CHAPTER 10

The process evaluation of two interventions aimed at portion size in worksite cafeterias

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ABSTRACT

**Background:** In a previous study, the effectiveness of introducing a small meal in addition to the existing size and a proportional pricing strategy have been assessed in Dutch worksite cafeterias. The aim of the current study was to describe the process evaluation of both interventions.

**Methods:** Process evaluation components from Baranowski and Stables, and Rogers were chosen as a theoretical basis. The process evaluation involved qualitative and quantitative data that was collected from 25 participating worksite cafeterias.

**Results:** The recruitment data showed that of the 99 worksite cafeterias that were eligible, 73 decided not to participate. During the study, one worksite cafeteria dropped out of the study. In the majority of cases, the participating worksite cafeterias followed the study protocol and the required resources were available. The worksite cafeterias managers did not consider offering large and small hot meals as complex, risky or time-consuming to implement. Some managers perceived the consumer demand as high, others as (too) low. Data with respect to continued use indicated that one year after the study had ended, 9 of the 17 intervention cafeterias have continued (at least partly) to follow the protocol.

**Conclusions:** Offering a smaller portion size in addition to the existing size, as well as proportional pricing was generally implemented as prescribed by the protocol and is promising in terms of continued use. However, additional efforts are needed to increase the consumer demand.
**BACKGROUND**

In many cases the evaluation of interventions targeted at health behavior is focused on its effectiveness. However, evaluating the *process* of an intervention delivery can be insightful and provides an understanding of the working mechanisms of an intervention. Additionally, process evaluations can help explain a lack of intervention effects and thereby prevent type III errors from occurring. Type III errors have been described as evaluating a program that has not been adequately implemented [1]. Another reason why it is useful to conduct a process evaluation, is that it documents how to achieve a successful intervention implementation and can thereby inform the design and delivery of future interventions [2, 3].

In this paper, a process evaluation is described of two worksite cafeteria interventions aimed at portion size. In the US and in Europe food portion sizes have increased in the past decades [4-6]. In addition, empirical studies have shown repeatedly that large portion sizes enhance people’s food intake [7, 8] and are thereby a risk factor for obesity. As a result of marketing strategies such as value size pricing (i.e. a lower price per unit for large portions than for small portions) consumers are stimulated to select a large portion [9] and consider this a normal size.

Interventions aimed at portion size might help consumers to reduce their food intake [10, 11]. These interventions can be situated in consumers’ food environment such as, for instance, worksite cafeterias. The effectiveness of two interventions directed at portion size has been evaluated in 25 Dutch worksite cafeterias [12]. The two interventions comprised offering a small meal in addition to the existing size (experimental condition 2) and proportional pricing (i.e. keeping the price per unit stable regardless of the size; experimental condition 1). The results of the effect evaluation indicated that approximately 10% of the consumers who normally purchased a regularly sized hot meal, replaced this meal with a small meal. Furthermore, proportional pricing did not have an additional effect.

It is relevant to assess the degree of implementation of interventions aiming to improve the nutrition environment, and to determine whether these interventions are promising in terms of continued use. The aim of the current study was to describe the
process evaluation of offering smaller meals in addition to the existing size and proportional pricing in worksite cafeterias.

**METHODS**

**Intervention**

The intervention study consisted of three conditions:

1) Experimental condition 1 (n = 9), in which a smaller portion (i.e. about two-thirds of the size of the existing portion) was offered in addition to the existing portion and proportional pricing was employed (i.e. the price was 65% of the existing size);

2) Experimental condition 2 (n = 8), in which a smaller portion was added to the assortment and value size pricing (i.e. a lower price per unit for large portions than for small portions) was employed (i.e. the price was 80% of the existing size);

3) The control condition (n = 8), in which only the existing size of the hot meal was available.

Not all meals were suitable to be offered as a small portion. When the meat or fish component was served as a unit that could not be reduced, the dish was not considered suitable to be offered as a small size. Therefore, in most cases only combined dishes (e.g. rice, chili, and pasta) were reducible and offered in both a large and a small portion size. Prices for the large meal were kept the same as before the study and were defined by each worksite cafeteria independently.

