Chapter 7
General discussion
Outline
The purpose of this thesis was to develop and evaluate the effectiveness of the intervention *The healthy worksite cafeteria*. The aim of *The healthy worksite cafeteria* is to encourage Dutch employees to purchase healthier lunch items as an effect of nudging and social marketing strategies. For the intervention development, we started with conducting two qualitative studies described in chapter 2 and 3. Chapter 2 issued the target population, namely Dutch employees and their food choice behaviour in general and at work. In chapter 3, the key stakeholders associated with the implementation of a worksite cafeteria intervention were consulted. Subsequently we developed *The healthy worksite cafeteria* intervention and determined the study design presented in chapter 4. We then evaluated the effects of *The healthy worksite cafeteria* by means of an RCT in chapter 5. In the last study, the vitality of the target population and its implications were described (chapter 6). In this closing chapter I give a summary of the main findings and put the results in a broader perspective. Finally, I suggest implications for further research, policy and practice.

Summary of the main findings
Motives for food choice in the worksite cafeteria can differ from food choice in general.
In chapter 2, we obtained insight into motivations regarding food choices of Dutch employees, especially when visiting the worksite cafeteria. Qualitative analyses from seven focus groups revealed that this group of Dutch employees mentioned healthiness, price and taste as important factors of food selection in general. However, healthiness played a less important role in making food choices in the worksite cafeteria than when making food choices in general. The participating employees generally visit the worksite cafeteria to have a break from their work setting. Reasons for buying unhealthy food items in the worksite cafeteria were: being tempted and the feeling to ‘deserve’ it after having worked hard. In order to support people to choose healthier foods, employees suggested a bigger offer of healthy food options, providing knowledge, changing prices (i.e., raising prices of unhealthy options and lowering prices of healthy options) and placing healthy foods prominently. This focus group study showed that drivers for food selection can differ per situation; health is important for food choice in general, but seems less important in the worksite cafeteria.

Key stakeholders will adopt and continuously implement a healthy worksite cafeteria intervention with nudging strategies as long as freedom of choice and profitability are guaranteed.
In chapter 3 we presented the opinion of 14 stakeholders regarding the factors that would facilitate or hinder the adoption and continued implementation of a healthy worksite cafeteria intervention with nudging strategies. Qualitative analyses showed that
important factors for adoption are guaranteeing freedom of choice, profitability and availability of attractive healthy options. Executing The healthy worksite cafeteria intervention with nudging strategies seems compatible with caterers’ values, goals and way of working, is not overly complex and is a unique selling point to caterers’ client, the employer. Furthermore, successful implementation could be enhanced by explaining the aim of the intervention to all executing professionals and by convincing the client to shift towards a healthy worksite cafeteria by demonstrating its proven effectiveness, for example on vitality. We recommended that implementation tools should aim at ways for caterers to convince their client to choose a healthy worksite cafeteria, for example by showing customer satisfaction and by showing ways to introduce a healthier offer while maintaining freedom of choice.

**Development of The healthy worksite cafeteria intervention**

In chapter 4 we described the development of an intervention to encourage healthier purchase behaviour in Dutch worksite cafeterias, called The worksite cafeteria 2.0 (working title during the experiment) and the study design of the randomised controlled trial (RCT) to evaluate the effectiveness of the intervention. We developed the intervention in four phases: collecting strategies from literature, qualitative face to face expert interviews, qualitative focus group interviews with employees of different Dutch companies and a feasibility pilot study. The intervention consisted of a combination of possible effective nudging and social marketing strategies.

*The healthy worksite cafeteria intervention is partly effective in nudging customers towards healthier choices*

Chapter 5 contained the main effect study of this thesis in which we evaluated The healthy worksite cafeteria intervention by means of an RCT with 30 worksite cafeterias, with sales data as main outcome measure. The intervention, which was called The worksite cafeteria 2.0 during the experiment, being more neutral in the sense of revealing the goal, was designed to encourage employees to make healthier choices during their daily worksite cafeteria visits. This was done by simultaneously conducting 14 nudging and social marketing strategies for 12 weeks (77% of which were executed as intended). Strategies included a bigger share in healthier food products offered, price strategies and the prominent placing of healthier food products. We found significantly positive effects of the intervention on purchases for 3 of the 7 studied product groups: healthier sandwiches, low fat cheese as sandwich fillings, and fruit. This study showed that the strategies of The healthy worksite cafeteria were partly effective to encourage healthier purchase behaviour.
**Vitality of Dutch employees is associated with self-reported work performance and salad purchase in the worksite cafeteria**

The final study described in chapter 6 showed the vitality of our target group of Dutch employees. As a result of an aging workforce there is a growing importance of ‘sustainable employability’. Vitality is associated with lifestyle and healthcare and productivity-related costs. Quantitative analyses with almost eight hundred Dutch employees revealed that they are more vital compared to the average Dutch adult population. Results showed that employees with a higher vitality bought more salad, had a higher self-reported work performance and had a lower BMI. The employees with lowest vitality scores (‘very low’ and ‘low’) had a higher BMI and lower self-reported work performance. We emphasized that future research should focus on specific sub-groups of employees, for example those with low vitality. This could result in developing more effective worksite health promotion programs (WHPPs). A tailored approach could show the way how to improve strategies. A combination of environmental and personal strategies possibly is more effective than only adjusting the worksite cafeteria environment.

