple types of interventions. Alternatively, a single intervention in a study can test multiple different intervention mechanism simultaneously (i.e., multi-component interventions).

Results: Overall synthesis

The interventions used in the settings *out-of-home*, *working environment* and *online* (websites) show a number of similarities, but also some differences.

Number of articles

The number of articles incorporated were fairly similar: 24 articles for *out-of-home*, 33 for *working environment* and 32 for *online*. This is an indication that food interventions are tested with a comparable frequency in each of the three settings.

Outcome variables

In the settings working environment and online most studies focused on a form of food intake/consumption as a main outcome variable, respectively 22 of the 33 studies for the setting *working environment* and 23 of the 32 for the setting *online*. For the setting *out-of-home*, most studies used purchases/sales of healthy food items as main outcome variable: 18 of the 24 studies. To compare: for *working environment* 10 of the 33 studies also included purchases/sales as a main outcome variable, while just one of the studies in the setting *online* did so. The latter might be a consequence of the setting, as the online interventions did not take place in a situation in which food was actually purchased (e.g. only 1 online intervention took place in an online store environment). Furthermore, most of the studies focus on stimulating healthy food choices.

Results: Overall synthesis

Type of interventions

In the settings *out-of-home* and *working environment*, the large majority of the interventions were through a type of nudging and fewer studies used and tested some form of education/information provision. For the setting *online*, this was precisely the other way around: the large majority of the interventions used a form of information provision, while fewer studies used a type of nudging in the intervention.

Out-of-home – Most studies tested a priming nudge (either by means of increased visibility, accessibility or availability) or a salience nudge (by means of calorie labelling, descriptive labels, colour labelling, taste testing or reducing plate size). A smaller number of studies (also) tested information or education tools as part of the intervention (e.g. factsheets, guides and education programmes). Only one intervention captured regulation.

Working environment – Most studies tested a priming nudge (either by means of visibility, accessibility or availability) or a salience nudge (by means of calorie labelling or colour labelling). A smaller number of studies (also) tested information or education tools as part of the intervention (e.g. nutrition information and workshops).

Online – Most studies tested a form of information provision (about 50/50 whether this was a form of personalised information or non-personalised information). Many studies also used a form of feedback as part of the intervention or provided educational materials. In the online setting, only social norm nudges (mostly via social norm feedback) and ego and commitment nudges (either in the form of goal setting tools or signing a contract) were tested.

Particularly in the settings *working environment* and *online*, there were relatively many multiple-component studies, in which multiple intervention mechanisms were tested simultaneously.

Results: Overall synthesis

Effectiveness of interventions

Across settings, most studies were successful in influencing their outcome variable of interest. Overall, multi-component studies appear to be somewhat more successful than single-component interventions. Thus, using multiple intervention mechanisms simultaneously in a single intervention might be more effective than using a single intervention mechanism. However, testing multiple intervention mechanisms simultaneously also has certain disadvantages: costs are often (but not always) higher for multi-component interventions, and when multiple mechanisms are tested at the same time it is not possible to pinpoint where an effect comes from.

Non-behavioural vs. behavioural measures

All interventions have a behavioural measure (since this was one of the selection criteria). In the settings *out-of-home* and *online* about half of the papers also discuss non-behavioural outcome measures in the abstract. In the setting *working environment*, only a quarter discuss non-behavioural measures. The non-behavioural measures most used in the out-of-home setting are attitudes, awareness and intentions. In the setting *working environment*, self-efficacy, food satisfaction and intentions are mentioned most. For the *online* setting most used measures are evaluation of the intervention and self-efficacy. In the settings *out-of-home* and *online*, in most cases an increase in one of the non-behavioural measures led to a change in one of the behavioural outcomes. In the setting *working environment*, this was the case for half of the studies. However, all settings also included studies that only found an effect of their intervention on the non-behavioural measures, and no effect on the behavioural measures, especially the setting *online*. The setting *working-environment* was the only setting with studies that found no effects on non-behavioural measures, but did find effects on the behavioural measures.



Appendix 1 presents an overview of the relevant articles for the setting out-of-home. The following paragraphs describe point-by-point the main results of the literature quick scan for interventions in this setting.

Summary

The studies conducted in an out-of-home setting did not necessarily focus on actual sit-down restaurants; most studies focused on fast-food environments or some kind of self-service restaurant. The main outcome-variable studies focused on is the purchase (sales) of healthy menu items. The non-behavioural measures most used were attitudes, awareness and intentions. The majority of studies were single-component, thus manipulating and testing a single variable. Manipulations consisted mostly of a type of nudge (mainly a salience or a priming nudge; Wilson et al., 2016). Calorie labelling was most often used as a technique to influence the purchase of healthy menu items. Overall, most studies were effective. Specifically, all the studies using **priming nudges** by means of **visibility**, **accessibility** and **availability** were successful. **Salience nudges** by means of **calorie labelling** were mostly ineffective and **salience nudges** by means of **descriptive labels** were mostly effective. **Financial incentives** did not elicit an additional effect compared to using only labels.

Descriptives (number of articles, setting specifications, target group)

- In total 24 articles are incorporated.
- Not many interventions focused on actual sit-down restaurants (merely 5 studies). The rest of the interventions focused on either fast-food restaurants (5 studies), self-service cafeterias (11 studies), take-away (1 study), a train station snack shop (1 study) or private dining areas (1 study).
- In total 7 interventions took place at a university, 3 interventions in a hospital cafeteria, 1 in a sporting canteen, 1 in a hotel and 1 in a swimming pool.
- The target groups of the interventions were mainly customers of the mentioned locations.



Type of interventions

- Only 4 out of 24 studies are intervention programmes focusing on multiple components in their interventions. Therefore, most studies focused on a single component in their intervention or used different experimental groups to test different components separately.
- Used intervention mechanisms:
 - Priming nudge by means of visibility (6 studies)
 - Priming nudge by means of accessibility (4 study)
 - Priming nudge by means of availability (4 studies)
 - Salience nudge by means of calorie labelling (10 studies)
 - Salience nudge by means of descriptive labels (5 studies)
 - Salience nudge by means of colour coded – traffic light (3 studies)
 - Salience nudge by means of taste testing (3 studies)
 - Salience nudge by means of reducing plate size/invitation to downsize meal (2 studies)
 - Point-of-decision/point-of-purchase prompts (4 studies)
 - Norms and messenger nudge (3 studies)
 - Default nudge (1 study)
 - Providing education & information (e.g. table tents, signs, posters, media, advertising, promotional materials, education programmes, group sessions, digital menu boards, guides, factsheets (8 studies)
 - Financial incentive (5 studies)
 - Regulation (1 study)



Outcome variables

- Main behavioural outcome variables: **purchase** (sales) of healthy menu items (total calories ordered) (18 studies), (self-reported) **food consumption** (4 studies), and **fruit and vegetable intake** (2 studies).
- Non-behavioural outcome variables that are reported, are: **awareness of the campaign/implementation of intervention activities** (6 studies) and **attitudes towards healthy food** (3 studies).
- Other interesting (behavioural and non-behavioural) outcome variables that were only considered in a single study were: food waste, intentions towards repatronage, willingness to pay, acceptance of smaller portions, weight and waist circumference, emotional eating, diet related self-efficacy, and barriers to weight management when eating out.



Effectiveness of single interventions

- All the studies **on priming nudges** by means of **visibility**, **accessibility** and **availability** were effective in increasing healthy purchases and fruit and vegetable consumption. One study found that adding extra disclosure information, had no extra effect.
- Salience nudges by means of **calorie labelling** was mostly ineffective. Only three studies found an effect on calorie consumption/purchasing. In one study, adding **traffic lights** elicited an effect on selecting low-calorie items. But in another study, which did find an effect of calorie labels, adding traffic lights had no additional effect. One study solely studying traffic lights, found an effect, but only under certain conditions.
- Salience nudges by means of **reducing plate size**/or **invitation to downsize** meals were effective in reducing food waste and reducing calories eaten.
- Salience nudges by means of **descriptive labels**, were effective in reducing food waste and increasing sales of certain food products. One study with salience nudging by means of **descriptive labels** and **taste testing** only found an effect on sales of healthy items in a subsample. **Financial incentives** had less impact than labels when it comes to influencing nutrition behaviour.
- **Point-of-decision/purchase prompts** were mostly effective in influencing purchase/intake behaviour. In one case it was only effective with sufficient motivation to change one's diet and sufficient objective nutrition knowledge.
- The **default nudge** was used only in one study, and it was successful. The ratio between the purchase of margarine and butter was changed sevenfold by reversing the positions.
- One study that focused on **education** through group sessions was effective. Participants in the intervention group lost significantly more weight, had lower average daily caloric and fat intake and had increased diet-related self-efficacy.



- The 'Treat Yourself Well' intervention included a combination of providing information, taste testing and norms and messenger nudging, and was an effective intervention, influencing purchasing behaviour of healthy menu items.
- The 'Waupaca Eating Smart' intervention included a combination of providing information, taste testing, norms and messenger nudging, priming nudging (availability, accessibility, visibility), point-of-purchase prompts and financial incentives. The intervention found no, or minimal changes, in customer behaviour.
- A combined intervention, including providing information, priming nudging (availability) and salience nudging (calorie labels), had no effect on behaviour. It did affect respondents noticing and using nutrition information to select their food items.
- A combined intervention, including providing information, norms and messenger nudging, priming nudging (availability, accessibility, visibility) and financial incentives, was effective in influencing members of intervention clubs to purchase fruit and vegetable and non-sugar-sweetened products.



About half of the papers also discuss non-behavioural measures in the abstract. The non-behavioural measures most used are attitudes, awareness and intentions. In most cases an increase in any of the non-behavioural measures leads to a change in the behavioural outcome. For example, in a study by Sonnenberg et al. (2003) respondents who noticed labels during the intervention and reported that labels influenced their purchases were more likely to purchase healthier items than respondents who did not notice labels. However, two studies only found an effect of their intervention on the non-behavioural measures, which was thus not translated into behaviour. Loureiro and Rahmani (2016) found that calorie information did reduce the probability of selecting high calorie meals in the questionnaire but did not have significant impact on actual purchasing behaviour in the field. Martinez-Donatel et al. (2015) found that restaurant food environment scores improved in the intervention community, however no or minimal changes in customer behaviours were observed.

Appendix 2 presents an overview of the relevant articles for the setting 'Working environment'. The following paragraphs describe point-by-point the main results of the quick scan for this setting.

Summary

In sum, most studies focused on intake/consumption and about one-third of the studies focused on purchases/sales as main outcome variable. The non-behavioural measures most used are self-efficacy, food satisfaction and intentions. About two-third of the studies were multi-component studies, in which several intervention mechanisms were tested simultaneously. The interventions that were conducted in these studies consisted mostly of a type of nudge. Priming nudges (availability and accessibility) were most often used. Overall, most studies were effective. Specifically, all the studies using availability nudges were successful. Mixed results were found for labelling nudges: colour-coded labelling appeared to be more effective than calorie labelling. Knowledge gaps for this specific setting lay in exploring other nudging mechanisms (i.e., default options, social norms, commitment nudges, incentive nudges). In half of the cases, a change in the non-behavioural measures led to a change in the behavioural outcome. However, one study did find a change in the non-behavioural outcome measures, but this did not translate into changes in the behavioural outcome, and there were three studies that found no effects on the non-behavioural measures, but did find an effect on the behavioural measure.