Before the intervention period started, all worksite cafeterias received an information card with pictures on which the protocol was clarified to the staff. The protocol dictated that at the counter where the meals were served, a display with pricing information was placed. Furthermore, worksite cafeteria employees in both experimental conditions were instructed to ask each costumer what size they wanted and to serve the small portion on a small plate so as to standardize the size.

**Theoretical framework**

For this study, process evaluation components from Baranowski and Stables (i.e. Recruitment, Maintenance, Context, Resources, Implementation, Exposure, Contamination,
and Continued use) [2] were chosen as a theoretical basis. See Table 1 for a description of these components.

For the component Continued use, it was considered relevant how the participating worksite cafeteria managers perceived the intervention. Therefore, the managers were asked to score the intervention on a number of characteristics that were based on the Diffusion of Innovations theory [13]. This theory was chosen because when conducting a process evaluation, it is recommended to use the same theoretical model that was used for the development of the intervention [3]. The Diffusion of Innovations theory was employed in two previous studies that were used for the development of this intervention [14, 15]. Diffusion of innovation characteristics that were taken into account were: Relative Advantage (i.e. the degree to which an innovation is perceived as better than the idea it supersedes); Complexity (i.e. the degree to which an innovation is perceived as difficult to understand and use); Time (i.e. the amount of time it takes to implement the innovation); Risk and uncertainty level (i.e. the degree to which an innovation can be adopted/implemented with minimal risk); and Compatibility (i.e. the degree to which the innovation fits with the adopter and the user).

Measures and Data collection procedures

The process evaluation involved multiple data collection instruments; see Table 10.1 for an overview.

1. A document was made of all the worksite cafeterias that were contacted and reasons for non-participation were recorded. This document was used in order to assess the Recruitment component.

2. The dropout data from the worksite cafeterias was used for measuring the Maintenance component.
<table>
<thead>
<tr>
<th>Process evaluation component</th>
<th>Description</th>
<th>Process components translated to research questions</th>
<th>Data source</th>
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<tbody>
<tr>
<td>Recruitment</td>
<td>Attracting agencies, implementers, or potential participants for corresponding parts of the program</td>
<td>- How were the worksite cafeterias recruited?</td>
<td>Recruitment record</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Keeping participants involved in the programmatic and data collection</td>
<td>- How many worksite cafeterias dropped out of the study? - What were the reasons for dropping out?</td>
<td>Drop-out data with respect to worksite cafeterias</td>
</tr>
<tr>
<td>Context</td>
<td>Aspects of the environment of an intervention</td>
<td>- What kind of companies participated in the study? - How large were the participating worksite cafeterias (in terms of number of visitors and hot meal sales)?</td>
<td>Intake interviews with participating worksite cafeterias Consumer data</td>
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<tr>
<td>Resources</td>
<td>Materials or characteristics of agencies, implementers, or participants necessary to attain project goals.</td>
<td>- Were the materials required for the intervention (i.e. display material and small plates) available at the intervention sites?</td>
<td>Structured observations Process evaluation interviews with worksite cafeterias managers</td>
</tr>
<tr>
<td>Implementation</td>
<td>Extent to which the program is implemented as designed.</td>
<td>Was the intervention carried out as prescribed in the study protocol (i.e. availability of two plate sizes, displays, pricing, and communication with customers)?</td>
<td>Structured observations Process evaluation interviews with worksite cafeteria managers</td>
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| Exposure       | Extent to which participants view or read the materials that reach them. | - What percentage of the consumers noticed that small meals were introduced in their worksite cafeteria?  
- What percentage noticed the prices?  
- Did the consumers in the proportional pricing condition consider the price for the hot meal as more attractive than participants in the value size pricing condition? | Consumer data |
| Contamination  | The extent to which participants receive interventions from outside the program and the extent to which the control group receives the treatment. | - Were there activities in the worksite cafeterias during the intervention period that might have affected the study results (i.e. healthy eating campaigns, changes in the food selection)  
- Were small portions offered in the control condition? | Process evaluation interviews with worksite cafeteria managers Structured observations |
<table>
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<tr>
<th>Continued use</th>
<th>The extent to which a participant continues to do any of the activities.</th>
<th>How many worksite cafeterias intended to continue offering small meals in addition to the existing meals?</th>
<th>Process evaluation interviews with worksite cafeteria managers Telephone interview 12 months after the intervention ended</th>
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<tr>
<td></td>
<td>How did the worksite cafeteria managers perceive the intervention’s characteristics?</td>
<td>How many participating worksite cafeterias continued offering small meals 12 months after the study period had ended?</td>
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*Based on the Diffusion of Innovations Theory.*
3. Before the start of the intervention, a member of the research team visited each of the 25 participating worksite cafeterias. During this visit, an intake interview with the cafeteria manager took place. This semi-structured interview consisted of 10 questions (e.g. about the numbers of customers per day and on how many days hot meals were offered), and provided information about the Context in which the intervention took place. Furthermore, in the last week of the intervention an online questionnaire was administered to a group of worksite cafeteria visitors in the two experimental conditions that were willing to participate in the study. The results of this questionnaire provide information with respect to the Context in which the intervention took place (i.e. the background characteristics of the worksite cafeteria visitors) and the cafeteria visitors’ Exposure to the intervention. Participants who were included in the data analysis (n = 225) had to have eaten in their worksite cafeteria at least sometimes during the intervention period. In this questionnaire worksite cafeteria visitors were asked to report, for instance, whether they had noticed that small meals were available, if they had seen the price, etc.