**Conclusions**

The main findings from this thesis can be summarised as follows: a healthy worksite cafeteria with nudging and social marketing strategies is feasible and partly effective in stimulating healthier food choices of Dutch customers. To possibly have more effect on food choices and subsequently on sustainable performance at work, some strategies should be intensified and additional efforts on specific target groups should be made.

**Reflection and interpretation**

In the following part I will reflect on and interpret our findings on consumer food choice in the worksite cafeteria. I will discuss the benefits and (potential) disadvantages of nudging and social marketing strategies. Furthermore, I will evaluate our findings in relation to other worksite intervention studies as a prelude to the recommendations in the following part.

**In the worksite cafeteria more support for healthy food choices is needed.**

In our RCT we found that healthier food choices in the worksite cafeteria can be realised by changing the food offer such as introducing relatively healthy products and offering a bigger share of those healthier options and by changing its price and presentation. Such strategies are a form of choice architecture. However, in order to be more effective we also stated that some of these strategies should be sharpened, for example by further increasing the share of healthier options, giving a bigger price discount on healthy items or offering (deep fried) snacks on even fewer days. From our focus group study we know that motives for food choices in the worksite cafeteria differ from food...
choices motives in general. It seemed that the overall motive to eat healthy needs extra support when one is in the worksite cafeteria. This support could include a wider choice of healthy options, preferably tasty and priced well. In addition, participants of the focus groups indicated that they would appreciate that support. To illustrate, in the worksite cafeteria often the unhealthy snacks are the most tempting and sometimes people choose them while they actually did not intend to. Compared to when being in the supermarket or on the go, being at work introduces the feeling of deserving a snack as a reward for working hard. This is a phenomenon that specifically occurs when at work: not intending to snack but being triggered in the worksite cafeteria by a combination of the availability of tempting unhealthy snacks and this feeling of having deserved it.

To alter food choice besides nudging, boosting is important.
Situational cues trigger conceptualizations, such as habits, impulses, hedonic goals, or stereotypical situations which can guide behaviour automatically. Changing such automatic effects can be tried by changing situational cues such as priming and nudging, as executed in our intervention.1 Alternatively, behaviour change interventions could also try to change these underlying situated conceptualizations through training interventions, such as a training to increase health literacy or to develop implementation intentions. In other words, the behaviour of buying a snack in the worksite cafeteria (represented by the quote ‘I’ve worked so hard, I deserve a snack in the worksite cafeteria’.2) could be changed by either the presence of healthier tempting food items and less prominently offered unhealthy snacks, but could also be changed by encouraging people’s competence or self-regulation. The latter is called ‘boosting’.3 The focus of boosting is on interventions that make it easier for people to exercise their own agency (the realization of desires, making plans, and carrying out actions) by improving existing competences or learning new ones.4

Differences between nudging and boosting.
Hertwig and Grüne-Yanoff (2017) stated that nudges and boosts differ in the target of the intervention and the causal pathways taken to prompt behaviour change. Nudges target the behaviour directly by co Selecting one’s (internal) cognitive and motivational processes and designing the (external) choice architecture. Boosts, in contrast, target the individuals’ competences to bring about behaviour change. Boosts aim to improve decision making and its outcomes either by training the functional processes or by adapting to the environment in which decisions are made or by doing both.4 Therefore, the use of boosts in combination with nudging has the advantage of being more prone to achieve a sustainable behaviour change. For example, offering smaller portions nudges and learning people to choose a smaller portion boosts. We must note that adding boosts to nudges cancels the unconscious character of some nudges and therefore may result in other reactions such as reactance. Disclosure about nudges
is however not necessarily counter effective. In their study Kroese et al. (2016) show that awareness of nudging not always cancels out the effect. In the study, researchers disclosed the intended outcome of an intervention at the kiosk of a train station with a sign placed prominently on the counter stating ‘We are helping you to make healthy choices’. The researchers observed that the sign did not impact the effectiveness of a repositioning nudge aimed to increase healthy food choices.

In line with this finding is the experience of Sunstein, who mentioned that the nudge of automatic enrollment even works better when enclosing to people that they have been automatically enrolled, but have the freedom to opt out. Adding boosts to nudges could possibly function in some situations as a catalyst and increase the effect on food choice.

The ethics of manipulation through nudging: does or doesn’t nudging violate autonomy?