Descriptives (number of articles, setting specifications)

- In total 33 articles are incorporated. Notice that 6 out of these 33 articles are written by Lassen et al.
- Most studies were published since 2010 (26 out of 33 articles).
- Hospital cafeteria/restaurant with hospital staff was most often used as a specific setting (7 times).

20 out of 33 studies are intervention studies that focus on multiple components in their interventions.

Out of the total amount of 33 articles, 19 articles were incorporated that purely focused on interventions with nudges, like increased availability of healthy foods, labelling of food items, but also price incentives:

- Saliency nudge by means of (colour-coded or calorie) labelling: **10 studies**
- Priming nudge by means of increasing the availability: **6 studies**
- Priming nudge by means of accessibility (making choices easier): **2 studies**
- Priming nudge by means of visibility (rearranging menu items): **2 studies**
- Use of financial incentives (i.e., discount or reduced price): **2 studies**
- Commitment nudge (i.e., by means of pre-ordering): **1 study**
- Social norm nudge: **1 study**
- Combination of financial incentive and availability nudge: **2 studies**

7 articles purely focused on interventions based on information and education:

- Providing information: either general nutrition information (folders), specific product information or tailored to the person (**6 studies**)
- Offering concrete activities: tastings, workshop, participatory strategies, mindfulness training (**4 studies**)
- Providing some form of feedback: either socially or personally (**2 studies**)
- Supporting the canteen owner in stimulating fruit and vegetable intake (**1 study**)
- Offering free fruit (**1 study**)

7 articles focused on interventions that contain both environmental changes as well as information provision:

- Providing information messages: for example '5-a-day' message or about the benefits of fruits and vegetables (**4 studies**)
- Promotions, e.g., use of POP displays, posters, stickers) (**4 studies**)
- Increased availability of healthy food items like fruits and vegetables (**4 studies**)
- Use of price incentives (i.e., price reductions) (**3 studies**)
- Use of labelling (**2 studies**)
- Use of group programmes (**2 studies**)
- Other (i.e., social norms, organisational support, emphasise ways to adapt (new) skills in everyday life, increase in physical activity facilities) (**4 studies**)

Behavioural outcome variables

- Most studies focused on intake/consumption as main outcome variable (22 studies, with no less than 17 studies focusing on fruit and/or vegetables intake, 6 studies reported fat intake and also 6 studies focused on energy intake).
- Additionally, 10 studies reported food purchases or sales data as outcome variable.

- From the 13 single component studies, 4 studies were not effective in influencing the outcome measures of interest. From the 20 multiple component studies, also 4 studies were not effective in influencing the outcome measures. However, when comparing both studies, the multiple component studies seem to be somewhat more successful (especially multicomponent studies with single interventions).
- Most of the 19 studies with nudging interventions were effective in influencing the outcome measure. In total, 16 out of the 19 articles were (partially) successful:
 - All availability nudges were successful.
 - Mixed results for accessibility nudges: changing choice architecture was not always successful.
 - Mixed results for labelling nudges: colour-coded labelling appeared to be more effective than calorie labelling.
 - Social norm and incentive nudges can enhance the effect of other nudges (i.e., colour-coded labelling) (see Thorndike, Riis & Levy, 2016).
 - In the study by Stites et al. (2015), both a commitment nudge (pre-ordering) and an incentive nudge (i.e. offering a discount) were employed. Although an effect was found, it is not possible to assign the effect to one of the nudges. Additionally, in the study by Thunström et al. (2016) a combination of visibility nudge (i.e., rearranging menu) and salience nudge (labelling) was applied.
- In total, 5 out of the 7 interventions that focused on information were successful:
 - Intervention designs with multiple components seem to be more successful than single interventions (all multi-component studies were effective, whereas no significant effects were reported for interventions with single components).
 - However, in interventions with multiple components it was difficult to disentangle what interventions exactly evoked the desired effects.
- In total, 4 out of the 7 studies that used a combination of environmental and informational interventions were successful.

About a quarter of the papers also discuss non-behavioural measures in the abstract. The non-behavioural measures mostly used are self-efficacy, food satisfaction and intentions. In half of the cases, a change in the non-behavioural measures led to a change in the behavioural outcome. For example, in a study by Backman et al. (2011) an increase in self-efficacy towards eating 2 servings of fruit each day was found as well as a significant increase in fruit and vegetable consumption. However, a study by Engbers et al. (2006) did find a change in the non-behavioural outcome measures, namely an increase in social support, self-efficacy and attitudes, but this did not translate into changes in fruit, vegetable and fat intake. There were also three studies that found no effects on non-behavioural measures, but that did find an effect on the behavioural measure. For example, in a study by Lassen et al. (2014) healthy labelled meals did not lead to an increase in food satisfaction, but did show a mean decrease in energy density in the consumed meals.



Appendix 3 presents an overview of the relevant articles for the setting 'Online'. The following paragraphs describe point-by-point the main results of the quick scan for this setting.

Summary

Most studies focused on a form of food intake/consumption as the main outcome variable. Fruit and vegetable intake was the most often used outcome variable. The non-behavioural measures most used are evaluation of the intervention and self-efficacy. About half of the studies were multi-component studies, in which several intervention mechanisms were tested simultaneously. Many of the studies with an online, website-based intervention used a form of information or education to affect one or more outcome variables. Relatively few studies used a type of nudge as part of the intervention. Overall, most of the studies had successful interventions, in the sense that at least one of the targeted outcome variables was successfully affected. In almost all the cases an increase in one of the non-behavioural measures led to a change in one of the behavioural outcomes. However, five studies found that an effect of their intervention on one of the non-behavioural measures did not also result in an effect on one of the behavioural measures.

Descriptives (number of articles, year)

- In total 32 articles are incorporated.
- Most studies were published since 2010 (27 of the 32 articles).
- 9 of the 32 studies specifically targeted obese individuals.



Type of interventions

- Half of the studies were multi-component studies (i.e. the interventions consist of multiple intervention mechanisms): 15 of the 32 studies. The effects of the different components of the interventions can therefore not be disentangled.
- Used intervention mechanisms:
 - Personalised/tailored information: 10 studies included some form of personalised/tailored information in the intervention.
 - Non-personalised information: 8 studies included some form of non-personalised/non-tailored information in the intervention.
 - Feedback: 9 studies included a form of feedback as part of the intervention. Notice that studies that include social comparative feedback are filed under social norm nudges.
 - Education: 6 studies explicitly focused on providing information with an educational purpose.
 - Planning tool: 3 studies.
 - Self-affirmation: 3 studies.
 - Implementation intentions: 5 studies.
 - Go/no-go training: 2 studies.
 - Social norm nudge: 2 studies.
 - Ego and commitment nudge (goal setting or signing a contract): 4 studies.

Behavioural outcome variables



- Most studies (23 of the 32 articles) focused on a form of **food intake/consumption** as the main outcome variable. **Fruit and vegetable intake** was the most often used outcome variable (14 studies included this as an outcome variable).
- 10 of the articles (also) measured **weight (loss)**.
- Some of the studies had a broader focus, not solely focusing on food intake, but also on smoking, alcohol and/or physical activity.



- Most studies were successful, although given the multi-component nature of half of the studies it is not always possible to ascribe the effectiveness or ineffectiveness of an intervention to a specific component/intervention mechanism.
 - 13 of the 15 multi-component studies were successful in affecting at least one outcome variable.
 - 12 of the 17 single-component studies were successful in affecting at least one outcome variable.
- The effectiveness of the specific components/intervention mechanisms:
 - Personalised/tailored information: 8 of the 10 studies were successful in affecting at least one outcome variable.
 - Non-personalised information: 8 of the 8 studies were successful in affecting at least one outcome variable.
 - Feedback: 8 of the 9 studies were successful in affecting at least one outcome variable.
 - Education: 6 of the 6 studies were successful in affecting at least one outcome variable.
 - Self-affirmation: 2 of the 3 studies were successful in affecting at least one outcome variable.
 - Implementation intentions: 3 of the 5 studies were successful in affecting at least one outcome variable.
 - Go/no-go training: 2 of the 2 studies were successful in affecting at least one outcome variable.
 - Social norm nudge: 2 of the 2 studies were successful in affecting at least one outcome variable.
 - Ego and commitment nudge (goal setting or signing a contract): 3 of the 4 studies were successful in affecting at least one outcome variable.



About half of the papers also discuss non-behavioural measures in the abstract. The non-behavioural measures most used are evaluation of the intervention and self-efficacy. In almost all the cases an increase in one of the non-behavioural measures led to a change in one of the behavioural outcomes. For example, a study by Armitage et al. (2015) found that participants who formed implementation intentions engaged in significantly more metacognitive processing (awareness, self-monitoring, self-regulatory effort) at follow-up and also ate significantly more fruit at follow-up than did participants in the control condition. However, five studies found that an effect of their intervention on one of the non-behavioural measures did not also result in an effect on one of the behavioural measures. For example, Genugten et al. (2012) found that their (tailored) intervention was considered more personally relevant, containing more new information and having longer texts than the control condition. However, their intervention did not have significant impact on BMI, waist circumference, skin folds, physical activity and intake of fat, snacks & sweetened drinks, compared to the control condition.

Conclusion and discussion



Conclusion and discussion

General discussion of the results of the quick scan

The majority of the interventions that were included in the quick scan were successful in stimulating the 'right' food choices. It should be addressed, however, that the overall success of interventions might also be inflated due to publication bias. Publication bias causes effective studies to be published more than ineffective studies.

In the settings *out-of-home* and *working environment* most interventions tested a type of nudging strategy to stimulate healthy and/or sustainable food choices. Testing the effectiveness of information and education tools is relatively underexplored. Salience nudges (calorie labelling) were most often used as a technique in the *out-of-home* setting to influence the purchase of healthy menu items, while priming nudges (availability and accessibility) were most often used in the *working environment* setting to encourage employees to make healthy choices in the worksite cafeteria. In both settings, studies that use priming nudges (i.e., by means of visibility, accessibility and availability) seem to be most successful, whereas mixed results were found for salience nudges (i.e., colour-coded labelling appeared to be more effective than calorie labelling). These findings are in line with Wilson et al. (2016), who also found that priming nudges are more effective than salience nudges.

In the *online* setting, most interventions tested forms of information and/or education in order to entice consumers to make more healthy and/or sustainable food choices, for example an online communication tool with a personalised message (vs. a general message) on dietary patterns. Relatively few studies tested a type of nudging strategy as part of an online intervention.

Conclusion and discussion

General discussion of the results of the quick scan

The majority of the studies included in this review were multi-component (especially in the settings *working environment* and *out-of-home*), in which several intervention mechanisms are tested simultaneously. Overall, intervention designs with multiple components seem to be more effective than single-component interventions. This aligns with Wilson et al. (2016), who also found that the studies where 'priming' and 'salience' nudges were combined were most effective in influencing healthier choices.

Knowledge gaps

Based on the overview of which type of behavioural interventions have been tested in each of the settings, we can also make an indication of what possible knowledge gaps are.

First, there is a need for more single-component studies in a real-life setting. Information on which mechanisms work in which context and in combination with which other techniques is lacking and therefore future studies cannot build onto that.