4. During the intervention structured observations took place in all participating worksite cafeterias. Appointments for these visits were made beforehand, because it was not possible to access all the worksite cafeterias without permission. The structured observations were conducted by a member of the research team and were used to collect data about Implementation and Resources. The aspects that had to be checked (e.g. whether two portions of hot meals were offered, the meals’ weight, the price, and the information that was displayed) were recorded on a checklist.

5. Within the two months after the study period had ended the participating worksite cafeterias in the experimental conditions were visited by a member of the research team for a semi-structured interview with the manager. The interview lasted approximately 28 minutes (ranging from 14 to 45 minutes) and consisted of questions with respect to the Resources, Implementation, Contamination, and Continued use of the intervention. See Table 10.2 for an overview of the interview topics.

6. Each worksite cafeteria manager in the experimental conditions that intended to continue offering small meals after the intervention had ended was contacted by
telephone 12 months after the end of the intervention. During the telephone interview the *Continued Use* of the intervention was assessed. Since this study did not carry the risk of inflicting physical or psychological harm to the participants, it was deemed exempt by the VU University Medical Centre Institutional Review Board.
### Table 10.2 - Main interview topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Question</th>
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<tr>
<td>Introduction</td>
<td>- What are your opinions about offering a small hot meal in addition to the existing size in your worksite cafeteria over the past months?</td>
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</table>
| Implementation   | - To what extent was it feasible to offer both a small and a large size of hot meals in your worksite cafeteria?  
                   | - To what extent was the intervention delivered as stated in the instruction manual?  
                   | - Were there specific instructions that were difficult to implement? If yes, which were these (consider for instance the display material, serving the meals, etc.)?  
                   | - Did you get any reactions from your customers about the availability of both a small and a large meal? If yes, what kind of reactions did you get?  
<pre><code>               | - Did you get any reactions from your staff about the availability of both a small and a large meal? If yes, what kind of reactions did you get? |
</code></pre>
<p>| Resources        | - Were the required materials (e.g. two plate sizes, display material) available in order to be able to offer the small and large meals? |</p>
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<th>Table 10.2 Continued</th>
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<tr>
<td>Continued use</td>
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<td>(Relative advantage,</td>
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<td>Complexity, Time,</td>
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<td>Risk and uncertainty level,</td>
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<td>Compatibility)</td>
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<td>Contamination</td>
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Data Analysis

Descriptive statistics were calculated, using SPSS version 17, for the data that was collected from the recruitment record, the intake interviews, the structured observations, the drop-out data, the telephone interviews, and the online questionnaire that was completed by the consumers.