Compared to boosting, nudging could be seen as manipulation. Boosts respond to cognitive and motivational competences, whereas nudges adapt choice architecture to these cognitive and motivational processes leaving them unaltered. Since the introduction and growing popularity of nudging, there has been a debate about its ethics. Wilkinson (2012) asked the questions: ‘Is it not manipulation to take advantage of people’s predictable deviations from economic rationality? And if it is manipulation, how can the nudging be libertarian?’ Manipulation, in a broad sense, can perhaps be understood as ‘intentionally causing or encouraging people to make the decisions one wants them to make by actively promoting those decisions resulting in people making the decisions in ways that rational persons would not want to make their decisions’. Primarily wrong about manipulation is therefore that it violates autonomy. Manipulation could also be wrong for other reasons, for instance because it causes us to act against our interests. However, manipulation is assessed as objectionable at first sight, even if someone is objectively better off. Because the concept of manipulation in itself is difficult to formulate and apply, whether and when nudging is manipulative is therefore a question not easily answered. People can be manipulated or nudged when they go shopping, sign contracts, vote, study at school, or donate money for charity. When your roommate puts a bowl of crisps on the table, you are being nudged. Sunstein confirms this view by stating that choice architecture cannot be avoided. ‘Nature itself nudges; so does the weather; so do customs and traditions; so do spontaneous orders and invisible hands. The private sector inevitably nudges, as does the government. It is reasonable to worry about nudges by government and to object to particular nudges, but not to nudging in general.’ Hereby he counters the view of nudging as unethical manipulation as a whole. Instead, nudging is a form of manipulation and we are manipulated, that is to say, our behaviour gets influenced all day, but as long as freedom of choice is preserved it can be called nudging.
Different views exist regarding the effects on autonomy
The former paragraph showed that nudging can be seen as manipulation since it alters someone’s behaviour. Furthermore, it can be considered as manipulative by violating autonomy. Opposite to the idea or belief that nudging is manipulative by violating autonomy, Griffiths and West stated that nudging increases autonomy.10 They have an alternative view on the widely cited Intervention Ladder of the Nuffield Council on Bioethics (figure 1 original Intervention Ladder; figure 2 an alternative Balanced Intervention Ladder) that structurally embodies the assumption that personal autonomy is maximized by non-intervention (‘Do nothing or simply monitor the current situation’).

![Intervention Ladder](image)

Figure 1. Nuffield Intervention Ladder.11

In the Nuffield Intervention ladder, the higher on the ladder, the more intrusive and autonomy limiting the intervention gets. Nudging can be placed midway on the ladder, reducing ones autonomy to a certain extent. However, Griffith and West show in their two-sided ‘Balanced Intervention Ladder’ that an intervention can either enhance or diminish autonomy (figure 2). A nudge like ‘ensuring a bigger share of the healthier food items’ (strategy 1 and 5 in The healthy worksite cafeteria intervention) is presented as autonomy-increasing, scoring +4 points on the Balanced Intervention Ladder. Because a larger share of the healthy options enables someone, motivated to eat healthier, to choose a healthy food product more easily. This provides a more positive view at nudging strategies, possibly helpful in tackling reactance. In accordance with this posi-
Collective self-binding. For example, a decision by a community, after debate and democratic decision making, to ban local sale of alcohol.

Enable choice. Enable individuals to change their behaviour, for example by offering participation in a National Health Service programme ‘stop smoking’, or building cycle lanes.

Ensure choice is available. For instance, by requiring that menus contain items that someone seeking to maintain health would be likely to choose.

Educate for autonomy. For example, through a media studies curriculum which shows children how to recognize the techniques used to manipulate choice through marketing, or by banning marketing primarily targeted on children.

Provide information. Inform and educate the public, for example as part of campaigns informing people of the health benefits of specific behaviour.

Guide choices through changing the default policy. For example in a restaurant, instead of providing chips as a standard side dish, menus could be changed to provide a more healthy option as standard (with chips as option).

Do nothing. Or, simply monitor the current situation.

Guide choices through incentives. Regulations can be offered that guide choices by fiscal and other incentives, for example offering tax-breaks for the purchase of bicycles that are used as means of travelling to work.

Guide choices through disincentives. Fiscal and other disincentives can be put in place to influence people not to pursue certain activities, for example through taxes on cigarettes, or by discouraging the use of cars in inner cities through charging schemes or limitations of parking spaces.

Restrict choice. Regulate in such way as to restrict the options available to people with the aim of protecting them, for example removing unhealthy ingredients from food, or unhealthy food from shops or restaurants.

Eliminate choice. Regulate in such way as to entirely eliminate choice, for example through compulsory isolation of patients with infectious diseases.

Figure 2. Balanced Intervention Ladder by Griffiths and West (2015). A balanced intervention ladder. The options available to government and policy makers to improve health may either enhance (+) or diminish (−) autonomy. No special justification is required for interventions that simultaneously enhance health and autonomy. For autonomy diminishing interventions, the health benefits to individuals and society should be weighed against this cost. In both cases, economic costs and benefits need be taken into account alongside health costs and benefits.

tive view is the study of Van Gestel et al. (2018) showing customers’ positive reaction to a nudging intervention at the kiosk at the train station. When the researchers disclosed to customers that they were being nudged to purchase fruit, 90% of the customers responded to appreciate it to be nudged in making a healthier food choice.
tion, for the more general situation of being targeted at work, a study with approximately 700 Dutch employees showed that most employees agree with the importance of Workplace Health Promotion Programs (WHPP). This positive attitude corresponds to results of a study showing moderate to high levels of people’s approval of being nudged to promote healthy eating. Nonetheless, approval was highly dependent on the degree of perceived intrusiveness of the nudge and on the degree of trust put in the choice architect implementing the intervention. Nudges implemented by experts and industry (marketing), as opposed to policy makers, were more approved of and approval was higher when perceived intrusiveness was low. These findings are positive regarding our intervention The healthy worksite cafeteria being implemented by experts and industry (catering companies). The level of intrusiveness is however doubtful since The healthy worksite cafeteria includes nudges being in between non-intrusive nudges such as offering water for free, and intrusive nudges, such as providing a preselected option as the default. All in all, these insights are very useful in creating support for nudging in all kinds of settings. Especially framing nudging as autonomy enhancing is useful for convincing people who have a fair influence on a food environment, such as a worksite cafeteria. However, the level of intrusiveness should be taken into account especially for nudging by the government.