In the settings *out-of-home* and *working environment*, we observed that testing the effectiveness of information and education tools is relatively underexplored, compared to the number of studies testing a nudging strategy.

Moreover, as noted, most studies focus on interventions related to healthy food choices, and less focus lies on sustainable food choices. Using environmental interventions to steer sustainable choice behaviour can offer new research opportunities.

Knowledge gaps per setting



Out of home:

we noticed that the majority of studies focus on fast-food environments or some kind of self-service restaurant, as compared actual sit-down restaurants. More insights can be gained by studying opportunities for health gains in sit-down restaurant.



Working environment:

some types of nudges are underexplored, for example default options, social norms, commitment nudges and incentive nudges.



Online:

there are relatively few studies testing a type of nudging strategy as part of an online intervention. This is to be expected, because an online setting is an accessible platform on which a lot of information can be transferred.

Appendix 1: *Out-of-home* table

Appendix 1: *Out-of-home* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Acharya, Patterson, Hill, Schmitz, Bohm	2006	Different restaurant chains: 1 fine-dining restaurant and three family-style restaurants (Mexican, upscale pizza, and 40s-style diner)	Consumers (general population)	<ul style="list-style-type: none"> ▪ 'TrEAT Yourself Well' (TYW) campaign ▪ Various promotional activities: <ul style="list-style-type: none"> • In-restaurant promotions <ul style="list-style-type: none"> - Table tents, posters, etc. • Community events <ul style="list-style-type: none"> - Seminars, food tasting, educational programmes • Information distributed by health professionals <ul style="list-style-type: none"> - Dietitians, physicians, health educators • Paid media advertising <ul style="list-style-type: none"> - Television and magazine advertisements 	<p>Non-behavioural</p> <ul style="list-style-type: none"> ▪ Awareness of 5-A-Day and the TrEAT Yourself Well campaign ▪ Beliefs, attitudes of healthy menu items <p>Behavioural</p> <ul style="list-style-type: none"> ▪ Purchase behavior of healthy menu items 	<p>Non-behavioural</p> <ul style="list-style-type: none"> ▪ Consumers who (a) were aware of the 5-A-Day campaign, (b) notice specially marked healthy menu items, or (c) dine in the region were more likely to be aware of the TYW campaign. ▪ Awareness of TYW Campaign had positive effects on their beliefs and attitudes toward healthy dining. <p>Behavioural</p> <ul style="list-style-type: none"> ▪ TYW campaign directly increased the probability of a consumer purchasing a healthy menu item by 3.7% ▪ By improving consumer attitudes toward healthy menu items, TYW campaign indirectly increased purchases of these items by 4.4%.
Dorresteijn, van der Graaf, Zheng, Spiering, Visseren	2013	Hospital self-service restaurant	Hospital staff & visitors	<ul style="list-style-type: none"> ▪ Point-of-decision prompts on hospital elevator doors promoting stair use ▪ Point-of-purchase prompts in the hospital restaurant promoting reduced-salt soup ▪ Point-of-purchase prompts in the hospital restaurant promoting lean croissants ▪ Reversal of the availability of diet margarine and butter 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> ▪ 24-h number of stair passages ▪ Purchase of low-salt soup and lean croissants ▪ Purchase of butter ▪ Purchase of margarine 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> ▪ Elevator signs increased the mean 24-h number of stair passages by 11.2% and maintained at least for 2 weeks after removal of the prompts ▪ Point-of-purchase prompts promoting low-salt soup and lean croissants did not result in altered purchase behaviour ▪ The ratio between the purchase of margarine and butter was changed sevenfold by reversing the positions

Appendix 1: *Out-of-home* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Ellison, Lusk, Davies	2014	Full-service, sit-down restaurant. \$14 for lunch incl. drinks and desserts. At Oklahoma State University but is open to everyone	Restaurant guests	<ul style="list-style-type: none"> Three menu treatments: <ul style="list-style-type: none"> Control: restaurant's conventional menu (without caloric information) Calorie-only menu Calorie + traffic light menu Prices were manipulated on all 3 menus: 'fat tax' for high caloric items and 'thin subsidy' on lower caloric items 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Total calories ordered (based on sales data from daily lunch receipts) 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Numeric labels did not influence food choice, but symbolic traffic light labels caused restaurant patrons to select lower-calorie menu items; Labels can both reduce intake more than a 10% tax on high-calorie items and a 10% subsidy on low-calorie items
Feldman, Hartwell, Brusca, Su, Zhao	2015	Student cafeteria	Students	<ul style="list-style-type: none"> Menu comprising 7 healthy and 7 unhealthy meal options: <ul style="list-style-type: none"> Unlabelled as control Labelled with healthy and non-healthy nutrient icons as an intervention test menu 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Consumers' first 3 choices of meals 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Findings demonstrate that despite a positive observed trend, there were no significant differences between healthy selection of labelled and unlabelled dishes ($p=0.16$).
Finkelstein, Strombotne, Chan, Krieger	2011	Mexican fast-food chain	Consumers (general population)	<ul style="list-style-type: none"> Mandatory menu labelling (calories) <ul style="list-style-type: none"> Drive-through postings 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Purchasing behaviour of healthy menu items (based on average calories per transaction) 	Non-behavioural / Behavioural <ul style="list-style-type: none"> No significant impact of mandatory menu labelling on monthly transactions and calories sold per transaction
Hammond, Goodman, Hanning, Daniel	2013	Experiment conducted in lab setting, but with real sandwiches ordered from Subway	Adults	<ul style="list-style-type: none"> Participants ordered a free meal from one of four experimental menus: 1) no nutritional information shown, 2) calorie amounts only, 3) calorie amounts in 'traffic lights', and 4) calorie, fat, sodium, and sugar shown in 'traffic lights' 	Non-behavioural <ul style="list-style-type: none"> Recall of nutrition Use of nutrition information Behavioural <ul style="list-style-type: none"> Calorie consumption 	Non-behavioural <ul style="list-style-type: none"> Participants in the calorie conditions were more likely to recall the calorie content of meals and to report using nutrition information when ordering. Behavioural <ul style="list-style-type: none"> The calorie content of meals was not significantly different across conditions; however, calorie consumption was significantly lower among participants in the Calorie only condition compared to the No information condition.

Appendix 1: *Out-of-home* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Hoefkens, Pieniak, Van Camp, Verbeke	2012	University canteens	University canteen customers (students)	<ul style="list-style-type: none"> Point-of-purchase (POP) nutrition information <ul style="list-style-type: none"> nutrition information on the best meal combinations 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Liking and use of the information Attitude towards healthy canteen meals Motivation to change diet Nutrition knowledge <p>Behavioural</p> <ul style="list-style-type: none"> Energy intake from canteen meals Number of chosen meals that complied with all recommendations 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Significant relations between liking of the information and its use A positive effect in attitude towards healthy canteen meals <p>Behavioural</p> <ul style="list-style-type: none"> Motivation to change diet and objective nutrition knowledge were required to maintain a recommended energy intake or to decrease in energy intake from canteen meals
James, Adams-Huet, Shah	2015	Two private dining areas at a university and a residence occupied by graduate students	Young adults, of which 77.3% college students	<ul style="list-style-type: none"> Subjects were randomised to: <ul style="list-style-type: none"> menu with no labels (no-labels) menu with kilocalorie labels (kcal-labels) menu with exercise labels displaying the minutes of brisk walking needed to burn the food energy (exercise-labels). 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Energy ordered and consumed <ul style="list-style-type: none"> weight of the food Energy content of the same foods on the restaurant Website. Post-lunch energy intake was assessed by food recall. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> The exercise-labels group consumed significantly less energy at lunch, compared to the no-labels group (not compared to the kcal-labels group) Energy ordered and consumed were not different between kcal-labels and no-labels groups. There was no difference in post-lunch energy intake by menu type.
Kallbekken, Sælen	2013	Hotel buffet	Hotel guests	<ul style="list-style-type: none"> Reducing plate size Providing social cues <ul style="list-style-type: none"> 'Welcome back! Again! And again! Visit our buffet many times. That's better than taking a lot once' 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Food waste 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Plate size reduces food waste by 19.5% The social cue reduces food waste by 20.5%

Appendix 1: Out-of-home table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Van Kleef, van den Broek, van Trijp	2015	Self-service restaurant located in a store	Customers of a self-service restaurant located in a store	<ul style="list-style-type: none"> 'Verbal prompting' as a nudge <ul style="list-style-type: none"> Four different prompts suggesting a side dish (i.e. orange juice, fruit salad, pancakes) given by cashiers 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Sales 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Sales of orange juice increased (35–42% of all breakfasts sold) compared to baseline (20%) Sales of fruit salad (9%) and pancakes (3%) rose to a small but significant extent compared to baseline sales (3% and 1%, respectively).
Krieger, Chan, Saelens, Ta, Solet, Fleming	2013	Fast-food chain restaurants in Washington	General population (> 14 years)	<ul style="list-style-type: none"> A regulation requiring chain restaurants to post calorie information on menus or menu boards was implemented 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Mean number of calories purchased 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Mean calories per purchase decreased 18 months after menu labelling in some restaurant chains and among women but not men
Kroese, Machiori, de Ridder	2016	Train station snack shops	Customers of train station snack shops	<ul style="list-style-type: none"> Repositioning of food products: healthy foods were placed at the cash register desk, while keeping unhealthy products available elsewhere in the shop 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Attitudes <p>Behavioural</p> <ul style="list-style-type: none"> Sales 	<p>Non-behavioural</p> <ul style="list-style-type: none"> A majority of customers reported positive attitudes toward the nudge. <p>Behavioural</p> <ul style="list-style-type: none"> A nudge led to more sales of healthy (but not fewer unhealthy) products. No difference between the nudge and the nudge + disclosure condition (the same nudge together with an explanatory sign)
Lachat, Verstraeten, De Meulenaer, Menten, Huybregts, Camp, Roberfroid, Kolsteren	2009	University canteens	Canteen customers	<ul style="list-style-type: none"> In the intervention group, canteen customers were given 2 portions of fruit and 1 portion of vegetables for free at lunchtime. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable intake 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Canteen customers in the intervention group ate 80 grams more fruit and 108 grams more vegetables than the control group.

