



10 ways to improve food choice interventions in real-life settings

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. Most interventions are focused on providing information on healthy and/or sustainable consumption or on offering educational programmes. Recently, more attention in research is focused on unconsciously changing eating behaviour by creating environments that stimulate healthy and/or sustainable choices. A lot of research is done, but where are we missing insights? This article presents ten ways to improve food choice interventions in real-life settings.

The ten ways to improve food choice interventions are based on ten knowledge gaps that have been identified within the project [Food, Value and Impact](#). In this project we aim to provide insights into existing knowledge about the effects of environmental interventions that consciously or unconsciously lead to healthy and sustainable consumer behaviour in real-life settings. This has, amongst others, led to the identification of ten knowledge gaps in environmental interventions aimed at unconscious processes to promote healthy and/or sustainable food choices.

1. **Need for studies with long-term effects**

How long-lasting are the effects of interventions? The longer the effects of interventions are sustained over time, the more successful an intervention can be judged to be. The majority of intervention studies have a short-term perspective. Most study designs include only limited measurements of the target behaviour after the intervention. This makes it difficult to determine what the duration is of the effectiveness of an intervention. For instance, Bucher and colleagues (2016) discuss the need to study long-term effects of placement of healthy food items at check-out lines. Another example is the need to determine the long-term effectiveness of interventions for worksite health promotion (Kahn-Marshall & Gallant, 2012, Soler et al., 2016). The longer the effects of interventions are sustained over time, the more successful an intervention can be judged to be.

About Food Value Impact

How do consumers choose the food they buy and eat? And how can companies help consumers make healthier and more sustainable choices and at the same time create added value and social impact for their business? Nine out of ten people in the Netherlands eat too little fruit and vegetables (source: RIVM). Within the project Food Value Impact a consortium of 19 partners consisting of knowledge institutions, companies and non-profit organizations wants to provide insight into which interventions actually tempt consumers into healthier and/or more sustainable food choices in their work environment, outdoors and online.

2. **Need for objective outcome measures**

Many intervention studies use self-reported outcome measures. This can provide valuable information to assess to what extent an intervention has affected consumers' behaviours (such as food choices). However, self-reported outcome measures have some disadvantages. The problem of such measures is that social desirability can affect them, namely that respondents can tend to report outcomes that are more favourable than they actually are, like overestimating their fruit consumption. Objective data of the actual food consumption itself, like using biomarkers in urine or internal measure in the mouth or stomach (as opposed to purchases) are still hard to establish and costly.

'We aim to provide insights on interventions in real life settings'

3. **Need for secondary outcome measures in experimental designs**

The end-goal of interventions aiming to promote healthy food choices is for consumers to live more healthy lives. However, most studies do not actually measure the effects of interventions on consumers' health. These insights can be reached through secondary outcome measures like the degree of healthcare utilisation, indicators of cardiovascular health, BMI, or productivity and absenteeism (in case the intervention is conducted in a workplace setting).

4. **Need to measure spill over-effects**

While many interventions have quite a broad scope in what they aim to achieve, the operationalisation of the target variable often is far more limited in scope. What if an intervention succeeds in making a consumer choose a more sustainable and/or healthy food item - for instance a vegetable snack instead of a candy bar - how does this affect a subsequent choice he or she will make? Will the consumer show licensing effects and choose a less sustainable and/or healthy food item (negative) or will the next food item be more likely to be sustainable and/or healthy as well (positive)?

5. **Need to distinguish between different target populations**

Interventions vary in the extent to which they target specific groups. It is unclear to what extent certain interventions are effective across different target populations. There is a need to conduct interventions across a more diverse range of target populations to get insight into the generalisability of the intervention and to see if it is necessary to tailor interventions to specific characteristics of a certain population in order to be effective. Examples of different target populations that have been proposed are low SES groups, non-western populations, adolescents, elderly, minority populations and people from rural areas.