How many benchmarks are needed for a social marketing approach?
In the previous paragraphs I reflected on some aspects of nudging for being an important substantive component of the intervention; 12 of the 14 included strategies are nudging strategies. However, in the process of developing the intervention, in other words, when compiling the nudging strategies, some elements of social marketing played a prominent role. Social marketing has the aim to change behaviour of a target audience by triggering elements that moves and motivates them. In the situation of the worksite cafeteria: changing food choice behaviour of customers through their drivers. The difference between social marketing and other approaches for social change such as legislation and education was argued by Andreasen (2002) as its emphasis of voluntary behaviour change. He proposed the six benchmarks for identifying a genuine social marketing approach (figure 3).15

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1. Behaviour change is the benchmark used to design and evaluate interventions.
2. Audience research is undertaken to (i) assess the needs of the target group (ii) pre-test the programme materials and ideas and (iii) monitor the ongoing implementation of the programme.
3. Segmentation principles are applied.
4. The intervention strategy creates attractive motivational exchanges with the target group.
5. The intervention strategy attempts to use all four Ps of the traditional marketing mix.
6. Careful attention is paid to the competition faced by the desired behaviour.

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Figure 3. Andreasen’s Benchmark criteria for a genuine social marketing programme, adapted from Andreasen 2002.15
As a result of the growth in interest in social marketing, in 2006 Gordon et al. reviewed the effectiveness of social marketing interventions designed to improve diet. They identified social marketing as a promising health behaviour intervention approach for different settings and target groups. In regard to the exact definition of a social marketing approach, Andreasen argued that it is unreasonable to expect interventions to provide strong evidence of all six benchmarks. It was however unclear under what conditions an intervention – not meeting all benchmarks – could still be seen as a social marketing approach. We especially used the insights of involving the target audience, in our case the employees purchasing lunch in the worksite cafeteria and key stakeholders, like facility managers and catering managers. The importance of the target audience is reflected in five out of the eight benchmarks (two were added) of social marketing: behaviour, customer orientation, insight, exchange and competition. Furthermore, we included the benchmark theory and marketing mix, but did not use the benchmark of segmentation. In short, we used seven of eight benchmarks. Using almost all benchmarks was in line with findings of the review of Carins et al. (2013). Concerning interventions using social marketing to improve eating behaviour they showed that of sixteen included studies the mean number of benchmark criteria identified was five (from the total of six of Andreasen’s criteria (2002)). The researchers found positive change to healthy eating behaviour in 14 of 16 studies. Their definition of social marketing was: ‘Systematic studies which sought to change behaviour through tailored solutions (e.g. use of marketing tools beyond communication was clearly evident) that delivered value to the target audience’. The sixteen studies that met the definition of social marketing used significantly more of Andreasen’s (2002) criteria and were more effective in achieving behavioural change than a subset of studies without consumer orientation, but identifying themselves as social marketing. They concluded that social marketing offers the potential to change eating behaviour when employed to its full extent.

Social marketing emphasizes the drivers of the target audience.

Regarding the insight in the target group, we learned from our focus groups (customer orientation) that the feeling of being entitled to a reward makes it difficult to resist unhealthy temptations in the worksite cafeteria (insights). However, identification of important drivers cannot always be converted to an appropriate and effective intervention strategy. In this situation, for example, coming up with a healthy temptation as a substitute (exchange and competition) is quite challenging. However, therefore we used the benchmark: marketing mix. The marketing mix addresses the elements of Product, Place, Promotion that overlap with nudging strategies in our intervention. The fourth P of Price however, enabled us to make healthy options more attractive price-wise. Strictly speaking price interventions are not nudging strategies, because one cannot really avoid a price increase. However, the strong effect of price as a trigger in
food choice can strengthen the behaviour change which is the goal of the intervention. The importance of price also emerged from our focus groups. Participants stated that they would be more likely to choose healthier options in the worksite cafeteria when those products would be relatively low priced. For example, a low-fat dairy drink of 250ml was seen as unattractively priced when the price was equal to a liter package in the supermarket. We were however able to add two price strategies to the 12 nudging strategies. The intervention worksite cafeterias gave a discount on some healthy products and increased the price of unhealthy snacks. To summarise, social marketing looks for the factors that can trigger the desired behaviour of the target group in the most optimal way. An advantage is that it has value for the target group as well as an overall social value and has a great change of being effective. A disadvantage is that the social marketing approach is quite labor intensive. In our study we used insight in behavioural triggers of our target group (price is an important factor) and the elements of the marketing mix for the intervention, namely increasing prices of unhealthy snacks, and lowering prices of healthy products, which seemed to have contributed to the intervention effect.