With respect to the semi-structured interviews, each interview was recorded and transcribed verbatim. The data were coded and analyzed with Atlas.ti 5.2 using an integrated approach as developed by Bradley and colleagues [16]. This approach combines the principles of inductive reasoning with employing predetermined code types. Firstly, the authors formed an initial coding list including concepts derived from Baranoswki and Stables [2] and Rogers [13]. The initial coding list was completed by codes that emerged from the interviews. Using the final coding list, one member of the research team (WMV) read the transcripts and coded the data. Subsequently, another member of the research team (FHL) independently coded three randomly selected transcripts. Differences in coding were negligible, and consensus was easily achieved. The results of the analyses of the process interviews with the managers are presented thematically rather than organized by frequency. When considered relevant, the data was analyzed and will be reported separately for both experimental conditions.

RESULTS

Recruitment

First, 158 worksites (i.e. 75 hospitals, 54 companies, 14 universities or research institutes, 4 police departments, and 11 miscellaneous) were telephoned to ask whether there was a worksite cafeteria selling hot meals. If that was the case, the name of the manager was requested and a letter was sent introducing the study. After a week, the manager was contacted by telephone. When a worksite cafeteria agreed to participate, a representative of the research team visited the manager to further clarify the study procedures and the protocol. Worksite cafeterias could participate in the study if they sold, on average, at least 30 meals per day, offered a reducible meal at least twice a week, were willing to be
randomly allocated to a study condition, and to follow the study protocol. Last, they had to agree to provide their daily sales figures for hot meals and fried snacks. Of the 99 worksite cafeterias that were eligible, 73 decided not to participate. Reasons that were mentioned for non-participation were: reorganization or time constraints (n = 18); customers served their own portion and managers were afraid that they would serve themselves a large portion for the price of a small portion (n = 5); their cafeteria was currently involved in another study (n = 3); they did not want participate in a study that involved pricing (n = 6); and the economic recession (n = 1). Forty cafeterias did not give a reason for non-participation.

**Maintenance**
During the study, one worksite cafeteria in experimental condition 2 dropped out of the study because it did not provide all the requested data.

**Context**
The 25 worksite cafeterias that were included in the data analyses (i.e. 15 hospitals, 5 companies, 3 universities, and 2 police departments) sold, on average, 104 hot meals per day (ranging from 30 to 550) and catered for 569 customers (ranging from 200 to 1750) per day. The consumer data indicate that the participants’ mean age was 38.92 (SD = 11.56), and that 52% of the participants were female. Furthermore, according to the self-reported length and body weight, 35% of the consumer panel was overweight. Last, 0.4% had a pre-primary educational level, 4.4% had a primary level, 31.6% had a lower secondary level, and 63.6% a tertiary level.

**Resources and Implementation**
The results from the structured observations and the interviews indicate that in all worksite cafeterias in the intervention conditions both small and large portions of the hot reducible meals were offered. In 4 cafeterias in experimental condition 1, the price for the small meal was in line with the protocol; in 3 cafeterias the price was too low; in 1 cafeteria the price
was too high (missing n = 1). In all cafeterias in experimental condition 2, the prices were correct.

Furthermore, the observations indicated that in 13 of the 17 cafeterias 2 plate sizes were available at the counter (missing n = 3).

It was observed that in 15 cafeterias (7 in experimental condition 1 and 8 in experimental condition 2) the prices were displayed at the counter. In 2 cafeterias no displays were seen. However, during the interviews with the managers of these cafeterias, it was stated that the displays had been available during the intervention. The manager of the other cafeteria did not mention a particular reason for not having had the display during the observation visit.

In general, the interviews indicated that when the manager endorsed the intervention and was willing to put effort into carrying out the intervention, the degree of implementation seemed higher. One manager mentioned for instance:

“If I was on the case, it [manager refers to following the study protocol] was being done. However, if I was not, there were days that it did not happen.”