Appendix 1: *Out-of-home* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Lee-Kwan, Bleich, Kim, Colantuoni, Gittelsohn	2015	Carryout (take-home) Restaurants	Low-income neighborhoods of Baltimore	<ul style="list-style-type: none"> Phase 1: menu board revision and healthy menu labeling Phase 2: increase of healthy sides and beverages Phase 3: promotion of cheaper and healthier combination meals. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Weekly handwritten menu orders collected to assess changes in the proportion of units sold and revenue of healthy items (entrée, sides and beverages, and combined) 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Odds for healthy entrée revenue significantly increased in phase 1, phase 2, and phase 3 Odds for healthy side and beverage revenues increased significantly in phase 2 and phase 3 compared to baseline. Total revenue in the intervention group was significantly higher in all phases than in the comparison
Loureiro, Rahmani	2016	Fast-food restaurant	Mainly students	<ul style="list-style-type: none"> Calorie information on fast food choices <ul style="list-style-type: none"> Food vouchers to be used in a fast-food restaurant 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Reported probability of selecting high calorie meals <p>Behavioural</p> <ul style="list-style-type: none"> Actual purchasing behaviour in fast-food restaurant. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Calorie information only reduces the probability of selecting high calorie meals in the questionnaire <p>Behavioural</p> <ul style="list-style-type: none"> Calorie information did not have significant impact on actual purchasing behaviour in the field.
Martinez-Donatel, Riggall, Meinen, Malecki, Escaron, Hall, Menzies, Garske, Nieto, Nitzke	2015	Two Midwestern U.S. communities (7 restaurants and 2 supermarkets)	Inhabitants of 2 Midwestern US communities	<ul style="list-style-type: none"> 'Waupaca Eating Smart' programme: <ul style="list-style-type: none"> <u>Restaurants</u> included healthy bundled meals, training wait staff to promote the programme, and promotional materials around the restaurant. <u>Supermarkets</u> included recipes and shopping lists for healthy bundled meals, in-store displays with healthy samples, promotional materials around the store, providing bag stuffers with healthy tips, and point-of-purchase signs for fruits and vegetables 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Food environment scores <p>Behavioural</p> <ul style="list-style-type: none"> Change in customer behaviour 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Restaurant food environment scores improved from 13.4 to 24.1 in the intervention community and did not change significantly in the control community. <p>Behavioural</p> <ul style="list-style-type: none"> No or minimal changes in customer behaviours were observed after a 10-month implementation period.

Appendix 1: *Out-of-home* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Olstad, Goonewardene, McCargar, Raine	2014	Recreational swimming pool	Visitors of the swimming pool	3 types of interventions were tested: <ul style="list-style-type: none"> Signs in supporting healthy food purchases Signs + taste testing in supporting healthy food purchases Signs + taste testing + economic incentive (30% price reduction) in supporting healthy food purchases 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Change in the proportion of healthy items sold in the intervention periods relative to pre- and post-intervention in the full sample 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Healthy items represented 41% of sales and were significantly lower than sales of unhealthy items In the full sample, sales of healthy items did not differ due to the interventions In a subsample, sales of healthy items increased by 30% when a signage + taste testing intervention was implemented. This increase was maintained when prices of healthy items were reduced by 30% and when all interventions were removed
Papies, Veling	2013	Café-style restaurant	Restaurant customers	<ul style="list-style-type: none"> Subtle environmental diet reminders <ul style="list-style-type: none"> Integrating diet-related words into the menu 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Low-calorie food choices 	Non-behavioural / Behavioural <ul style="list-style-type: none"> Diet reminders increased choices for low-calorie foods, among both chronic and current dieters
Schwartz, Riis, Elbel, Ariely	2012	Chinese fast-food restaurant (on a university campus)	Mix of college students, staff, and visitors	<ul style="list-style-type: none"> Servers ask customers if they wanted to downsize portions of three starchy side dishes. <ul style="list-style-type: none"> Participants were invited to take a half portion of their side dish. 	Non-behavioural <ul style="list-style-type: none"> Acceptance of the downsizing offer Behavioural <ul style="list-style-type: none"> Average calories served per customer 	Non-behavioural <ul style="list-style-type: none"> 14–33 percent of customers accepted the downsizing offer, and they did so whether or not they were given a nominal twenty-five-cent discount. Behavioural <ul style="list-style-type: none"> Those who accepted smaller portions did not compensate by ordering more calories in their entrées, and the total calories served to them were, on average, reduced by more than 200. Accepting the downsizing offer did not change the amount of uneaten food left at the end of the meal.

Appendix 1: *Out-of-home* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Sonnenberg, Gelsomin, Levy, Riis, Barraclough, Thorndike	2013	Hospital cafeteria	Visitors of the hospital cafeteria	<ul style="list-style-type: none"> Traffic light food labelling <ul style="list-style-type: none"> Red (unhealthy) Yellow (less healthy) Green (healthy). 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Awareness of healthy foods <p>Behavioural</p> <ul style="list-style-type: none"> Purchase of healthy foods 	<p>Non-behavioural</p> <ul style="list-style-type: none"> More respondents identified health / nutrition as an important factor in their purchase and reported looking at nutrition information <p>Behavioural</p> <ul style="list-style-type: none"> Respondents who noticed labels during the intervention and reported that labels influenced their purchases were more likely to purchase healthier items than respondents who did not notice labels
Timmerman, Brown	2012	The intervention is the group sessions. Measurements focus on eating out in general	Women 40-59 years old who eat out at least 3 times per week	<ul style="list-style-type: none"> 6 weekly 2-hour small group sessions that focused on reducing calorie and fat intake when eating out through education, behavior change strategies, and mindful eating meditations. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Diet related self-efficacy Barriers to weight management when eating out <p>Behavioural</p> <ul style="list-style-type: none"> Weight, Waist circumference Self-reported calorie and fat intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> The intervention group increased diet-related self-efficacy and had fewer barriers to weight management when eating out. <p>Behavioural</p> <ul style="list-style-type: none"> The intervention group lost more weight and had lower average daily caloric and fat intake
Vanderlee, Hammond	2014	Hospital cafeterias	Cafeteria patrons	<ul style="list-style-type: none"> The 'intervention' site featured energy (calorie), sodium and fat content on digital menu boards, as well as a health logo for 'healthier' items. The intervention site had also revised its menu items to improve the nutrient profiles. The 'control' site provided limited nutrition information at the point of sale. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Self-reported measures on noticing and using nutrition information <p>Behavioural</p> <ul style="list-style-type: none"> Self-reported measures on food choice & consumption 	<p>Non-behavioural</p> <ul style="list-style-type: none"> More respondents at the intervention site reported noticing nutrition information and using it to select their food items. <p>Behavioural</p> <ul style="list-style-type: none"> Respondents at the intervention site consumed significantly less energy, sodium, saturated fat and total fat.

Appendix 1: *Out-of-home* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Wansink, Painter, van Ittersum	2002	A faculty cafeteria at a major Midwestern university	Customers of faculty cafeteria	<p>During the Tuesday and Friday lunch of each of the six test weeks:</p> <ul style="list-style-type: none"> Two of the items were presented with a basic label (e.g., grilled chicken) Two items were presented with a descriptive label <ul style="list-style-type: none"> A mix of geographic labels, nostalgia labels, or sensory labels 'Grandma's zucchini cookies' 'Succulent Italian seafood filet' Two items were not offered 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Attitudes Intentions towards repatronage Willingness to pay <p>Behavioural</p> <ul style="list-style-type: none"> Sales 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Attitudes towards the food and the restaurant improved Intentions towards repatronage improved Willingness to pay was not directly increased <p>Behavioural</p> <ul style="list-style-type: none"> Sales increased by 27%
Wolfenden, Kingsland, Rowland, Dodds, Gillham, Yoong, Sidey, Wiggers	2015	Community sporting club canteens	Members of the sporting club canteen	<ul style="list-style-type: none"> Availability of fruit, vegetables and non-sugar sweetened beverages Used promotional strategies <ul style="list-style-type: none"> Meal deals Signs and posters Displaying products within view of consumers and at eye level Coaches recommending all players to drink water and consume fruit at half time Handing out healthy food and drink guides/factsheets to parents/players 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Purchase of fruit, vegetable and non-sugar sweetened drinks 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Clubs allocated to the intervention were significantly more likely to: <ul style="list-style-type: none"> report purchase of fruit, vegetables and non-sugar sweetened drinks

Appendix 2: *Working environment* table

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Backman, Gonzaga, Sugerman, Francis, Cook	2011	Worksite	Low-wage employees	<ul style="list-style-type: none"> Fresh fruit deliveries with enough for 1 serving per employee, 3 days a week 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Self-efficacy <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable intake Purchasing of vegetables 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Significant increase in self-efficacy toward eating 2 servings of fruit each day <p>Behavioural</p> <ul style="list-style-type: none"> Significant increase in fruit and vegetable consumption, in fruit purchases and in family vegetable purchases.
Beresford, Shannon, McLerran, Thompson	2000	Work sites (13 in total)	Employees	<ul style="list-style-type: none"> Different types of interventions combined into 1 intervention programme: '5-a-day' message (5 servings a day) was continually posted at work site, social norms, increased availability of fruits and vegetables at work sites, organisational support. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Change in fruit and vegetable intake between baseline and follow-up (measured via Food Frequency Questionnaire (FFQ)) 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Greater changes in fruit and vegetable intake occurred in the work sites compared with medium average baseline intake
Beresford, Thompson, Ziding Feng, Christianson, McLerran, Patrick	2001	Work sites with food-serving cafeterias (14 intervention, 14 control)	Employees	<ul style="list-style-type: none"> Different intervention messages following (transtheoretical) stages of change model. Start with '5 a day' message (1. precontemplation), message benefits fruits and vegetables (2. preparation), use of POP displays and incentives (phase 3), emphasise ways to adapt (new) skills in everyday life (phase 4) 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Change in fruit and vegetable intake between baseline and 2-year follow-up (FFQ) 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Self-reported intervention effect of +0.3 servings fruits and vegetables (intervention group vs control group) Objective intervention effect of +0.16 servings fruit and vegetables (via plate observations at checkout)
Engbers, Van Poppel, A Paw, Van Mechelen	2006	Governmental companies (1 intervention, 1 control)	Employees	<ul style="list-style-type: none"> Intervention consists of product information (kcal in products translated into number of minutes needed to burn those calories via physical activity) 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Social support, self-efficacy and attitudes <p>Behavioural</p> <ul style="list-style-type: none"> Intake of fruit, vegetables and fat 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Social support, self-efficacy and attitudes positively changed <p>Behavioural</p> <ul style="list-style-type: none"> Intervention was ineffective in changing intake of fruit, vegetables and fat

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Fiske, Cullen	2004	Lounges of teachers	Employees (teachers)	<ul style="list-style-type: none"> Promotional materials: 1. Labels with price stickers for low-fat items, 2. Labels + large (motivational) signs Increased availability of low-fat items in vending machines (3 new low-fat items in designated area, in addition to 5 low-fat items that were already present) 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Sales of low-fat items in vending machines 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Most low-fat items sold in condition of increased availability + labels + large signs (3.2 per week vs. 2.6 in condition increased availability + labels vs. 2.5 control)
Franco, De Castro, Wolkoff	2013	Worksites	Employees	<ul style="list-style-type: none"> Elements of the intervention (historical control group): 1. investment in making the concessionaire owner and the nutritionist more aware of the importance of promoting fruit and vegetable intake. Suggestions were provided on how to incorporate more fruit and vegetables in food items in the canteen. 2. Food tastings with fruit and vegetable dishes, folders containing information about the benefits of consuming fruits and vegetables. 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable intake 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable consumption increased among employees exposed to an intervention focused on the promotion of these foods with 53.6 g (38%), corresponding to an increase of 0.66% of a portion of FV.
French, Harnack, Hannan, Mitchell, Gerlach, Toomey	2010	Garages	Metropolitan transit workers	<ul style="list-style-type: none"> Multiple components of intervention programme: increase in physical activity facilities, increase in healthy choices in vending machines, lower prices on healthy choices in vending machines, group behavioural programmes. 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> BMI Energy intake Fruit and vegetable intake 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> In the intervention group: <ul style="list-style-type: none"> No significant change in BMI Significant decrease in energy intake Significant increase in fruit and vegetable intake No significant change in unhealthy choices (e.g. sweets)

