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A nutrition labeling intervention in worksite cafeterias: An implementation evaluation across two large catering companies in the Netherlands

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Abstract
Introduction: By both increasing the availability of healthy foods and labeling these products with the Choices logo, caterers may facilitate employees to make a healthier choice in their worksite cafeterias. The aim of this study was to explore which attributes influence the implementation of the Choices logo in worksite cafeterias in the Netherlands.

Methods: Questionnaires were completed by catering managers of 316 cafeterias of two large caterers in the Netherlands (response rate 49.8%). Attributes from the Diffusion of Innovations Theory were used to investigate whether they could predict implementation.

Results: Compatibility (consistency with the beliefs of the catering manager; OR = 1.52), voluntariness (perception of the implementation as voluntary; OR = 0.50), result demonstrability (ability to communicate the implementation; OR=1.52) and complexity in the sense of time (time needed for implementation; OR = 0.70) were the best predictors for the frequency of offering fresh Choices products (all significant). For the frequency of using Choices promotion materials, voluntariness (OR = 0.54), result demonstrability (OR=1.51), and relative advantage (perceived advantage of the implementation; OR=1.44) were the best predictors (all significant).

Conclusions: This study provides unique insights in which perceived attributes influence the implementation of a nutrition logo in worksite cafeterias. In order to increase the implementation, the Choices logo should be consistent with catering managers’ ideas about healthy food, the workload of implementing the logo should be limited and it could be recommended to incorporate the logo in the health policy of the caterer.
Introduction

Nowadays, many people eat out-of-home meals during lunch (1). In the United States, 25.3% of out-of-home lunches are consumed in worksite cafeterias (2). In the Netherlands, 35-40% of employees have their lunch in worksite cafeterias (3). Out-of-home eating has been associated with large portion sizes (1). Large portions have been related to a high energy intake, which has been associated with diet-related chronic diseases (4). These findings stress the importance of offering healthy lunches in worksite cafeterias. There are several strategies to make worksite cafeterias healthier. A systematic review investigating the effectiveness of worksite health promotion programs using environmental modifications indicated the potential to improve dietary behavior in worksite cafeterias by using strategies such as increasing the availability of healthy products, promotional materials, efficient food placement, and food labeling (5).

In 2006, a new front-of-pack nutrition logo was introduced in the Netherlands, the Choices nutrition logo, introduced by a foundation of food manufacturers, retail and food service organizations, the Netherlands Nutrition Center, nutrition scientists, and conditionally endorsed by the Dutch Government. The logo is assigned to products that qualify for criteria of sodium, added sugar, saturated fatty acids, trans fatty acids, fiber and energy, based on international recommendations by the World Health Organization (WHO). Logo products inform healthier food choices within their respective product category. The logo can be found on a variety of food products in different supermarket chain stores, and in several food service locations. One of the aims of the logo is to stimulate consumers to make healthier food choices. Earlier of our studies showed that consumers were largely familiar with the logo one year after its introduction and consumers more interested in health purchased most logo products (6, 7). A detailed background of the logo has been described elsewhere (6). Since 2008 the Choices logo has been implemented in worksite cafeterias operated by several commercial catering companies in the Netherlands. After following a training course, the catering manager of the worksite cafeteria is supposed to increase the availability of healthy food choices and implement the logo in his/her worksite cafeteria. Additional to pre-packaged products, the worksite cafeteria may offer freshly prepared products which comply with the Choices criteria, such as Choices sandwiches and salads. It is interesting to mention that we found that the logo has influenced food manufacturers and caterers to reformulate existing products and develop new products with a healthier product composition especially where sodium and dietary fiber are concerned (8). Further, the catering managers are allowed to use promotion materials, such as labeling in their worksite cafeterias (see Figure 1). By both increasing the availability of healthy foods and labeling these

Figure 1. Freshly prepared Choices sandwiches labeled with the Choices logo
products with the logo, the caterer may facilitate employees to make a healthier choice in their worksite cafeterias.

The implementation of the logo in worksite cafeterias has not been evaluated yet, because it is a relatively new labeling system which is implemented on a voluntary basis. It is of interest to investigate which perceived attributes influence the implementation of the logo in worksite cafeterias in order to be able to increase its implementation. Therefore, this study investigated the degree of implementation and which perceived attributes influence the degree of implementation of the Choices logo in worksite cafeterias in the Netherlands.