The results from the structured observations showed that in 10 cafeterias the portions were labeled as “small” and “large”. However, not conforming to the protocol, some worksite cafeterias labeled the portions differently (e.g. as “regular and small “or “full and half”). During the interviews the managers explained that some customers did not consider the large portion to be large. These managers did not want to get involved in this discussion and, therefore, preferred to label the portions differently.

Lastly, it was observed that in 12 cafeterias (missing n = 5) the staff asked each customer what portion they wanted. Reasons that the managers provided during the interviews for not posing this question were: staff turnover; time constraints; it was considered unnecessary; and customers found this question annoying.

After the observation visits, all managers of worksite cafeterias in which deviations from the protocol were detected, were asked to amend them. Whether this happened was ascertained with a second observation visit.
Exposure
The data from the consumer panel showed that, in experimental condition 1, 61.8% and in experimental condition 2, 65.2% of the consumers noticed that a small portion was available in addition to the existing size ($\chi^2 (1) = .27, p = .6$). With respect to the pricing, a significant difference was found between the two experimental conditions. In experimental condition 1, 32.4% thought that the prices of both the small and existing meal were clearly communicated, whereas in experimental condition 2, 49.4% had this opinion ($\chi^2 (1) = 6.59, p = .01$). Furthermore, 36.0% of the participants in experimental condition 2 and 27.9% of the participants in experimental condition 1 considered the price for the small portion to be (much) too high ($\chi^2 (1) = 1.61, p = .2$).

Contamination
The results from the interviews with the managers showed that in some cafeterias theme weeks were organized (e.g. “Health check”, “Italian week”, etc.). However, portion sizes were not mentioned in this respect.

Structured observations in the control group cafeterias indicated that no small portions were available.

Continued use
During the interviews with the worksite cafeterias managers, 12 managers (7 in experimental condition 1 and 5 in experimental condition 2) indicated that they intended to continue offering small hot meals in addition to the existing size, 4 (1 in experimental condition 1 and 3 in experimental condition 2) did not intend to continue, and for 1 cafeteria (in experimental condition 1) it was unclear. From the managers that intended to continue offering small portions, the majority did not plan to adapt the original protocol. Other managers intended to change the names for instance into normal and small portions, or full and half portions. One manager intended to start offering more products in multiple sizes. No differences in the intended adaptations were found between both experimental conditions.
One year after the study had stopped, all worksite cafeteria managers (except the 4 that had already stopped offering two hot meal sizes) were telephoned in order to ask them whether they still offered different sizes of hot meals. Results showed that 6 worksite cafeterias still offered small and large hot meals, 3 had made adaptations to the original intervention (i.e. by only offering the small portion, or to offer multiple size options for only one type of meal), and 4 cafeterias had completely stopped.

Relative Advantage
The most important advantage of offering a small meal in addition to the existing size seemed to be the absence of disadvantages, with the exception of one disadvantage that offering two portions took more space on the counter. According to the managers, customers were satisfied with the extra service and if they were not interested in the small portion, they did not complain that the option was available.

One manager stated:

“From a food facility perspective, we are service-oriented. The possibility is there, and we don’t lose anything by offering smaller sizes.”

Other advantages that were mentioned were that offering multiple portion sizes has a professional appearance. Also, by offering two sizes discussions with customers about portion sizes were avoided and customers who chose a small portion were happy that they paid a lower price.

Another issue that was mentioned was consumer demand. About half of the managers perceived the demand as quite large, the other half as small (when assessed separately for experimental condition 1 and 2, no differences in perceived consumer demand were found). The latter group thought that their customers considered the small portion too small. With respect to consumer satisfaction, managers mentioned that they considered it a service to offer their guests more choice and added that their guests reacted positively.
Complexity

In general, the managers mentioned very few issues with respect to the complexity of offering a small portion of reducible meals. A complexity that was mentioned, however, was that two plate sizes could cause logistics problems; for instance, with respect to the dishwashers and the machines that warm the plates. Furthermore, one manager indicated that the cash desk needed to be adapted, which was a bit complicated. Another issue that was mentioned was that presenting the small portion in such a way that it still looked attractive was sometimes a challenge.