6. **Need for more multi-level approaches to find interactions between community, social network and individual level**

Multi-level approaches would help to assess how environmental factors in multiple levels might interact with each other. The most common multi-level approach when designing interventions, is one that takes into account the macro (community), meso (social network) and micro level (individuals). This way we can figure out how the effects of for instance individual interventions (e.g., someone who is persuaded to eat more healthy) affect the food choices of his or her social network, for instance partners, family and friends, and vice versa. Ammerman and colleagues (2012), for example, describe a combination of individual-level interventions, population-level prevention strategies and macro-level state and environmental interventions in order to test the effect of health promotion strategies on (chronic) disease rates.

7. **Determining which mechanisms cause effects of interventions**

Many interventions involve multiple components, especially when conducted in the field. For instance, an intervention can encompass several alterations to the environment to test what the effect is on consumers' selection of healthy food items. However, if the intervention is successful, it then becomes very difficult to establish which of the alterations were critical in causing the effects. Was it for instance because of a change in aisle arrangement, colour use or promotional activities?

8. More emphasis on real-life settings

More intervention studies should be conducted in real-life settings, such as restaurants and cafeterias. The outcomes of studies in real-life settings should then be compared to studies in more controlled settings to get a better indication of both the internal and external validity of an intervention.

9. Focus on implementation of the interventions

There is little insight into how interventions are implemented afterwards. For instance, if an intervention shows that a certain change in the environment (such as aisle arrangement in a supermarket) led to more purchases of sustainable food items, did the supermarket actually change the environment afterwards? And if not, why did they choose to not implement the intervention?

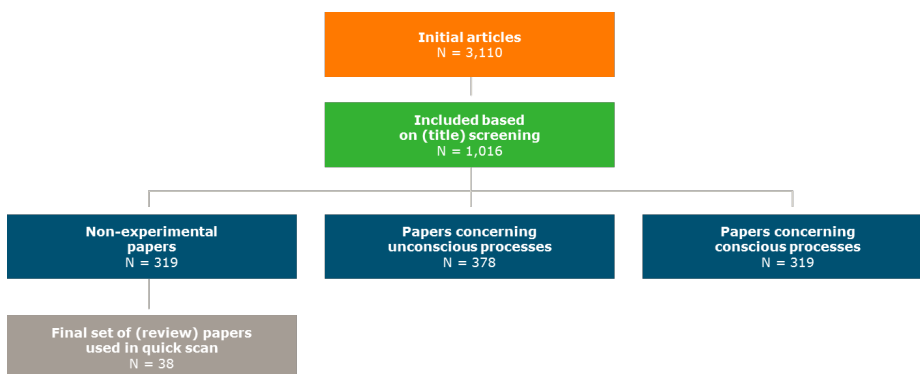
10. Measuring cost-effectiveness of the intervention: What does it cost?

Many intervention studies currently do not take into account the (financial) costs of running the intervention. However, the cost-effectiveness of an intervention can play an important role in how successful it is; a cheap, effective intervention may be considered to be more successful than an intervention that is slightly more effective, but much more expensive to run and implement. Organisations will be more inclined to implement an intervention if they have a clear indication of what it costs and when the costs are relatively low, given the effects the intervention can have on its target population.

Research method: Quick scan

The knowledge gaps were identified based on a quick scan of the literature. Specifically, the quick scan was focused on 38 English review studies (36 systematic literature reviews and 2 meta-analyses) published in the period 2000-2017 to identify current knowledge gaps. To select these review studies, we first started with a broad search for articles that present environmental intervention studies that (unconsciously) affect healthy or sustainable food consumption. Criteria that were used to initiate this search were:

- The study should involve a type of a field experiment
- The outcome variable of the study should be a behavioural measure
- The study should concern the food domain or the domain of health or sustainable food consumption and
- The study should apply an environmental intervention that (unconsciously) affects behaviour.



After a selection process, in which the relevant review papers (i.e., systematic literature reviews or meta-analyses) were retrieved from the list of 319 non-experimental papers, 38 relevant articles remained. The knowledge gaps are mainly based on the recommendations and future research directions that are identified in these 38 studies. As a disclaimer, it should be stressed that the knowledge gaps are based on a quick scan of the literature, which cannot be labelled as a systematic review. Therefore it is possible that some relevant studies might be missing.