**Methods**

*Design and population*

A cross-sectional quantitative design was used. Catering managers were recruited from the two largest catering companies in the Netherlands who joined the Choices Foundation. These two caterers have a market share of 52% of the Dutch catering market. In 72% of their workplaces, the Choices logo has been introduced. Questionnaires were sent by e-mail or post to the managers of 634 catering sites located in different areas of the Netherlands in March 2009. A total of 316 (49.8%) questionnaires were returned. The study protocol of the study was approved by the Scientific Ethics Committee of the VU University Amsterdam.

*Questionnaire and calculations*

**Perceived attributes of the program.** A theory frequently used for studies investigating the implementation of innovations is the Diffusion of Innovations theory (9). Exploring the implementation of the Choices logo as an innovation according to this theory may provide useful insights which can be used to improve its implementation. Rogers identifies the following attributes related to program diffusion: *relative advantage* (the degree to which the implementer sees the innovation as an advantage), *compatibility* (the degree to which the innovation is consistent with the ideas and opinions of the implementer), *complexity* (the degree to which the innovation is difficult to work with), *trialability* (the degree to which the implementer can experience the innovation before implementation) and *observability* (the degree to which the results of the innovation are visible to the implementer). In this study we included all these attributes except observability, because Moore and Benbasat found a more valid way of including observability by measuring the attribute *result demonstrability* (the degree to which the implementer is able to measure, observe and communicate the results of the innovation) (10). Additionally, we also measured *voluntariness* (the degree to which the implementer perceives the implementation as voluntary) and the *knowledge* of the catering manager about the meaning and use of the Choices logo in worksite cafeterias. The questionnaire for this study was based on the questionnaire of Moore and Benbasat (10) and Pankratz and colleagues (11). Although these questionnaires are not related to food labeling, they measure the above mentioned attributes which form the theoretical framework of this study. Therefore, these questionnaires were used. The operationalization of the attribute *relative advantage* was based on the study in worksite cafeterias by Steenhuis and colleagues (12).

*Respondents.* The questionnaire measured the age, gender and educational level of
the catering managers. Educational level was divided into three categories: a low educational level (primary school or basic vocational education), a medium level (secondary vocational education or high-school degree) or a high educational level (higher vocational education or university degree), corresponding to the commonly used classification in the Netherlands (13). Further, the catering managers reported how many employees worked in their cafeteria, how many users their cafeteria had, whether they had followed a Choices training course (yes/no), who decided that he/she had to follow this training (respondent/other), and when this training was followed.

**Degree of implementation.** We developed two measures to assess the implementation of the logo in the worksite cafeterias. The frequency of offering freshly prepared Choices products was defined as a measure for implementation (How often do you offer freshly prepared Choices products in your worksite cafeteria?), measured on a five-point Likert scale (never = 1, always = 5). This measure was divided into two categories: low frequency implementers (LOI; score 1 – 3) and high frequency implementers (HOI; score 4 – 5). The second measure was defined as promotion of the logo and included five questions about the frequency of using Choices promotion materials (e.g. How often do you place Choices signs in front of freshly prepared Choices products in your worksite cafeteria?), all items were measured on a five-point Likert scale (never = 1, always = 5). A mean score was calculated and this measure was also divided into two categories: low promotion implementers (LCI; score 1.0 – 3.0) and high promotion implementers (HCI; score 3.1 – 5.0).

**Attributes influencing implementation.** We measured all perceived attributes of the program on a five-point Likert scale (strongly disagree = 1, strongly agree = 5). The attribute complexity was subdivided into three categories: complexity of working with the Choices recipes for freshly prepared products (four items), complexity of working with the Choices signs for freshly prepared products (three items), and complexity in the sense of time (two items). For example, an item of the attribute complexity of working with the Choices recipes for freshly prepared products was: “In general, I think the Choices recipes are easy to use.” Additionally, compatibility (two items), trialability (one item), voluntariness (three items), result demonstrability (three items), relative advantage (three items), and knowledge about the meaning and use of the logo (three items) were measured in a similar way. Mean scores were calculated per attribute. The reliability of the attributes was tested using Cronbach’s alpha, with the lowest alpha being 0.58 (result demonstrability and complexity of working with the Choices signs for freshly prepared products) and the highest alpha 0.87 (knowledge about the meaning and use of the logo). Please see appendix I for the complete description of all items.