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Gans, Markham-Risica, Dulin-Keita, Mello, Dawood, Strolla, Harel	2015	Worksites	Employees	<ul style="list-style-type: none"> 3 intervention groups: 1. Non-Tailored written information (NT), which received three separate mailings of traditional nutrition education and other wellness brochures. 2. Tailored written information (TW), which received three separate mailings of written materials tailored for participants; 3. Tailored written information + tailored video (TW+ TV), which received three separate tailored videotapes (DVDs) plus the tailored written materials. 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fat intake Fruit and vegetable intake 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> The tailored interventions were more likely to decrease fat intake and increase F&V intake than the non-tailored intervention, and that for the most part, the TW+ TV group was the stronger of the two tailored interventions, especially at the longer term follow-up
Geaney, Harrington, Fitzgerald, Perry	2011	A public sector workplace setting (hospital)	Those who consumed at least one main meal in the hospital staff canteen daily	<ul style="list-style-type: none"> Provide nutritious food while reducing sugar, fat and salt intakes 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Intakes of total sugars, (saturated) fat and salt 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Reported mean intakes of sugar, (saturated) fat and salt were significantly lower in the intervention hospital, adjusted for age and gender 72% of respondents, compared with 42% in the non-intervention hospital, complied with the recommended under-3 daily servings of food high in fat and sugar 43% of respondents exceeded the recommended salt intake of 4–6 g/d, compared with 57% in the non-intervention hospital
Holdsworth, Raymond, Haslem	2004	Worksites	Employees	<ul style="list-style-type: none"> Intervention is the implementation of the Heartbeat Award (HBA) scheme, a programme that provides information, reminders, guidelines and reinforcement to promote healthier food choices 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Intake of 20 food items (e.g. fruit consumption, consumption low-fat milk), both at work and at home 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Pre- vs. post-test, the intervention had a positive impact on 4 of the 20 food items studied: more fruit & low-fat milk products and reduction in sweet pudding and fried food

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Krogholm, Bredsholff, Alinia, Christensen, Rasmussen, Dragsted	2010	Worksites	Employees	<ul style="list-style-type: none"> Intervention consists of provision of free fruit at worksites 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fruit intake Measurement 10 flavonoids (objective biomarkers of fruit intake) 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Increase in self-reported fruit intake in intervention group, compared to control group Measurements of flavonoids (objective biomarkers of fruit intake) are consistent with self-reported increases in fruit intake
Kushida, Murayama	2014	Worksite canteens	Employees	<ul style="list-style-type: none"> Intervention based on Transtheoretical Model (TTM): based on stage of change participants read different types of information message in table tents + In the intervention group posters were placed in the canteen about locally grown vegetables and social support of local farmers. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Stage of change <p>Behavioural</p> <ul style="list-style-type: none"> Vegetable intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> The stage of change did not significantly differ <p>Behavioural</p> <ul style="list-style-type: none"> The environmental intervention caused an increase in vegetable consumption
Lassen, Hansen, Trolle	2007	Worksite canteens in Denmark	Employees having lunch at the worksite canteens	<ul style="list-style-type: none"> Two meal serving systems <ul style="list-style-type: none"> Buffet style with a fixed price for a varied number of dishes A la carte style with a separate price for each item on the menu 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Energy intake Macronutrient composition Fruit and vegetable intake Lower energy density of the food 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> No association between the meal serving system and energy intake or macronutrient composition Eating at buffets was associated with an increased intake of fruit and vegetables and a lower energy density of the food for both genders
Lassen, Thorsen, Sommer, Fagt, Trolle, Biltoft-Jensen, Tetens	2011	Worksites	Employees	<ul style="list-style-type: none"> Intervention measures differed per intervention worksite and control worksite (e.g. free fruit programme, food workshop), with the exception of informational material on nutrition which was provided at all intervention worksites. 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fat intake Fibre intake Fruit and vegetable intake 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Decrease of fat intake in the intervention group Increase in fruit and vegetable intake in the intervention group; greater effect for fruit Increase in fibre intake in the intervention group

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Lassen, Ernst, Poulsen, Andersen, Hansen, Biltoft-Jensen, Tetens	2012	Financial worksite	Employees of the worksite	<ul style="list-style-type: none"> Canteen Take Away (CTA): providing employees with healthy ready-to-eat meals to bring home to their families 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Energy density Vegetable intake 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Overall dietary quality (energy density of the food; excluding beverages) was significantly lower on days consuming CTA meals Increased vegetable intake
Lassen, Beck, Leedo, Andersen, Christensen, Mejborn, Thorsen, Tetens	2013	Worksites	Employees	<ul style="list-style-type: none"> Use of 'keyhole' label on food items which are identified as healthy 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fat intake Fruit and vegetable intake Energy intake 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Mean decrease in lunch intake of fat from 40 E% to 21 E% Increase in mean fruit and vegetable content from 35 g/100 g to 45 g/100g. Mean energy intake decreased significantly from 2.5 MJ to 1.8 MJ per lunch meal eaten
Lassen et al.	2014	Worksite canteen	Employees	<ul style="list-style-type: none"> Healthy labelled meals in the intervention worksite 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Food satisfaction <p>Behavioural</p> <ul style="list-style-type: none"> Nutrient composition of the consumed lunch meals and plate waste (based on a validated digital photographic method) 	<p>Non-behavioural</p> <ul style="list-style-type: none"> No significant changes were seen with regard to food satisfaction and plate waste. <p>Behavioural</p> <ul style="list-style-type: none"> Intervention showed mean decrease in energy density in the consumed meals.

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Lassen, Beck, Leedo, Andersen, Christensen, Mejborn, Thorsen, Tetens	2014	Worksite canteens	Employees	<ul style="list-style-type: none"> Use of 'keyhole' label on food items which are identified as healthy 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Food satisfaction <p>Behavioural</p> <ul style="list-style-type: none"> Energy intake Plate waste 	<p>Non-behavioural</p> <ul style="list-style-type: none"> No significant effects of intervention on food satisfaction <p>Behavioural</p> <ul style="list-style-type: none"> Mean decrease in energy density in the consumed meals from 561 kJ/100 g at baseline to 368 and 407 kJ/100 g at end-point and follow-up, respectively (P < 0.001) No significant effects of intervention on plate waste Results of the half-year follow-up measurement found that the nutritional improvements of the lunch meals were sustained
Levy, Riis, Sonnenberg, Barraclough, Thorndike	2012	Cafeteria	Employees of a large hospital	<ul style="list-style-type: none"> A traffic light-style color-coded labelling system <ul style="list-style-type: none"> Healthy items (labelled green) Unhealthy items (labelled red) 'Choice architecture' - physically rearranging certain cafeteria items <ul style="list-style-type: none"> Green-labelled items more accessible Red-labelled items less accessible 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Food purchases 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Labelling decreased all employees' red item purchases and increased green purchases Choice architecture further decreased red purchases after the labelling
Lowe, Tappe, Butryn, Annunziato, Coletta, Ochner, Rolls	2010	Worksite cafeterias	Employees	<ul style="list-style-type: none"> 2 conditions: 1. Intervention with only environmental changes (i.e. introduction of 10 new low-energy-density food items and provision of labels for all food items with information on kcal, nutritional content and energy density), 2. Intervention with environmental changes + pricing incentives (15-25% discounts on low-energy-density food items) + 4 group sessions in which participants learned more on energy density. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Total energy intake as a result of cafeteria intake 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> No difference in energy intake between the two groups of participants

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Mackison, Mooney, Macleod, Anderson	2016	Worksites	Employees	<ul style="list-style-type: none"> The EatSMART intervention: <ul style="list-style-type: none"> A reduced price Healthy meal combination Promotions (stickers, posters, weekly and daily point of sale menus, content for electronic bulletins, etc. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Consumer evaluation Intention to continue with intervention delivery <p>Behavioural</p> <ul style="list-style-type: none"> Sales data 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Consumers reported improved value for money and quality. Both sites reported an intention to continue the intervention delivery. <p>Behavioural</p> <ul style="list-style-type: none"> Sales data indicated that the uptake of promoted items varied by week (range 60–187 items) and by site.
Patsch et al.	2016	Hospital cafeterias	Hospital employees	<ul style="list-style-type: none"> During baseline phase, healthy versions of existing unhealthy items were introduced. The intervention phase included marketing and price incentives/disincentives for healthy and unhealthy items, with a 35% price differential. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Average and proportional change in sales and impact on financial outcomes 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Significant impact was demonstrated on all burger sales in the desired direction during intervention. Cafeteria gross sales and burger profit ($P < .001$) increased at both cafeterias.
Sorensen, Barbeau, Stoddard, Hunt, Kaphingst, Wallace	2005	Worksites	Employees	<ul style="list-style-type: none"> The intervention programme consisted of multiple components: participatory strategies, social context approaches, small-group discussions, health fairs, behavioral self-assessments with feedback. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Increase in fruit and vegetable consumption Reduction red meat consumption Increase multivitamin use Increase physical activity 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Employees at intervention worksites improved more for every outcome than did employees at control worksites (but only statistically significant for multivitamin use and physical activity).

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Steenhuis, Van Assema, Van Breukelen,	2004	Worksite canteens	Employees	<ul style="list-style-type: none"> Implementation of educational programme consisting of information on healthy nutrition via brochures, table tents, self-help manual and posters (vs. control group). Implementation of food supply programme which increased the availability of low-fat products and fruit and vegetables in worksite canteens. Labelling programme: labelling of low-fat products Conditions: 1. Only educational programme, 2. food supply + educational programme, 3. Labelling + educational programme, 4. Control. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Reduction fat intake Increase in fruit and vegetable consumption 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> For the whole study population, no significant effects on consumption was found for any of the programs. A beneficial and significant treatment effect of labelling on total fat intake was found for respondents who believed they ate a high-fat diet Sales data revealed a significant effect of labelling on desserts, but not for the other products.
Stites, Singletar, Menasha, Cooblall, Hantula, Axelrod, Figueredo, Phipps	2015	An urban hospital	Employees of the hospital	<ul style="list-style-type: none"> Mindful eating training Online pre-ordering Price discounts toward lunch purchases 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Mindful eating behaviors Intention to use pre-ordering system if offered in the future <p>Behavioural</p> <ul style="list-style-type: none"> Healthier lunch purchases <ul style="list-style-type: none"> Kilocalories Grams of fat 	<p>Non-behavioural</p> <ul style="list-style-type: none"> At the end of the study, a moderate increase in participants' mindful eating behaviours was found. The majority of participants (92%) said they would use the pre-ordering system if offered in the future. <p>Behavioural</p> <ul style="list-style-type: none"> The treatment group purchased lunches with an average of 144.6 fewer kcal and 8.9 fewer grams of fat Participants also decreased the average number of calories in their meals by 114.6 kcal per lunch and the average grams of fat by 5.4 per lunch compared to baseline.