More information

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Used articles

- Ammerman, A. S., Lindquist, C. H., Lohr, K. N., & Hersey, J. (2002). The efficacy of behavioral interventions to modify dietary fat and fruit and vegetable intake: a review of the evidence. *Preventive medicine*, 35(1), 25-41. <https://doi.org/10.1006/pmed.2002.1028>
- An, R. (2013). Effectiveness of subsidies in promoting healthy food purchases and consumption: a review of field experiments. *Public health nutrition*, 16(7), 1215-1228. <https://doi.org/10.1017/S1368980013002024>
- Appleton, K. M., Hemingway, A., Saulais, L., Dinnella, C., Monteleone, E., Depezay, L., Morizet, D., Armando Perez-Cueto, F. J., Bevan, A. & Hartwell, H. (2016). Increasing vegetable intakes: rationale and systematic review of published interventions. *European Journal of Nutrition*, 55(3), 869-896. <https://doi.org/10.1007/s00394-015-1130-8>
- Brambila-Macias, J., Shankar, B., Capacci, S., Mazzocchi, M., Perez-Cueto, F. J., Verbeke, W., & Traill, W. B. (2011). Policy interventions to promote healthy eating: a review of what works, what does not, and what is promising. *Food and Nutrition Bulletin*, 32(4), 365-375. <https://doi.org/10.1177/156482651103200408>
- Bucher, T., Collins, C., Rollo, M. E., McCaffrey, T. A., De Vlieger, N., Van der Bend, D., Truby, H. & Perez-Cueto, F. J. (2016). Nudging consumers towards healthier choices: a systematic review of positional influences on food choice. *British Journal of Nutrition*, 115(12), 2252-2263. <https://doi.org/10.1017/S0007114516001653>
- Capacci, S., Mazzocchi, M., Shankar, B., Brambila Macias, J., Verbeke, W., Pérez-Cueto, F. J., Koziol-Kozakowska, A., Piórecka, B., Niedzwiedzka, B., D'Addesa, D., Saba, A., Turrini, A., Aschemann-Witzel, J., Bach-Larsen, T., Strand, M., Smillie, L., Wills, J., & Traill, J. B. (2012). Policies to promote healthy eating in Europe: a structured review of policies and their effectiveness. *Nutrition Reviews*, 70(3), 188-200. <https://doi.org/10.1111/j.1753-4887.2011.00442.x>
- Carvalho de Menezes, M., Bragunci Bedeschi, L., dos Santos, L. C., & Souza Lopes, A. C. (2016). Interventions directed at eating habits and physical activity using the Transtheoretical Model: a systematic review. *Nutricion hospitalaria*, 33(5). <http://dx.doi.org/10.20960/nh.586>
- Crutzen, R., de Nooijer, J., Brouwer, W., Oenema, A., Brug, J., & de Vries, N. K. (2011). Strategies to facilitate exposure to internet-delivered health behavior change interventions aimed at adolescents or young adults: a systematic review. *Health Education & Behavior*, 38(1), 49-62. <https://doi.org/10.1177/1090198110372878>
- De Leon, E., Fuentes, L. W., & Cohen, J. E. (2014). Characterizing periodic messaging interventions across health behaviors and media: systematic review. *Journal of Medical Internet Research*, 16(3). <https://doi.org/10.2196/jmir.2837>
- Dute, D. J., Bemelmans, W. J. E., & Breda, J. (2016). Using mobile apps to promote a healthy lifestyle among adolescents and students: A review of the theoretical basis and lessons learned. *JMIR mHealth and uHealth*, 4(2). <https://doi.org/10.2196/mhealth.3559>
- Engbers, L. H., van Poppel, M. N., Paw, M. J. C. A., & van Mechelen, W. (2005). Worksite health promotion programs with environmental changes: a systematic review. *American Journal of Preventive Medicine*, 29(1), 61-70. <https://doi.org/10.1016/j.amepre.2005.03.001>