**Statistical Analyses**

*Respondents and degree of implementation.* Descriptive analyses were used to report demographic data of the participants and the worksite cafeterias, and the degree of implementation. Chi-square tests were used to test for differences in high and low implementers for the two implementation measures (frequency and promotion) according to gender, education, and who made the decision to follow a Choices
training course. T-tests were used to test for differences in high and low implementers for the two measures (frequency and promotion) according to age.

Attributes influencing implementation. T-tests were used to examine significant differences in the attributes influencing implementation between high and low implementers for each of the two measures (frequency and promotion). A backward selection procedure was used to obtain the best logistic regression model, using the frequency implementation measure and the promotion implementation measure as the dependent variables. The independent variables tested were the perceived attributes of the program. Statistical analyses were performed in SPSS 15.0 (SPSS, 2006) statistical package using a significance level of 0.05. For the prediction model an exclusion p-value of 0.10 was used.

Table 1: Demographic variables of the catering managers.

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Total (n = 316)</th>
<th>LFI(^1) (n=157)</th>
<th>HFI(^1) (n=145)</th>
<th>LPI(^1) (n=137)</th>
<th>HPI(^1) (n=158)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (% women)</td>
<td>76.7</td>
<td>75.4</td>
<td>77.9</td>
<td>76.3</td>
<td>77.9</td>
</tr>
<tr>
<td>Who decided to follow Choices training: manager him/herself or others (% other)</td>
<td>88.2</td>
<td>84.7</td>
<td>91.3</td>
<td>85.1</td>
<td>90.3</td>
</tr>
<tr>
<td>Education (%)</td>
<td>49.0</td>
<td>44.6</td>
<td>53.0</td>
<td>46.9</td>
<td>50.7</td>
</tr>
<tr>
<td>Low</td>
<td>43.5</td>
<td>45.5</td>
<td>41.8</td>
<td>42.5</td>
<td>44.2</td>
</tr>
<tr>
<td>Medium</td>
<td>7.5</td>
<td>9.9</td>
<td>5.2</td>
<td>10.6</td>
<td>5.1</td>
</tr>
<tr>
<td>High</td>
<td>45.6</td>
<td>44.7</td>
<td>46.5</td>
<td>46.0</td>
<td>45.6</td>
</tr>
<tr>
<td>Age (mean) (SD)</td>
<td>45.6</td>
<td>44.7</td>
<td>46.5</td>
<td>46.0</td>
<td>45.6</td>
</tr>
</tbody>
</table>

\(^1\) LFI: Low Frequency Implementer, HFI: High Frequency Implementer, LPI: Low Promotion Implementer, HPI: High Promotion Implementer

*p<0.05, ** p<0.01

Results

Respondents and degree of implementation

The research population consisted of 316 managers. Table 1 shows the demographics of the catering managers. In almost all worksite cafeterias there were fewer than ten employees working in the cafeteria (86.4%) and fewer than 200 cafeteria users a day (71.2%). Most worksite cafeterias implemented the logo between six months and a year ago (55.0%), followed by under six months ago (27.0%). A total of 53.6% of the worksite cafeterias had a high promotion implementation. The percentage of cafeterias with a high frequency implementation was slightly lower (48.0%). A total of 34.2% had both a high frequency and a high promotion implementation. No significant differences in demographics were detected between managers from low and high implementation cafeterias.
Attributes influencing implementation

Table 2 shows the mean scores of the perceived attributes of the program for all participants, as well as separate means for high and low promotion implementers, and high and low frequency implementers. For both implementation measures high implementers had significantly higher scores on relative advantage, compatibility, trialability, and result demonstrability than low implementers; and high implementers had significantly lower scores on complexity and voluntariness than the low implementers. High frequency implementers had higher scores on knowledge about the meaning and use of the logo than low frequency implementers. The logistic regression analyses (with the two implementation measures as the dependent variables and the perceived attributes of the program as the independent variables) showed

Table 2: Attributes influencing implementation, subdivided into low and high frequency implementation, and low and high promotion implementation (mean scores (SD)).