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Thorndike, Riis, Levy	2016	Hospital cafeteria	Employees of the hospital who used their platinum plate card	<ul style="list-style-type: none"> All items labelled green (healthy), yellow (less healthy), or red (unhealthy) a monthly letter with social norm feedback about healthy food purchases, comparing employee to 'all' and to 'healthiest' customers (feedback-only) a small financial incentive for increasing green purchases (feedback-incentive) 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Green-labelled purchases 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> The percentage increase in green-labelled purchases was larger in the feedback-incentive group compared to control The rate of increase in green-labelled purchases was higher in both feedback-only and feedback-incentive compared to control. At the end of the study, there was no effect of both interventions anymore.
Thunström, Nordström & Shogren	2016	Lunch restaurant at industrial company	Employees	<ul style="list-style-type: none"> Three meals were listed on a whiteboard-style menu where the subjects entered the restaurant. The order in which the healthy meal was listed changed each day, listed either first, second or third throughout the study period. The Keyhole label was displayed in two ways: (1) highlighting the healthy meal on the daily whiteboard-style menu inside and outside the restaurant, and (2) highlighting the healthy meal on the menu sent to the e-mail list. 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Restaurant sales 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> The estimated coefficient for the dummy variable indicating that the restaurant offers a healthy-labelled meal is both small and not statistically significant.
Van Berkel, Boot, Proper, Bongers, Van der Beek	2014	Worksites	Employees	<ul style="list-style-type: none"> Intervention based on mindfulness training. 8 weeks, each week had a different mindfulness activity (e.g. meditation, yoga balance) 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Physical activity in leisure time Fruit and vegetable intake Sedentary behavior at work 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> No significant effects of the mindfulness intervention were found

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Van Kleef, Otten, van Trijp	2012	Hospital staff restaurant	Hospital staff	<ul style="list-style-type: none"> Shelf arrangement (i.e. accessibility) <ul style="list-style-type: none"> Putting healthy snacks at higher shelves Assortment structure (i.e. availability) Offering an assortment that either included 25% or 75% healthy snacks 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Sales of (un)healthy and total snacks 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> The lab and field study both showed a higher probability of healthy snack choice when 75% of the assortment consisted of healthy snacks No differences were observed regarding shelf display location Sales of unhealthy and total snacks were not impacted by manipulations
Vanderlee, Hammond	2014	Hospital cafeterias	Employees	<ul style="list-style-type: none"> The 'intervention' site featured energy (calorie), sodium and fat content on digital menu boards, as well as a health logo for 'healthier' items. The intervention site had also revised its menu items to improve the nutrient profiles. The 'control' site provided limited nutrition information at the point of sale. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Energy intake Sodium intake Fat intake 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> At the intervention site significantly less energy (-21 %, P < .001), sodium (-23%, P < .001), saturated fat (-33%, P<.001) and total fat (-37 %, P<.001) was consumed compared to the control site.
Vermeer, Steenhuis, Leeuwis, Heymans, Seidell	2011	Worksite cafeterias	Employees of the worksite	<ul style="list-style-type: none"> Offering a small portion size of hot meals in addition to the existing size <ul style="list-style-type: none"> Proportionally priced (that is, the price per gram was comparable regardless of the size) Value size pricing was employed. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Sales 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> The ratio of small meals sales in relation to large meals sales was 10.2% No effect of proportional pricing was found 19.5% of the participants who had selected a small meal often-to-always purchased more products than usual in the worksite cafeteria

Appendix 2: Working environment table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Vyth, Steenhuis, Heymans, Roodenburg, Brug, Seidell	2011	Worksites	Employees	<ul style="list-style-type: none"> Use of nutrition logo ('ik kies bewust') in intervention group 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Behavioral determinants of food choice (ie, attitude, self-efficacy, and intention) Intention to eat healthier Paying attention to product information <p>Behavioural</p> <ul style="list-style-type: none"> Sales Self-reported consumption of foods with logo. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> No significant differences in behavior determinants between the intervention and control groups were found. Intention to eat healthier and paying attention to product information were positively associated with self-reported consumption of foods with the Choices logo. <p>Behavioural</p> <ul style="list-style-type: none"> No nutritionally meaningful intervention effects were found in the sales of sandwiches, soups, snacks, fruit, and salads. The intervention did not have a significant effect on employees' lunchtime food choices.
Wilson, Bogomolova, Buckley	2015	A university-based research institute	Staff members and research students	<ul style="list-style-type: none"> A sign with the message 'Pick me! I am low calorie' was then placed on the low-fat milk 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Choice for low-fat milk vs. full-cream milk 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> No effects on healthier milk choices Sub-analysis indicate an increase in selection of both milk types, but with a greater increase in low-fat milk selection. However, after two weeks milk selection returned towards baseline during the rest of the intervention period

Appendix 3: *Online (website-based) table*

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Alexander et al.	2010	The Web-based MENU programme	Members aged 21 to 65 years from 5 health plans	<ul style="list-style-type: none"> The Web-based MENU programme, based on principles from Social Cognitive Theory, Transtheoretical Model, and Health Belief Model. The tailoring included: <ul style="list-style-type: none"> Motivation to change Specific motives for changing Barriers to changing Cues to action One group received motivational interviewing-based counseling via e-mail 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Programme satisfaction <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Overall programme satisfaction was high <p>Behavioural</p> <ul style="list-style-type: none"> Overall baseline mean fruit and vegetable intake was 4.4 servings per day. Average servings increased by more than 2 servings across all study arms The greatest increase (+2.8 servings) among participants of arm 3 (+motivational interviewing via e-mail) compared with control
Armitage	2015	Online (via e-mail)	Employees	<ul style="list-style-type: none"> Participants received an e-mail with the statement ('We want you to plan to have an extra portion of fruit each day because forming plans has been shown to increase fruit intake'). Those in the intervention group then got a specific implementation intention instruction in which they were asked to formulated their plans as detailed as possible. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Metacognitive processing: Awareness of standards, self-monitoring, self-regulatory effort <p>Behavioural</p> <ul style="list-style-type: none"> Fruit intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Participants who formed implementation intentions engaged in significantly more metacognitive processing at follow-up than did participants in the control condition <p>Behavioural</p> <ul style="list-style-type: none"> Participants who formed implementation intentions ate significantly more fruit at follow-up than did participants in the control condition

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Blomfield et al.	2014	Online support weight loss	Adult men with a body mass index (BMI) of 25–40 kg/m ²	<ul style="list-style-type: none"> Three-arm weight loss RCT grounded in Social Cognitive Theory; (1) Resources: gender-tailored weight loss resources (DVD, handbooks, pedometer, tape measure); (2) Online: resources plus website and e-feedback, (3) Wait-list control. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Primary outcome (weight) Secondary out-comes (dietary intake, portion size) 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Energy, total fat, saturated fat, and carbohydrate intakes decreased in the online group, which differed significantly from controls at 3- and 6-month follow-up ($P < 0.05$). There was an increase in %energy from core foods and decrease in %energy from energy-dense nutrient-poor foods ($P < 0.05$) that was significantly different compared to controls at 3 and 6 months ($P < 0.05$).
Buller et al.	2008	The 5 a Day, the Rio Grande Way website	755 adults from a rural area (65% Hispanic, 9% Native American, 88% female)	<ul style="list-style-type: none"> The 5 a Day, the Rio Grande Way website contained: <ul style="list-style-type: none"> Health benefits of FV Instruction on buying, storing, preparing FV, increasing FV in the family diet (with children) Advice on gardening Recipes that included FV Information on FV in season A community directory of organisations that sold FV or supplies for gardening in the region Listing of health resources on the Internet related to FV 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Website use Fruit and vegetable intake 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Change in daily intake on a food frequency questionnaire and single item was in the expected direction but significant for the single item. Website use was low and variable, but it was associated positively with fruit and vegetable intake A nutrition website may improve FV intake, perhaps only when they are used enough.
Cameron et al.	2015	online theory-based intervention to promote healthy lifestyle behaviours	Undergraduate students	<ul style="list-style-type: none"> Repeat trial of study by Epton et al. (2014) The intervention consisted of a self-affirmation manipulation, health messages based on the theory of planned behaviour and implementation intention tasks. Participants were followed-up 1 and 6 months after starting university 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Portions of fruit and vegetables Metabolic equivalent of tasks (physical activity) Units of alcohol Smoking status. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Despite successfully increasing levels of engagement, the intervention did not have a significant effect on the primary outcome measures. The relatively weak effects of the intervention, found in both the original and repeat trials, may be due to the focus on multiple versus single health behaviours.

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Collins et al.	2011	The Self-Help, Exercise and Diet using Information Technology (SHED-IT)	Overweight/obese men of the campus community of the University of Newcastle	<ul style="list-style-type: none"> 15min technical orientation on the free online website Calorie KingTM (www.calorieking.com.au), explaining how they were to use the tools and information the website provides to self-monitor their diet and physical activity behaviours. The Calorie King website was used as an educational tool to assist men in understanding the concept of energy balance and allowed them to estimate the contribution of food intake and physical activity to changes in energy balance. Use of the website also provided an opportunity for feedback by study staff on how to improve their dietary intake and physical activity behaviours, and has been described previously 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Portion size Energy intake Fat intake Saturated fat intake Intake of energy-dense items Intake of nutrient-poor items Fibre intake Alcohol intake 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> The average portion size decreased significantly over time with no differences between groups (Internet vs. Information) While both groups reduced mean daily energy intake, there was a trend towards a greater reduction in the Internet group. Both groups reduced percentage of energy from fat, saturated fat and energy-dense/nutrient-poor items, with no change in dietary fibre or alcohol
Couper et al.	2010	The MENU tailored Web programme	Study subjects, aged 21 to 65 years, recruited from 5 health care systems	<ul style="list-style-type: none"> The Web-based MENU programme, based on principles from Social Cognitive Theory, Transtheoretical Model, and Health Belief Model. The tailoring included: <ul style="list-style-type: none"> Motivation to change Specific motives for changing Barriers to changing Cues to action One group received motivational interviewing-based counseling via e-mail 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Online participant engagement <ul style="list-style-type: none"> Web pages visited Time spent online with the intervention materials <p>Behavioural</p> <ul style="list-style-type: none"> Dietary intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Tailored interventions exhibited significantly more engagement than the untailored arm Engagement was significantly associated with completion of follow-up surveys <p>Behavioural</p> <ul style="list-style-type: none"> Web pages visited was also significantly positively associated with mean increase in fruit and vegetable consumption

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
De Bruijn, Visscher, Mollen	2015	Internet-based study	Dutch adults	<ul style="list-style-type: none"> Messages combining information on intake of others (low vs high intake) with information about positive or negative outcomes of (in)sufficient fruit intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Motivation to consume sufficient fruit <p>Behavioural</p> <ul style="list-style-type: none"> Fruit intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Those already consuming sufficient fruit and receiving negative information about insufficient fruit intake increased their motivation to consume sufficient fruit immediately, but not at 1-week follow-up <p>Behavioural</p> <ul style="list-style-type: none"> Those who read positive information about sufficient fruit intake reported higher fruit consumption than those who read negative information about insufficient fruit intake. This was stronger in those already consuming sufficient fruit. There were no effects of descriptive norm information.
Epton et al.	2014	Online health behaviour intervention	University students	<ul style="list-style-type: none"> Intervention versus control group Participants assigned to the intervention arm were asked to complete a profile page that contained the self-affirmation manipulation. After completing their profile, participants were asked to sign in to the website and view the online resources, which included theory-based messages (i.e., text, videos and links to further information) relevant to each of the four targeted health behaviours and a planner that contained instructions to form implementation intentions. Intervention participants were emailed and invited to download a smartphone app. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Portions of fruit and vegetables Metabolic equivalent of tasks (physical activity) Units of alcohol Smoking status. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> The intervention had a statistically significant effect on smoking status at 6-month follow-up, with fewer smokers in the intervention arm (8.7%) than in the control arm (13.0%; Odds ratio = 1.92, p = .010). There were no significant intervention effects on the other primary outcomes (physical activity, alcohol or fruit and vegetable consumption) at 6-month follow-up.