- Escaron, A. L., Meinen, A. M., Nitzke, S. A., & Martinez-Donate, A. P. (2013). Peer reviewed: supermarket and grocery store-based interventions to promote healthful food choices and eating practices: a systematic review. *Preventing Chronic Disease*, 10, E50. <https://doi.org/10.5888/pcd10.120156>
- Espino, J. N. V., Guerrero, N., Rhoads, N., Simon, N. J., Escaron, A. L., Meinen, A., Nieto, F. J. & Martinez-Donate, A. P. (2015). Peer reviewed: Community-based restaurant interventions to promote healthy eating: A systematic review. *Preventing Chronic Disease*, 12, E78. <https://doi.org/10.5888/pcd12.140455>
- Eyles, H., Mhurchu, C. N., Nghiem, N., & Blakely, T. (2012). Food pricing strategies, population diets, and non-communicable disease: a systematic review of simulation studies. *PLoS Medicine*, 9(12), e1001353. <https://doi.org/10.1371/journal.pmed.1001353>
- Fernandes, A. C., Oliveira, R. C., Proença, R. P., Curioni, C. C., Rodrigues, V. M., & Fiates, G. M. (2016). Influence of menu labeling on food choices in real-life settings: a systematic review. *Nutrition Reviews*, 74(8), 534-548. <https://doi.org/10.1093/nutrit/nuw013>
- Geaney, F., Kelly, C., Greiner, B. A., Harrington, J. M., Perry, I. J., & Beirne, P. (2013). The effectiveness of workplace dietary modification interventions: a systematic review. *Preventive Medicine*, 57(5), 438-447. <https://doi.org/10.1016/j.ypmed.2013.06.032>
- Jensen, J. D. (2011). Can worksite nutritional interventions improve productivity and firm profitability? A literature review. *Perspectives in Public Health*, 131(4), 184-192. <https://doi.org/10.1177/1757913911408263>
- Kahn-Marshall, J. L., & Gallant, M. P. (2012). Making healthy behaviors the easy choice for employees: a review of the literature on environmental and policy changes in worksite health promotion. *Health Education & Behavior*, 39(6), 752-776. <https://doi.org/10.1177/1090198111434153>
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- Kroeze, W., Werkman, A., & Brug, J. (2006). A systematic review of randomized trials on the effectiveness of computer-tailored education on physical activity and dietary behaviors. *Annals of Behavioral Medicine*, 31(3), 205-223. https://doi.org/10.1207/s15324796abm3103_2
- Larson, N., & Story, M. (2009). A review of environmental influences on food choices. *Annals of Behavioral Medicine*, 38, 56-73. <https://doi.org/10.1007/s12160-009-9120-9>
- Liberato, S. C., Bailie, R., & Brimblecombe, J. (2014). Nutrition interventions at point-of-sale to encourage healthier food purchasing: a systematic review. *BMC Public Health*, 14(1), 919. <https://doi.org/10.1186/1471-2458-14-919>
- Matson-Koffman, D. M., Brownstein, J. N., Neiner, J. A., & Greaney, M. L. (2005). A site-specific literature review of policy and environmental interventions that promote physical activity and nutrition for cardiovascular health: what works? *American Journal of Health Promotion*, 19(3), 167-193. <https://doi.org/10.4278/0890-1171-19.3.167>
- Mhurchu, C. N., Aston, L. M., & Jebb, S. A. (2010). Effects of worksite health promotion interventions on employee diets: a systematic review. *BMC Public Health*, 10(1), 62. <https://doi.org/10.1186/1471-2458-10-62>
- Neville, L. M., O'Hara, B., & Milat, A. J. (2009). Computer-tailored dietary behaviour change interventions: a systematic review. *Health Education Research*, 24(4), 699-720. <https://doi.org/10.1093/her/cyp006>
- Nour, M., Chen, J., & Allman-Farinelli, M. (2016). Efficacy and external validity of electronic and mobile phone-based interventions promoting vegetable intake in young adults: systematic review and meta-analysis. *Journal of Medical Internet Research*, 18(4). <https://doi.org/10.2196/jmir.5082>