**Nudging and social marketing are not the silver bullet...**

As a conclusion of chapter 5 we emphasized that altering food choice in the worksite cafeteria by changing the food environment in its own, is only partly effective. Tightening the strategies, such as selling fried snacks on even fewer days than during the experiment, is the first option to possibly increase the effects. Furthermore, combining nudging and social marketing strategies, like price strategies, with elements that target conscious food choice behaviour is probably more effective in changing food choice. The ‘boosting’ part as it is mentioned earlier.

Apart from adding boosts to nudges, it is necessary to intervene in more ways. I would like to state that nudging and some small and selective (social marketing) price strategies are ‘just’ one way to cause a change in food choice behaviour. It is particularly useful for situations wherein individuals, especially the ones with less self-regulation skills, want to or need to be supported to make healthier choices. However, to bring Dutch overweight rates back to the levels of 1990, as stated in the aim of the Dutch National Prevention Pact (aimed at reducing alcohol consumption, smoking and overweight) nudging and boosting is not enough. Adding other types of interventions seem necessary to achieve the goal of altering overweight levels. This means, simultaneously executing different strategies to alter food choice behaviour. Not only nudging, but also changing prices in wider range of food categories, for example. The World Health Organization (WHO) states ‘Governments can take a number of actions to improve availability and access to healthy foods and have a positive influence on the food people choose to consume.’ In the bulletin of the WHO, Thow et al. (2018) concluded that well designed taxes and subsidies can change the prices, purchase and
consumption of target foods, however, the effects on overall diet and health are less clear.\textsuperscript{21} In the Dutch National Prevention Pact a variety of stakeholders made commitments of achieving goals to contribute to reducing obesity levels. A lot of emphasis is on improving the food environment, by means of increasing availability of healthy foods and making it easier to choose for, merely by nudging. For example, governmental worksite cafeterias are now required to implement nudging strategies of the Guidelines Healthier Canteens\textsuperscript{22} quite similar to the strategies studied in current thesis. Another strategy included however in the National Prevention Pact is the reformulation of food products by reducing levels of sugar, salt or saturated fat. Although more research into the effects of several policies and interventions like nudging is needed, the positive effects of The healthy worksite cafeteria intervention indicates that we should not wait with implementing these in all worksite cafeterias. It will contribute to the health in all policies-approach like (fiscal) rules and regulations rules recommended by WHO.\textsuperscript{23-25}

\textit{The healthy worksite cafeteria intervention versus other worksite RCT’s.}

In the former paragraphs I elaborated on the various aspects of nudging and social marketing we used in our RCT. In the following paragraph I will place our RCT in the perspective of other workplace health promotion programs (WHPP) RCTs. Multiple reviews show that WHPP targeting physical activity (PA)\textsuperscript{26,27}, but also both PA and diet, are among other things effective in preventing weight-related risk factors.\textsuperscript{28,29} Regarding worksite interventions specifically aimed at improving employees diets, like our intervention, Ni Mhurchu \textit{et al.} (2010) and Geaney \textit{et al.} (2013a) concluded in their reviews that in general, worksite interventions are associated with moderate improvement in dietary intake (an increase in fruit and vegetable intake and a decrease in total fat intake).\textsuperscript{30,31} Our study is consistent with these results. However, most studies differed with our intervention in types of strategies used (i.e. providing nutrition education) and number of strategies executed simultaneously (i.e. single strategies like free servings of fruit). The randomised intervention study of Bandoni \textit{et al.} (2011) did involve several aspects, including menu planning, food presentation and motivational strategies, but only aimed at increasing fruit and vegetable consumption.\textsuperscript{32} Also in contrast to our intervention, previous studies using multiple strategies often included an educational programme.\textsuperscript{33-37}

To our opinion, the ‘Food choice at work’ intervention by Geaney \textit{et al.} (2013b) is most comparable to our intervention as it combined multiple similar nudges simultaneously in worksite cafeterias. However, it also included an educational component. The Food choice at work study had ‘the aim to assess the comparative effectiveness of a workplace environmental dietary modification intervention and a nutrition education intervention both alone and in combination versus a control workplace’.\textsuperscript{38,39} Their environmental dietary modification included five elements: (a) menu modification: restriction of saturated fat, sugar and salt, (b) increase in fibre, fruit and vegetables, (c) price discounts
for whole fresh fruit, (d) strategic positioning of healthier alternatives and (e) portion size control, all also included in The healthy worksite cafeteria intervention. For example, repositioning of certain healthy foods within the worksite cafeteria like the replacement of confectionary products with healthy snacks (fresh fruit, dried fruit, natural nuts) by the cash registers was similar to ours. However, we did not intervene in the vending machines. Another difference was that our intervention also included price increases of unhealthy fried snacks. Again very similar was the way the intervention was developed, namely with consulting stakeholders. During intervention development Geaney et al. were advised by catering and human resource stakeholders. In contrast, we also consulted the target audience and other key stakeholders like insurance experts. Striking is the similarity in discussing the amount of days without deep fried products with the catering stakeholders. Geaney et al. for example, suggested three days without chips but two days without chips was agreed upon, whereas we included two days free of all deep fried snacks including chips and discussed about which days. A substantial difference was the educational element of their intervention. It was hypothesised by Geaney et al. that the combined intervention (environmental dietary modification, comparable to our environmental nudging intervention and nutrition education) would be more effective than either intervention alone, in promoting positive changes in employees’ dietary intakes, nutrition knowledge and health status outcomes. In line with their hypothesis, the intervention did show effects for the combined intervention. For the solely environmental intervention, effects were smaller and in general non-significant. Finally, they found an improvement of off-duty dietary intakes in the combined intervention group.40 The extended reach of a worksite cafeteria to other settings needs further research, but is a promising element of worksite cafeteria interventions.