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Fielden, Silience, Little, Harris	2016	Online self-affirmation	Low SES mothers and undergraduate students	<ul style="list-style-type: none"> Online self-affirmation 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable consumption 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Self-affirmed participants reported consuming significantly more portions of fruit and vegetables. The effect was greatest amongst lowest baseline consumers.
Franko et al.	2008	MyStudentBody.com-Nutrition (MSB-N)	Students from six universities in the US	<ul style="list-style-type: none"> MyStudentBody.com-Nutrition (MSB-N) is an interactive internet-based nutrition and physical activity education programme for college students and is comprised of: <ul style="list-style-type: none"> Three information links (Ask the Expert, Student Voices, College News) Rate Myself assessment (questions used to provide feedback to the user) Four main topic pages (Nutrition 101, Eating on the Run, Weighing In, Fitness), contains: <ul style="list-style-type: none"> Text and audio information Interactive activities Goal-setting areas Resources 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Motivation to change eating behaviors Social support Self-efficacy Attitude towards exercise <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable intake Physical Activity 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Both experimental groups improved their motivation to change eating behaviors and were also more likely to increase their social support and self-efficacy for dietary change Experimental groups also improved their attitude toward exercise <p>Behavioural</p> <ul style="list-style-type: none"> Group I (MSB-N) and II (MSB-N Booster: providing access to the website for an additional time after the initial intervention period) increased their fruit and vegetable intake by .33 and .24 servings, respectively, relative to the control group at post-test. Experimental groups did not increase their physical activity

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Genugten et al.	2012	Computer-tailored intervention	Overweight adults	<ul style="list-style-type: none"> The first module: <ul style="list-style-type: none"> Commitment to prevent weight gain Identifying and setting a goal Making a plan for change Individualised feedback on behaviour Guided goal setting Implementation plan The second and third modules: <ul style="list-style-type: none"> Evaluation of progress Feedback on past week performance Support adaptation of plans (when attempts were unsuccessful) The fourth module: <ul style="list-style-type: none"> Promoting sustained self-regulation of body weight without the programme Tool to monitor/evaluate body weight Guidelines for long term WGP Positive reinforcement for maintenance At the end, a personalised contract was signed, which included personal goals, actions plans, weight status, etc. The website contained recipes, a peer-to-peer forum and links to useful websites 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Evaluation of the intervention <p>Behavioural</p> <ul style="list-style-type: none"> Weight-related anthropometric measures (BMI, skin folds and waist circumference) Energy balance-related behaviors (PA, fat intake, snacks and sweetened drinks) 	<p>Non-behavioural</p> <ul style="list-style-type: none"> The first module of the tailored intervention was visited by almost all participants but 15% completed all modules, while 46% completed the three modules of the general information intervention. The tailored intervention was considered more personally relevant, containing more new information and having longer texts <p>Behavioural</p> <ul style="list-style-type: none"> BMI remained stable over time and that there were no significant differences between the groups Similar results were found for waist circumference and skin folds Amount of PA increased and intake of fat, snacks & sweetened drinks decreased, but no differences between groups

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Goodman et al.	2016	Online intervention	Ontario adults between 18-25 years	<ul style="list-style-type: none"> Using a pre-post design, participants were randomly assigned to intervention or control groups. The intervention group watched a video, received online information and tracked intake of vitamin D using a mobile application for 12 weeks. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> vitamin D knowledge and perceptions <p>Behavioural</p> <ul style="list-style-type: none"> vitamin D intake blood concentrations of vitamin D 	<p>Non-behavioural</p> <ul style="list-style-type: none"> The increase in vitamin D knowledge and perceived importance was significantly higher in the intervention than control group. <p>Behavioural</p> <ul style="list-style-type: none"> Mean vitamin D intake in the sample increased significantly from pre-test to post-test and increased significantly more in the intervention than control group after controlling for gender and education. Mean blood vitamin D3 increased significantly from pre-test to post-test, but did not differ significantly between groups.
Huang et al.	2006	Online food shopping over the Internet	Consumers from Sydney, New South Wales, Australia	<ul style="list-style-type: none"> A fully automated computerised system that provided real-time advice tailored to the consumers' specific purchases recommending foods lower in saturated fat 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Saturated fat Costs of food bought 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> The amount of saturated fat in the foods purchased by the intervention group was 0.66% lower than in the control The effects of the intervention were sustained over consecutive shopping episodes There was no difference in the average cost of the food bought by each group

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Johnston et al.	2012	Club One Island is an interactive weight loss community delivered via Linden Lab's Second Life	Overweight people	<ul style="list-style-type: none"> Club One Island provides participants with a professional team, education, and specialised tools to help them overcome individual barriers to weight loss, along with virtual world and email access to instructors. NB. For more information, see paper. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> PA self-efficacy Weight loss self-efficacy <p>Behavioural</p> <ul style="list-style-type: none"> Weight loss Physical Activity Fruit and vegetable consumption 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Improvements are found in both PA self-efficacy and weight loss self-efficacy for the virtual-world group. A group × time interaction for PA self-efficacy and weight loss self-efficacy <p>Behavioural</p> <ul style="list-style-type: none"> Both groups lost a significant amount of weight; no significant differences between groups We detected a significant group × time interaction for moderate and vigorous PA, PA self-efficacy, fruit and vegetable consumption and weight loss self-efficacy
Kattelmann et al.	2014	Web-delivered intervention (Young Adults Eating and Active for Health)	College students	<ul style="list-style-type: none"> 21 mini-educational lessons and e-mail messages (called nudges) were developed focusing on: <ul style="list-style-type: none"> eating behaviour physical activity stress management healthy weight management. Nudges were short, frequent, entertaining, and tailored to each behaviour stage. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Stage of change for FVI and PA <p>Behavioural</p> <ul style="list-style-type: none"> BMI Weight Waist circumference Fruit- and Vegetable Intake Vigorous physical activity Fat intake Self-instruction and regulation for mealtime behaviour Hours of sleep 	<p>Non-behavioural</p> <ul style="list-style-type: none"> At post intervention, a greater proportion of experimental participants were in the action/maintenance stages for FVI and physical activity than control. <p>Behavioural</p> <ul style="list-style-type: none"> No differences between experimental and control participants in BMI, weight, and waist circumference Small improvements in FVI, vigorous physical activity in females, fat intake, self-instruction and regulation for mealtime behaviour, and hours of sleep at post intervention, but improvements were not maintained at follow-up.

Appendix 3: Online (website-based) table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Kerr et al.	2016	Text messaging and mobile food record App (mFR)	Young adults	<ul style="list-style-type: none"> A three-arm, parallel, randomised control trial was conducted. After baseline assessments, participants were randomised to one of three groups: A) dietary feedback and weekly text messages, B) dietary feedback only or C) control group. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Dietary intake: changes in serves of fruits, vegetables, energy-dense nutrient-poor (EDNP) foods and sugar-sweetened beverages (SSB). Body weight 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Overall, no changes in food group serves for either intervention groups were observed. An unanticipated outcome was that tailored dietary feedback only resulted in a decrease in EDNP foods in men and SSB in women, together with a reduction in body weight.
LaChausse	2012	My Student Body (MSB)	Undergraduate students	<ul style="list-style-type: none"> MSB-Nutrition programme (an on-campus weight management course) comprises: <ul style="list-style-type: none"> 4 RateMyself assessments (to provide individual feedback to the user) 3 information links (Ask the Expert, Student Voices, College News) 4 main learning modules (Nutrition 101, Eating on the Run, Weighing In, Fitness) 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Stress Fruit and vegetable self-efficacy Exercise self-efficacy <p>Behavioural</p> <ul style="list-style-type: none"> Fruit and vegetable consumption Exercise behaviour Weight loss 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Compared with the on-campus course and a comparison group, the MSB-Nutrition programme reduced stress, and increased fruit and vegetable self-efficacy but had no significant effect on students' exercise self-efficacy <p>Behavioural</p> <ul style="list-style-type: none"> Compared with the on-campus course and a comparison group, the MSB-Nutrition programme increased fruit and vegetable consumption but had no significant effect on students' exercise behavior, or weight loss.

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Lawrence, O'Sullivan, Parslow, Javaid, Adams, Chambers, Kos, Verbruggen	2015	Online response inhibition training	Adults who were predominantly overweight or obese	<ul style="list-style-type: none"> Four 10-min sessions of either active or control go/no-go training in which either high-energy density snack foods (active) or non-food stimuli (control) were associated with no-go signals. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Liking of high-energy density foods Evaluation training <p>Behavioural</p> <ul style="list-style-type: none"> Food consumption Weight Daily energy intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Participants in the active relative to control condition showed significant reduction in rated liking of high-energy density (no-go) foods from the pre- to post-intervention week. Excellent rates of adherence (97%) and positive feedback about the training. <p>Behavioural</p> <ul style="list-style-type: none"> Participants in the active relative to control condition showed significant weight loss, reductions in daily energy intake from the pre- to post-intervention week. No changes in self-reported daily snacking frequency. At longer-term follow-up, the active group showed significant reductions in self-reported weight at six months, whilst both groups reported significantly less snacking at one- and six-months.
Livingstone et al.	2016	Internet-based personalised nutrition intervention	General population	<ul style="list-style-type: none"> Participants were randomly assigned to receive conventional dietary advice [control; level 0 (L0)] or PN advice on the basis of current diet [level 1 (L1)], diet and phenotype [level 2 (L2)], or diet, phenotype, and genotype [level 3 (L3)]. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> consumption of a Mediterranean diet 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> MedDiet scores at month 6 were greater in individuals randomly assigned to receive PN (L1, L2, and L3) than in controls (P = 0.002). There was no significant difference in MedDiet scores at month 6 between PN advice on the basis of L1 compared with L2 and L3. However, differences in MedDiet scores at month 6 were greater in L3 than in L2 (P = 0.029).