<table>
<thead>
<tr>
<th>Attributes¹</th>
<th>Total (n=316)</th>
<th>LFI² (n=157)</th>
<th>HFI² (n=145)</th>
<th>LPI² (n=137)</th>
<th>HPI² (n=158)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative advantage</td>
<td>3.2 (0.87)</td>
<td>3.12 (0.83)</td>
<td>3.35* (0.90)</td>
<td>3.07 (0.87)</td>
<td>3.38** (0.86)</td>
</tr>
<tr>
<td>Compatibility</td>
<td>3.4 (0.97)</td>
<td>3.18 (0.92)</td>
<td>3.69** (0.94)</td>
<td>3.27 (0.93)</td>
<td>3.59** (0.98)</td>
</tr>
<tr>
<td>Trialability</td>
<td>3.6 (1.26)</td>
<td>3.3 (1.29)</td>
<td>3.85** (1.18)</td>
<td>3.23 (1.30)</td>
<td>3.84** (1.17)</td>
</tr>
<tr>
<td>Complexity signs</td>
<td>2.3 (0.91)</td>
<td>2.52 (0.90)</td>
<td>2.07** (0.87)</td>
<td>2.54 (0.85)</td>
<td>2.10** (0.92)</td>
</tr>
<tr>
<td>Complexity recipe</td>
<td>2.6 (0.96)</td>
<td>2.83 (0.95)</td>
<td>2.29** (0.90)</td>
<td>2.78 (0.93)</td>
<td>2.40** (0.96)</td>
</tr>
<tr>
<td>Complexity of time</td>
<td>2.8 (1.15)</td>
<td>3.16 (1.09)</td>
<td>2.41** (1.09)</td>
<td>3.11 (1.08)</td>
<td>2.51** (1.15)</td>
</tr>
<tr>
<td>Voluntariness</td>
<td>2.5 (1.08)</td>
<td>2.88 (1.04)</td>
<td>2.09** (0.98)</td>
<td>2.86 (1.03)</td>
<td>2.19** (1.04)</td>
</tr>
<tr>
<td>Result demonstrability</td>
<td>3.8 (0.81)</td>
<td>3.52 (0.77)</td>
<td>3.98** (0.79)</td>
<td>3.55 (0.78)</td>
<td>3.92** (0.81)</td>
</tr>
<tr>
<td>Knowledge about the Choices logo</td>
<td>4.6 (0.8)</td>
<td>4.5 (0.9)</td>
<td>4.8* (0.7)</td>
<td>4.5 (0.9)</td>
<td>4.7 (0.8)</td>
</tr>
</tbody>
</table>

¹ All attributes were measured on a five-point Likert scale (strongly disagree = 1, strongly agree = 5); please see appendix I for the complete description of all items.

² LFI: Low Frequency Implementer, HFI: High Frequency Implementer, LPI: Low Promotion Implementer, HPI: High Promotion Implementer

*p < 0.05, ** p < 0.01
that compatibility (OR = 1.52, 95% CI: 1.10; 2.11, p=0.012), voluntariness (OR = 0.50, 95% CI: 0.38; 0.66, p<0.001), result demonstrability (OR=1.52, 95% CI: 1.04; 2.22, p=0.031) and complexity in the sense of time (OR = 0.70, 95% CI: 0.53; 0.91, p=0.009) were the best predictors for a high frequency implementation. For a high promotion implementation voluntariness (OR = 0.54, 95% CI: 0.41; 0.69, p<0.001), result demonstrability (OR=1.51, 95% CI: 1.07; 2.13, p=0.021), and relative advantage (OR=1.44, 95% CI: 1.04; 2.01, p=0.03) were the best predictors.