Methodological issues

Strengths

The first strength of this thesis is that we used different methods to develop the intervention, including the insights in drivers of the target group and the consultation of experts regarding implementation. This meets the appeal of Carins et al. (2016) who argue the need for multiple methods in formative research to obtain a more in depth understanding of behaviour change compared to only obtain insights from an audience’s perspective.41 Furthermore, we also conducted a pilot study in two worksite cafeterias to explore the feasibility of the intervention and obstacles to resolve for executing the RCT. A second strength lies also in the study design, namely the randomization of worksites to the experimental or the control group. RCTs are considered the golden standard within experimental studies, because confounding variables can be neutralised.42 Regarding methodology of worksite cafeteria interventions it is emphasized that the quality of studies until 2009 has frequently been sub-optimal. Not all were randomised controlled trials and a significant risk of bias was caused by self-reported
methods of dietary assessment. Third, our objective outcome measure, sales data is a strength. Whereas self-reported measures have the change of recall bias, our study avoided this problem. In a review by Hendren et al. (2017) the self-reported measure was still a concern. Our objective measure of sales data is an improvement in that regard. A fourth strength is the implementation of the intervention in a real life situation, making the outcome more relevant for practice and policy recommending such interventions as a measure. The relatively large number of worksite cafeterias made it fairly generalizable for the Dutch situation of employees having lunch at work and can therefore be considered a fifth strength. Whereas the relatively high ‘exposure’ to a worksite cafeteria in a lifetime advocates to intervene here. A sixth strength is that the length of 12 weeks for the intervention being this comprehensive is quite unique. In many experiments, the exposure to nudging strategies is too short to draw conclusions about the sustainability of the effects. Some interventions are implemented for a period shorter than 12 weeks. Studies with longer follow-up are often interventions with less strategies or less outcome measures, for example only fruit and vegetable intake. Ideally strategies are implemented and measured over several months and measures for example by using customer loyalty cards.

Limitations
This thesis also has some limitations, related to the study design, study population and measurements. The first limitation is that we did not conduct a systematic review for collecting all possible effective nudging strategies to incorporate in the intervention. As a result of sufficient availability of studies presenting the overview of nudging strategies, we decided to conduct a desk research instead of a more thorough review. We therefore did not conduct all guidelines of a systematically approach such as the PRISMA checklist. However, by combining the outcomes of the desk research with the insights in the target audience and key stakeholders’ knowledge and experience regarding implementation, the intervention development was still thorough. As a second limitation we can mention that we did not measure the possible prolonged effects as a result of improved food purchases in the worksite cafeteria. Sufficiently long periods of follow-up to determine long-term effects of programs on, for example, employee health, absenteeism and productivity, healthcare utilisation and cost-effectiveness are needed. Such study would take ideally a follow-up of several years, with a minimum of 1-year. Furthermore, food purchases could differ from actual dietary intake and we did not measure possible effects on consumption the rest of the day. However, since the health goal of the worksite cafeteria intervention was not explicitly communicated anywhere we don’t expect employees to have compensated for their healthier purchases. A third limitation concerning the overall design lies in the timing and use of the questionnaire of chapter 6. Combining the questionnaire with the qualitative studies would
have given the opportunity to target at a specific (vulnerable) group in the intervention. In the light of social marketing benchmarks this would have been a way to incorporate the benchmark segmentation.\textsuperscript{15} A disadvantage is then that the targeted group is much smaller than the group that needs to lower bodyweight, which is half of the adults in the Netherlands.\textsuperscript{51}

A fourth limitation is the fact that we included mainly white collar companies. We therefore do not know to what extend our intervention will have similar effects in worksite cafeterias of companies with more blue collar workers. Looking at the higher prevalence of overweight in groups with low socioeconomic status (SES) \textsuperscript{51}, we could argue that the group with low SES needs more support in reducing overweight. When recruiting companies it appeared to be harder to convince companies with a high number of low educated employees. Reasons given by managers were among others their fear for negative reactions of the employees as a result of the unavailability of deep fried snacks for two days a week. Some even mentioned this could lead to a strike, which had also happened a few years prior to this study due to comparable changes in the worksite cafeteria. The possibility of a strike would logically be too much of a financial risk. However, this also says something about the norm of what a worksite cafeteria should look like for certain specific target groups. When deep fried snacks are this much important food items in the total offer in the worksite cafeteria, one could consider these cafeterias are the most important to tackle.

In this thesis we used a variety of measures. A last limitation lies in the use of sales data to reflect food choice behaviour. For food choice behaviour sales data can be considered an objective measure. Extending food choice behaviour to actual consumption must be done with caution. We cannot be sure that all food items bought are actually consumed. Furthermore, with the use of solely sales data a complete picture of an employee’s lunch cannot be made in the situations when certain food items are derived from other places (i.e. home, supermarket nearby the company). However, compared to self-reported food intake, there is no occurrence of recall bias, which is an advantage.\textsuperscript{52}

Recommendations for research, policy and practice
Based on our findings and reflections, I now formulate some recommendations for future research, policy and practice regarding the steering of food choices, in particular by changing food environments, such as worksite cafeterias.