Lastly, in addition to the intervention protocol, some worksite cafeterias had also offered small portions of meals that were not considered reducible (i.e. when the meat or fish component was served as a unit). These managers indicated during the interviews that this was indeed too complex in terms of food loss, presentation and purchase.

Time

In general, the managers did not consider the intervention time-consuming. Apart from a few single activities at the beginning (e.g. adapting the cash desk, making the displays), the only aspect that needed time investment was instructing the employees, especially as there was considerable staff turnover, this could take some time. The following fragment illustrates this:

Interviewer: “Which aspect was most time-consuming?”
Interviewee: “Communicating it [the intervention] to the people within the company, both within our department as well as people from higher up in the company.”

Risk and uncertainty level

The managers mentioned a few risks. Firstly, in the self-service cafeterias, customers who chose a small portion actually served themselves a large portion. Secondly, offering a small portion was not possible with every type of meal (see intervention description). Nevertheless, some guests expected a small portion every day and it was difficult to explain that this was not possible. A final risk that was mentioned was sales volume. Some managers
said that it could be a risk that if many customers chose a small portion, the sales volume would decrease. However, only a few managers mentioned that this had actually happened. Moreover, some managers had the impression that by offering a small portion they had actually attracted a new consumer group (for instance, women were more likely to eat a small hot meal or a customer who previously did not eat a hot meal now ordered a small meal). Some managers observed that it was profitable to offer small portions, because the customers that chose a small portion now purchased additional items such as salads or snacks. One manager illustrated this by stating the following:

“My first impression is that there is quite some demand for the small portion. The only thing is that this is being compensated for by a side-item. People think that when they choose a small portion, they can take an additional side-item such as a croquette. That’s what I’ve noticed.”

Compatibility
Some managers mentioned that offering small portions corresponded to their policy of offering healthier food options. Other managers did not associate offering small portions with health, but said that it did appeal to being more service-oriented.

DISCUSSION
Process evaluations of previously conducted nutritional programs that were situated in worksite cafeterias have given important insights [17, 18]. For instance, such programs need intensive promotion and are partly dependent on the supplies from relevant manufactures and wholesalers. A strength of the current study was that multiple data sources were used, which has contributed to a comprehensive process evaluation. From the study, the following can be concluded:

Firstly, the process evaluation indicates that, on the whole, the intervention study was executed as planned. No contamination took place, and the majority of the worksite cafeterias in both experimental conditions implemented the intervention along the lines of
the protocol and if not, this was adjusted quickly. Therefore, the relatively modest intervention effects that were found [12] do not seem to stem from an inadequate implementation and thus from a Type III error.

In line with the previous, the resources necessary for the intervention were few and easily obtainable. It should be added that the implementation was higher when the manager endorsed the intervention and actively monitored the implementation. A few barriers with respect to the implementation were also encountered. Some managers had problems with labeling both portions in terms of large and small. Also, asking each customer what size they wanted was omitted in some cases. With respect to the proportional prices, the consumer data indicates that exposure to the prices was lower in experimental condition 1 than in experimental condition 2. This triggers the question whether the managers in experimental condition 1 wanted to conceal the proportional prices. On the other hand, the structured observation data does not point in this direction.

Secondly, the managers did not perceive the intervention as complex, time-consuming or risky. Some managers thought that offering small portions was compatible with their policy of offering healthier food; others considered it more professional or service-oriented. Advantages as described by the managers were consumer satisfaction and that discussions with guests about portion sizes were avoided. Opinions differed with respect to consumer demand: some considered it (too) small; and others as quite large. Furthermore, the results suggest that the intervention is promising in terms of feasibility and continued use, especially, since research has indicated that, compatibility and complexity in the sense of time were predictors for the degree of implementation of the “Choices logo” (i.e. a front-of-pack logo on products that are a healthy choice within a food category) in Dutch worksite cafeterias [19].