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Mouttapa et al.	2011	Personal Nutrition Planner (PNP), an online nutrition intervention tool	Female university staff	<ul style="list-style-type: none"> PNP online produces individualised nutrition feedback based on initial online assessment. Including weekly e-mail reminders. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Opinions regarding intervention <p>Behavioural</p> <ul style="list-style-type: none"> Dietary intake frequencies Weight loss 	<p>Non-behavioural</p> <ul style="list-style-type: none"> On a scale of 1-5, mean ratings of the PNP programme ranged from 3-4 <p>Behavioural</p> <ul style="list-style-type: none"> Relative to the control group, the treatment group increased dairy intake frequency across the 3 assessments Weight loss in the treatment group was significantly higher than in the control group (for participants who wanted to lose weight)
Neuenschwander et al.	2013	Web-based nutrition education	Low-income adults	<ul style="list-style-type: none"> The web-based group received three nutrition education lessons (eg, fruits and vegetables, Nutrition Facts label reading, and whole grains). Lessons were developed using Kolb's Learning Styles and Experiential Learning Model. 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fruit, vegetable, whole-grain intake, Nutrition Facts label use, breakfast, and meal-planning frequency 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Most nutrition-related behaviour outcomes (eg, fruit, vegetable, whole-grain intake, Nutrition Facts label use, breakfast, and meal-planning frequency) improved significantly from pre to post within both groups, meaning that each intervention was effective. When these nutrition-related behavior improvements were compared between groups, the changes were statistically equal, except for one question about use of the Nutrition Facts label

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Oenema et al.	2008	http://www.gezondlevencheck.nl	Dutch adults aged 30 years or over who had Internet skills	<p>http://www.gezondlevencheck.nl is a website with tailored information modules on:</p> <ul style="list-style-type: none"> ▪ Saturated fat intake & PA <ul style="list-style-type: none"> • awareness of personal risk behaviour through personal and normative feedback • current behavior compared with previous performance • personally tailored suggestions on how to reduce saturated fat intake or increase PA <ul style="list-style-type: none"> - Who wants to change: <ul style="list-style-type: none"> - tailored information to increase self-efficacy - implementation intentions - Who doesn't want to: <ul style="list-style-type: none"> - strengthen attitude and motivation to change ▪ Smoking cessation <ul style="list-style-type: none"> • enhance motivation to quit by • increasing positive outcome expectations of quitting • Feedback about social, physical, and self-evaluative outcomes of quitting • Increase self-efficacy to refrain from smoking <ul style="list-style-type: none"> - Individualised advice on nicotine replacement - selected skills to cope with risk situations • Follow-up module <ul style="list-style-type: none"> - feedback was provided on current smoking status and progression on relevant psychological factors. ▪ If applicable, referred to the motivational or self-efficacy enhancing parts 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> ▪ Saturated fat intake ▪ Physical activity (PA) ▪ Smoking cessation 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> ▪ The intervention resulted in: <ul style="list-style-type: none"> • a significantly lower self-reported saturated fat intake • a higher likelihood of meeting the PA guidelines among those who were insufficiently active at baseline ▪ no significant effects for self-reported smoking status

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Patrick et al.	2011	Weekly tailored Web modules	Overweight/obese men	<ul style="list-style-type: none"> The intervention was based primarily on social cognitive theory and also informed by the behavioral determinants model The intervention was designed to influence factors, such as goal setting, use of behavioural skills, and increasing social support and self-efficacy. The intervention consisted of three components, an initial computerised assessment to tailor recommendations for behavioural targets, weekly Web-based learning activities, and individualised feedback on their progress. 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Saturated fat Grams of fiber Fruit/vegetable Calories Walking behavior BMI Weight Waist circumference 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> At 12 months compared to controls, intervention men decreased percent of energy from saturated fat and increased grams of fiber and fruit/vegetable servings per 1.000 kcal and walked 16 min more a day No between-group differences in body mass index (BMI), weight, or waist circumference were seen, but among completers, men in the highest tertile of the intervention had lower weight, BMI and waist circumference compared to men who participated less often.
Plotnikoff, McGarnar, Wilson, Loucaides	2005	Worksites	Employees	<ul style="list-style-type: none"> E-mail intervention (12 weeks); weekly message with combined physical activity and nutrition message (messages based on Theory of Planned Behavior, Protection Motivation Theory, Transtheoretical Model). 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> Physical activity (self-reported) Reduction of fat intake 	<p>Non-behavioural /</p> <p>Behavioural</p> <ul style="list-style-type: none"> The intervention group increased their total activity levels at time 2, whereas the control group reduced their total physical activity levels at time 2 Both the intervention group and control group increased healthy eating practices (e.g. more low-fat), but the effect was stronger in the intervention group (note: small effect sizes)

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Rabbi et al.	2015	Automated personalized feedback by mobile phone app (MyBehavior) > MyBehavior attempts to create personalized suggestions automatically from self-tracked information (ie, manual food logging and automatic tracking of activity).	Participants (mainly students)	<ul style="list-style-type: none"> In a randomized two-group trial, investigators randomly assigned participants to receive either MyBehavior's personalised suggestions (n=9) or nonpersonalised suggestions (n=8), created by professionals, from a mobile phone app over 3 weeks. 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Ratings MyBehavior <p>Behavioural</p> <ul style="list-style-type: none"> Daily activity level Dietary intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> In a poststudy survey, users rated MyBehavior's personalised suggestions more positively than the nonpersonalised, generic suggestions created by professionals (P<.001). <p>Behavioural</p> <ul style="list-style-type: none"> MyBehavior users walked significantly more than the control group over the 3 weeks of the study (P=.05). Although some MyBehavior users chose lower-calorie foods, the between-group difference was not significant (P=.15).
Schroder	2011	a computer-assisted dieting intervention (CAD)	Overweight and obese adults	<ul style="list-style-type: none"> A single-session nutrition intervention (CAD-only) or a combined CAD plus self-management group intervention (CAD+G) 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Number of servings from various food groups and macronutrients related to body weight 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Both intervention groups reduced the consumption of energy, fat, and carbohydrates. Relative to CAD-only, the CAD+G condition was more successful in reducing fat intake, increasing vegetable consumption, and maintaining fruit intake.

Appendix 3: Online (website-based) table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Soureti et al.	2011	Website	Age (30–60 years) obesity (BMI ≥ 29), no heart condition or cancer or being pregnant, and being computer savvy.	<ul style="list-style-type: none"> A web-based cardiovascular disease (CVD) risk message A fully automated planning tool on risk perceptions, intentions, and saturated fat intake changes 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Intentions to change diet Risk perceptions <p>Behavioural</p> <ul style="list-style-type: none"> Self-perceived consumption of low saturated fat Percentage saturated fat intake 	<p>Non-behavioural</p> <ul style="list-style-type: none"> Intentions to change diet increased more in participants allocated to the planning than the control group. Risk perceptions among those receiving the CVD risk message changed to be more in line with their age, whereas there was no change among those who did not receive the CVD risk message. <p>Behavioural</p> <ul style="list-style-type: none"> Self-perceived consumption of low saturated fat increased more in participants allocated to the planning than the control group. No differences were observed with regard to percentage saturated fat intake changes. There was no difference in perceived and percentage saturated fat intake change between the CVD risk message plus planning group and the control group.
Springvloed et al.	2015	Web-based computer-tailored nutrition education intervention	General population	<ul style="list-style-type: none"> RCT was conducted with a basic (tailored intervention targeting individual cognitions and self-regulation processes; n = 456), plus (additionally targeting environmental-level factors; n = 459) and control group (generic nutrition information; n = 434). 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Fruit, vegetable, high-energy snack and saturated fat intake, Body Mass Index (BMI) 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> In general, both intervention versions did not result in long-term intervention effects. Exception: effects on vegetable intake in the total sample differed according to educational level ($p = .02$). Among low/moderate-educated participants, the basic version was significantly more effective in increasing vegetable intake than the control programme and plus version.

Appendix 3: *Online (website-based)* table



Author(s)	Year	Setting	Target group	Type of intervention(s)	Outcome variables	Effectiveness
Winett et al.	2011	Web-based Guide to Health, WB-GTH	Between 18 & 63 years, BMI between 23 & 39, sedentary to low-active but healthy	<ul style="list-style-type: none"> 52 weekly Social cognitive theory-based modules of 15–20 screens (taking 5–10 min per module): <ul style="list-style-type: none"> Modules 1–5: self-efficacy and self-regulatory strategies Modules 6-16: outcome expectations, social support for walking and nutrition changes, and PA enjoyment Modules 17–52: continued self-regulation to enhance and maintain nutrition and PA behaviour change. Basic included generic feedback and planning and Enhanced included highly tailored planning and feedback 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Physical activity Bodyweight F&V intake 	<p>Non-behavioural</p> <p>/</p> <p>Behavioural</p> <ul style="list-style-type: none"> Participants in both Basic and Enhanced at follow-up increased physical activity by about 1,400 steps/day, lost about 3% of bodyweight, and increased F&V by about 1.5 servings/day. There was evidence that the least physically active, those who were obese, and those with poorest nutrition made greater long-term improvements.

Appendix 4: Final search strings used to retrieve articles

Appendix 4: Final search strings used to retrieve articles

Search term quick scan 1a: Setting out-of-home

TS=((intervention OR 'field experiment' OR 'field experiments' OR RCT OR 'randomized controlled trial' OR 'randomized controlled trials' OR 'randomised controlled trial' OR 'randomised controlled trials' OR 'natural experiment' OR 'natural experiments' OR quasi-experiment OR 'independent group design' OR 'non-randomized trial' OR 'non-randomized trials'))

AND

(behav* OR intent* OR intake OR consum* OR choice OR choos* OR decid* OR 'decision making' OR buy* OR purchas* OR eat* OR drink* OR WTP OR 'willingness to pay' OR cook* OR prepar* OR dispos* OR spend* OR 'behavior change' OR 'behaviour change')

AND

(food OR vegetable OR fruit OR meat OR dairy OR fish OR snack OR breakfast OR lunch OR dinner OR dessert OR meal)

AND

(restaurant OR school OR canteen OR hotel OR 'fast food' OR cafeteria OR 'train station' OR 'train stations' OR 'gas station' OR 'gas stations' OR airport OR 'on the go' OR 'vending machine' OR 'vending machines'))

Appendix 4: Final search strings used to retrieve articles

Search term quick scan 1b: Setting working environment

TS=((intervention OR 'field experiment' OR 'field experiments' OR RCT OR 'randomized controlled trial' OR 'randomized controlled trials' OR 'randomised controlled trial' OR 'randomised controlled trials' OR 'natural experiment' OR 'natural experiments' OR quasi-experiment OR 'independent group design' OR 'non-randomized trial' OR 'non-randomized trials'))

AND

(behav* OR intent* OR intake OR consum* OR choice OR choos* OR decid* OR 'decision making' OR buy* OR purchas* OR eat* OR drink* OR WTP OR 'willingness to pay' OR cook* OR prepar* OR dispos* OR spend* OR 'behavior change' OR 'behaviour change')

AND

(food OR vegetable OR fruit OR meat OR dairy OR fish OR snack OR breakfast OR lunch OR dinner OR dessert OR meal)

AND

(canteen OR work OR office OR employee OR restaurant OR cafeteria OR 'meeting room' OR 'meeting rooms' OR pantry OR 'vending machine' OR 'vending machines'))

Appendix 4: Final search strings used to retrieve articles

Search term quick scan 1c: Setting online food context

TS=((intervention OR 'field experiment' OR 'field experiments' OR RCT OR 'randomized controlled trial' OR 'randomized controlled trials' OR 'randomised controlled trial' OR 'randomised controlled trials' OR 'natural experiment' OR 'natural experiments' OR quasi-experiment OR 'independent group design' OR 'non-randomized trial' OR 'non-randomized trials')

AND

(behav* OR intent* OR intake OR consum* OR choice OR choos* OR decid* OR 'decision making' OR buy* OR purchas* OR eat* OR drink* OR WTP OR 'willingness to pay' OR cook* OR prepar* OR dispos* OR spend* OR 'behavior change' OR 'behaviour change')

AND

(food OR vegetable OR fruit OR meat OR dairy OR fish OR snack OR breakfast OR lunch OR dinner OR dessert OR meal)

AND

('food box' OR 'food boxes' OR 'meal box' OR 'meal boxes' OR 'online store' OR 'online stores' OR internet OR e-commerce OR website OR mobile OR virtual OR 'meal kit' OR 'meal kits' OR 'food kit' OR 'food kits' OR 'food delivery' OR 'home delivery' OR 'parcel delivery')

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