- Olson, C. M. (2016). Behavioral nutrition interventions using e-and m-health communication technologies: a narrative review. *Annual Review of Nutrition*, 36, 647-664. <https://doi.org/10.1146/annurev-nutr-071715-050815>
- Pomerleau, J., Lock, K., Knai, C., & McKee, M. (2005). Interventions designed to increase adult fruit and vegetable intake can be effective: a systematic review of the literature. *The Journal of Nutrition*, 135(10), 2486-2495. <https://doi.org/10.1093/jn/135.10.2486>
- Porter, J., Huggins, C. E., Truby, H., & Collins, J. (2016). The effect of using mobile technology-based methods that record food or nutrient intake on diabetes control and nutrition outcomes: A systematic review. *Nutrients*, 8(12), 815. <https://doi.org/10.3390/nu8120815>
- Sarink, D., Peeters, A., Freak-Poli, R., Beauchamp, A., Woods, J., Ball, K., & Backholer, K. (2016). The impact of menu energy labelling across socioeconomic groups: A systematic review. *Appetite*, 99, 59-75. <https://doi.org/10.1016/j.appet.2015.12.022>
- Schoeppe, S., Alley, S., Van Lippevelde, W., Bray, N. A., Williams, S. L., Duncan, M. J., & Vandelandotte, C. (2016). Efficacy of interventions that use apps to improve diet, physical activity and sedentary behaviour: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 13(1), 127. <https://doi.org/10.1186/s12966-016-0454-y>
- Seymour, J. D., Yaroch, A. L., Serdula, M., Blanck, H. M., & Khan, L. K. (2004). Impact of nutrition environmental interventions on point-of-purchase behavior in adults: a review. *Preventive Medicine*, 39, 108-136. <https://doi.org/10.1016/j.ypmed.2004.04.002>
- Skov, L. R., Lourenco, S., Hansen, G. L., Mikkelsen, B. E., & Schofield, C. (2013). Choice architecture as a means to change eating behaviour in self-service settings: a systematic review. *Obesity Reviews*, 14(3), 187-196. <https://doi.org/10.1111/j.1467-789X.2012.01054.x>
- Soler, R. E., Leeks, K. D., Razi, S., Hopkins, D. P., Griffith, M., Aten, A., ... & Walker, A. M. (2010). A systematic review of selected interventions for worksite health promotion: the assessment of health risks with feedback. *American Journal of Preventive Medicine*, 38(2), S237-S262. <https://doi.org/10.1016/j.amepre.2009.10.030>
- Thapa, J. R., & Lyford, C. P. (2014). Behavioral economics in the school lunchroom: Can it affect food supplier decisions? A systematic review. *International Food and Agribusiness Management Review*, 17(A). <https://ageconsearch.umn.edu/record/164604>
- Thomas, J. G., & Bond, D. S. (2014). Review of innovations in digital health technology to promote weight control. *Current Diabetes Reports*, 14(5), 485. <https://doi.org/10.1007/s11892-014-0485-1>
- Turton, R., Bruidegom, K., Cardi, V., Hirsch, C. R., & Treasure, J. (2016). Novel methods to help develop healthier eating habits for eating and weight disorders: a systematic review and meta-analysis. *Neuroscience & Biobehavioral Reviews*, 61, 132-155. <https://doi.org/10.1016/j.neubiorev.2015.12.008>
- Van 't Riet, J. (2013). Sales effects of product health information at points of purchase: a systematic review. *Public health nutrition*, 16(3), 418-429. <https://doi.org/10.1017/S1368980012001103>
- Wilson, A. L., Buckley, E., Buckley, J. D., & Bogomolova, S. (2016). Nudging healthier food and beverage choices through salience and priming. Evidence from a systematic review. *Food Quality and Preference*, 51, 47-64. <https://doi.org/10.1016/j.foodqual.2016.02.009>
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