Directly after the intervention had ended, the majority of managers intended to continue offering small hot meals in addition to the existing size. One year after the intervention, six worksite cafeterias still offered small and large hot meals, and three other cafeterias had implemented an adapted version of the intervention. Apparently, the study had motivated worksite cafeterias to take a critical look at their portion sizes and make adaptations where considered necessary. In general, these results suggest that the
implementation of an environmental intervention such as that described in this study, is relatively effortless except for a few actions in the beginning. As opposed to educational interventions that require recurring effort, continued use is more likely for environmental interventions after the initial investments have been made.

An issue that merits attention is that some managers observed that customers who chose a small meal were more likely to order other items, such as snacks. Some managers also indicated that the small meals attracted a new consumer group instead of motivating people to replace their large meals with small meals. This can be considered a risk for the effectiveness of the intervention. On the other hand, the effect evaluation results did not point in this direction [12]. All in all, the interviews give reason to recommend further research into the effectiveness of the intervention and the possible occurrence of undesirable side effects.

A limitation of this study is that many more worksite cafeterias were recruited than finally participated, and that due to the low response rate the external validity of the intervention study is open to discussion. The results show that for a minority of the worksite cafeterias, intervention-related reasons were mentioned. In the other cases, it seems that the study itself was the reason for not participating. This implicates that the intervention itself was considered feasible according to the majority of the worksite cafeterias that were requested to participate. It is nevertheless conceivable that the worksite cafeterias that chose to participate in the study were for instance more strongly health oriented than the worksite cafeterias that did not participate.

Related to the external validity of this study is the issue that in the Netherlands, except for hospitals, it is not very common to eat a hot meal in worksite cafeterias. Therefore, this intervention might have a bigger impact in countries where it is more common to eat a hot meal in the worksite cafeteria. Furthermore, for the reason mentioned above, the study sample consisted predominantly of hospitals. This could partly explain that the intervention was implemented in a context that is characterized by a highly educated target group (i.e. 63.3% of the participants in the consumer sample had a tertiary educational level compared to 27.0% in the Dutch population [20]. It should however be noted that the consumer panel might differ from the general group of visitors in the
worksite cafeterias. Also, in the literature hospitals are generally considered to be suitable settings for worksite interventions as they employ a diverse population [21]. A positive aspect is that the dropout rate was very low and apparently unrelated to the intervention.

Lastly, this study would have benefitted from more data with respect to the characteristics of the worksite cafeteria (e.g. company size, corporate financial support). These data could have helped placing the results from both the effect and process evaluation in a broader context.

**CONCLUSION**

The results from this process evaluation provide valuable lessons that can inform the implementation of other interventions targeted at improving the nutrition environment. A success factor of the two interventions was that they were based on formative research and can therefore be considered acceptable for the target group and feasible to implement. Also, the results of this process evaluation suggest that the managers are potentially important moderators of the intervention’s effectiveness. We therefore recommend involving decision makers in the intervention development and implementation.

Furthermore, offering large and small hot meals seems to be a feasible intervention that is not perceived as complex, risky or time-consuming to implement. This might explain that a year after the intervention study, more than half of the participating worksite cafeterias have continued to (at least partly) follow the protocol. However, a threat for the continued use is that some managers considered consumer demand too low. This also raises questions with respect to the effectiveness of the intervention. Even more so since, according to some managers, the small meals might have attracted a new consumer group and/or compensatory food intake might have occurred.

Based on this process evaluation, it is recommended advertising the availability of small portion sizes more actively in order to increase consumer demand. Furthermore, it is suggested assessing whether informing consumers about the relation between portion sizes and weight control reduces the occurrence of compensatory food intake. A last suggestion,
which is already being done by one worksite cafeteria, is reducing the size of the large meal instead of offering multiple sizes.
REFERENCES

8. Rolls BJ, Roe LS, Meengs JS. The effect of large portion sizes on energy intake is sustained for 11 days. Obesity (Silver Spring) 2007; 15: 1535-1543.


16. Bradley EH, Curry LA, Devers KJ. Qualitative data analysis for health services research: Developing taxonomy, themes, and theory. *Health Serv Res* 2007; 42: 1758-1772.