Recommendations for research
As discussed in chapter 5, we can define some methodological challenges for future nudging research that we can supplement with recommendations from chapter 6 and the thesis as a whole. Three topics for future research we like to address are long-term effectiveness, combined interventions (nudging and boosting) and specific target groups.
First, evaluating the long-term effect of nudging strategies is necessary. To illustrate, in the context of current nudging research our intervention of 12 weeks can be considered long-term. Although an effect of habituation could occur after 12 weeks, for example for priming nudges (‘placing healthier options most prominent’), examining effects of a longer exposure to nudges seems necessary. According to the Transtheoretical Model (TTM) or the Stages of Change Model, learning a new habit can take between 3 and 6 months. However, a study measuring the time it took for an eating, drinking or activity behaviour to become automatic ranged from 18 to 254 days. Therefore I would recommend to implement nudging strategies for at least six months, ideally a year. Furthermore, it is also interesting to investigate the possibility of the nudge becoming invisible as a result of long-term implementation. The nudge could lose its effect by employees getting used to it. On the other hand, a new healthy behaviour could also spill over to the food choice behaviour outside the worksite cafeteria. Second, also more research is needed concerning the combination of changing the food environment, together with training personal knowledge and skills, like food literacy or implementation intentions (boosting) and the effect on food choice. Altering the food environment by introducing nudges combined with boost could support ones consciously intended healthy food choices. A third recommendation is to get more insights in the effect of nudging and other approaches for specific target groups. In the light of the increasing socioeconomic inequalities in health it is important to focus on vulnerable groups. To illustrate, employees with lower socioeconomic status were underrepresented in our study. This could however be a group needing more support since being overrepresented in the group of adults with overweight.

**Recommendations for policy and practice**

Recommendations for policy and practice of our intervention are sharpening the nudges, upscaling and developing implementation tools. First, in chapter 5 we emphasized on the possible larger effectiveness when sharpening the nudges, for example increasing the amount of days on which fried snacks are not offered. A second recommendation from this thesis concerning practice, is that emphasis should be on the upscaling of nudging interventions in worksite cafeterias and subsequently on developing implementation tools to support this. In order to structurally roll out this intervention in many more companies, a start is to get more caterers to learn how to exploit a healthier worksite cafeteria. Like we concluded in chapter 3, caterers should also be instructed how to convince employers about the importance of having a heathier worksite cafeteria for their employees. This could also be enhanced by informing employer associations about the importance of employees eating healthy at work. A way to achieve upscaling is ensuring the embedding of the nudging strategies in the so-called formulas of caterers. For example, by being trained by nudgeing experts combined with implementation experts or by using an implementation tool. Employers should be
informed about the low costs of these type of interventions, which could lower the barriers for implementation. In a recent study Fitzgerald et al. (2017) compared the costs of an intervention with environmental modifications comparable to ours (menu modifications, fruit discounts, strategic positioning of healthier alternatives and portion size control) with the cost for nutrition education or a combination of both. They found that the incremental cost-effectiveness ratio of this environmental intervention (€101.37/quality-adjusted life-year), when compared with the control, is less than the nationally accepted ceiling ratio.58 Although their study is fairly similar to The healthy worksite cafeteria intervention, cost-effectiveness of worksite interventions in general is hard to conclude due to methodological issues.50

Recommendation concerning the combined interventions (nudging and boosting) and specific target groups I mentioned in the last paragraph also has implications for policy and practice. For employers with low educated employees I would recommend to check with the employees if there is a need for extra support. Besides adjusting the worksite cafeteria, also programs to increase health or food literacy could be helpful. Health literacy is defined as the ‘knowledge, motivation and competencies of people to access, understand, appraise, and apply health information in order to make judgments and make decisions in everyday life concerning healthcare, disease prevention and health promotion, to maintain or improve quality of life during the life course’.59

A review of Michou et al. (2018) showed that low levels of health literacy are associated with excess body weight. They also state that initiatives to improve health literacy levels could be a useful tool in the management of the obesity epidemic.60

Besides facilitating the practical implementation of an integrated approach for improving the food environment mentioned in the paragraph above, I like to recommend that policy makers, alongside researchers, should gain insights in the opinion of the target group about being nudged. Nowadays, the fear of being patronizing, disrupting autonomy or being manipulative is used by stakeholders who could influence the food environment, such as policy makers, as an argument not to intervene by nudging. There is little evidence on whether citizens of various societies support nudges and nudging. However, Reisch and Sunstein found strong majority support for nudges of the sort that have been adopted, or under serious consideration, in democratic nations.61,62 Evers et al. (2018) showed that there is moderate to high level of approval for nudges when the level of intrusiveness is low and the trustworthiness of the source high. In general, nudges implemented by experts received more approval than those by policy makers.14 And even giving disclosure is an option, because nudges can survive transparency.5,63 Therefore, besides gaining insights in the opinion of the ones being nudged, I also recommend to incorporate nudging strategies in policies together with the explanations of what strategies are implemented. Referring to the experts consulted could be useful.
General conclusions

This thesis showed that a healthy worksite cafeteria with nudging and social marketing strategies is feasible, and partly effective in stimulating healthier food choices of Dutch employees. The key elements of the intervention The healthy worksite cafeteria were the bigger share of healthier options visibly available, the low prices for healthier products, the prominent placement of these products and the combination of multiple strategies applied at one group of healthier products. In future research, investigating the additional effect of increasing the level of personal knowledge and skills, such as (elements of) food literacy and its contribution to healthier food choices at work is interesting. Furthermore, future research should emphasize on targeting most vulnerable groups. Increasing vitality of employees by enhancing eating behaviour could be beneficial for lifestyle and could consequently improve health and work-related outcomes. In the light of an aging workforce it is important for employers to create a work environment supporting their workers’ health and well-being. Nudging is a suitable strategy to be used in the worksite cafeteria and possible in other food environments. It is a valuable contribution to an integrated approach alongside governmental interventions such as taxes and subsidies, with the aim to evoke sufficient changes in the average Dutch eating pattern. Finally, this thesis provided enough reason for future research to investigate the long-term effects of a healthy worksite cafeteria with nudging and social marketing strategies on health and work-related outcomes.
References


Verleid worden om gezonder te lunchen op het werk

Factsheet onderzoek Het gezonde bedrijfsrestaurant

In het bedrijfsrestaurant is vaak veel keuze. Soep, salades, broodjes, warme gerechten; de mate van gezondheid van producten verschilt. Deze plek waar we dagelijks lunchen speelt een aanzienlijke rol in ons etenpatroon en daarmee onze gezondheid. Maar hoe kun je mensen verleiden om gezonder te eten? Om bij te kunnen dragen aan de gezondheid van Nederlands heeft Veneca de Vrije Universiteit Amsterdam benaderd om dit te onderzoeken.

DIT ONDERZOEK IS UITGEVOERD DOOR

Professor Ingrid Steenhuis
Gezondheids-wetenschapper Liesbeth Velema
Gezondheids-wetenschapper Ellis Vyth

wetenschappelijk literatuuronderzoek + advies van experts + inzichten in de doelgroep = veertien strategieën die kunnen verleiden tot gezondere keuzes

12 weken experiment
30 bedrijfsrestaurants
7 verschillende productgroepen
controlegroep vs interventiegroep

DEZE VEERTIEN STRATEGIEËN ZIJN VERVOLGENS GETEST IN EEN ONDERZOEK

De productgroepen

belegde broodjes
salades
tribuur- en bladerdeeg snacks
kaasbeleg
vleesbeleg
fruit
snoep

VAN HET 'BETERE KEUZE' KAASBELEG, DE GEZONDERE BROODJES EN HET FRUIT WERD SIGNIFICANT MEER VERKOCHT.

Dit verschil was constant gedurende de 12 weken.

'Betere keuze' kaasbeleg

AANPASSING

MARKETING MIX

Meer van uitgestald dan van de reguliere 48+ kaas.

Prominent geplaatst.

Product

Plaats

60% 'BETERE KEUZE' 30+ KAAS

40% REGULIERE 48+ KAAS

'BETERE KEUZE' KAASBELEG (VERPAKKINGEN)

VERKOCHT PER 100 GASTEN

**Verleid worden om gezonder te lunchen op het werk**

**Gezondere broodjes**

<table>
<thead>
<tr>
<th>AANPASSING</th>
<th>MARKETING MIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% goedkoper aangeboden.</td>
<td>Prijs</td>
</tr>
<tr>
<td>Meer van uitgestald dan van de reguliere broodjes.</td>
<td>Product</td>
</tr>
<tr>
<td>Prominently geplaatst.</td>
<td>Plaats</td>
</tr>
<tr>
<td>Promotie op menu’s en in een voordeelig combi-deal.</td>
<td>Promotie</td>
</tr>
</tbody>
</table>

**Fruit**

<table>
<thead>
<tr>
<th>AANPASSING</th>
<th>MARKETING MIX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Op meerdere plekken aangeboden, waaronder bij de kassa. Bij de kassa lag niets anders dan fruit en snackgroenten.</td>
<td>Plaats</td>
</tr>
<tr>
<td>Fruit maakte deel uit van een combi-deal waardoor er een kortings van 25% op werd gegeven.</td>
<td>Promotie</td>
</tr>
</tbody>
</table>

**Conclusies Het gezonde bedrijfrestaurant**

De manier waarop een bedrijfswagen is ingericht heeft effect op wat mensen kopen. De strategieën van *Het gezonde bedrijfswagen* zijn deels effectief om gasten te verleiden om een gezondere keuze te maken.

---

**PRIJS**
Het verlagen van prijzen van gezondere opties lijkt te werken.

**VERHOUING AANBOD**
Mensen lijken eerder te kiezen voor een gezondere optie wanneer het aandeel gezondere opties groter is.

**COMBINEREN**
Het relatief eenvoudig combineren van de verschillende strategieën om een product aantrekkelijk te maken heeft waarschijnlijk effect.

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GA NAAR [WWW.VENeca.NL](http://WWW.VENeca.NL)
VOOR HET ONDERZOEKSRAPPORT EN DE PRAKTISCHE HANDLEIDING

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VENeca Vereniging Nederlandse Cateringorganisaties

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