Discussion
The aim of this study was to investigate the degree of implementation and which perceived attributes influence the degree of implementation of the Choices logo in worksite cafeterias in the Netherlands. A total of 34.2% of the worksite cafeterias had both a high frequency and a high promotion implementation. Voluntariness (the degree to which the catering manager perceives the implementation as voluntary) and complexity in the sense of time (the degree to which the catering manager perceives the implementation of the logo as time consuming) appeared to be the most important predictors for a low implementation. Result demonstrability (the degree to which the catering manager is able to observe and communicate the results of implementing the logo), relative advantage (the degree to which the catering manager perceives the implementation of the logo as an advantage for his/her cafeteria), and compatibility (the degree to which the implementation of the logo is perceived to be compatible with the way catering managers like to work and their ideas about healthy food) appeared to be the most important predictors for a high implementation.

A systematic review shows that implementation data are essential to evaluate the impact of intervention programs on program outcomes in different research areas and different settings, such as tobacco use prevention, alcohol use prevention, health promotion at schools, at workplaces and at home (14). Positive implementation results have been reported with implementation levels around 60%. In our study, the worksite cafeteria was the setting to evaluate. It was found that around one third of the worksite cafeterias had reached a high implementation level. One could question whether this is high or low. This is the first implementation evaluation of the Choices logo in worksites and there are no appropriate studies to compare with. Taking into account that the Choices logo is a relatively new labeling system implemented on a voluntary basis, an implementation level of one third is considered as a good starting point. Nevertheless, compared with the findings of Durlak and DuPre, our result stresses the importance of investigating which attributes influence the implementation of the logo in worksite cafeterias in order to further increase its implementation.

The finding that the attribute voluntariness (the degree to which the catering manager perceives the implementation of the logo as voluntary) appeared to be a predictor of a lower implementation of the logo in worksite cafeterias in the Netherlands is considered a little remarkable: involuntary strategies are not frequently used to increase the implementation of programs, because implementers may not feel dedicated to the program in such a situation (14, 15). In our study, however, it appears that the relation between voluntariness and the implementation of the logo might be
interpreted from a different point of view. Catering managers indicated that they offer Choices products because they are obliged to do this owing to the policy of their caterer. Therefore, it is supposed that by incorporating the Choices logo in the (health) policy of the caterers, the implementation of the logo could further be increased.

Nevertheless, although the logo’s implementation might increase because of the caterer’s policy, our results show that compatibility was important as well. Using the logo has certainly to be compatible with the way catering managers like to work and their ideas about healthy food, in agreement with earlier research (14). It is supposed that the more the logo will be compatible with the manager’s ideas about healthy food, the more the managers will be able to communicate the advantages of using the logo in their worksite cafeterias. Therefore, it is not surprising that result demonstrability (the degree to which the catering manager is able to observe and communicate the results of implementing the logo) and relative advantage (the degree to which the catering manager perceives the implementation of the logo as an advantage for his/her cafeteria) appear to be important predictors of the implementation of the logo as well. Earlier research concludes that innovations with a clear, visible advantage are more easily implemented (16). The advantage mentioned by catering managers related to the logo was that using the Choices signage makes healthy products more recognizable for their visitors. However, we should note that it is not clear yet whether the logo actually stimulates healthier food purchases. Our randomized controlled trial in worksite cafeterias did not show an effect of labeling with the logo on lunchtime food purchases (17).

The finding that complexity in the sense of time proved to be a predictor of the frequency implementation is in accordance with other studies: time seems to be a frequently mentioned barrier to implementation (17-21). In this study, the main time-consuming element appears to be the weighing of the ingredients for the preparation of the fresh Choices products, as indicated by the catering managers. To solve this obstacle, one could think of alternative ways of weighing the ingredients instead of using a scale, for example by providing catering managers with cups with pre-defined portion sizes, or by using standard portion sizes from pre-packaged foods in the Choices recipes.

There are a few limitations of this study that should be discussed. First, we only used two caterers from whom to recruit participants. Although we included the two largest catering companies in the Netherlands who joined the Choices Foundation with a market share of 52%, future studies should include more caterers to create more insight in the implementation of the logo. Secondly, the catering managers might have provided socially desirable answers, or the participating managers might work in the worksites with the highest implementation levels. Those implementing the program most could have been more inclined to complete the questionnaire and to share their implementation experiences than those with a relatively low implementation. Consequently, we possibly found a higher implementation level than there actually was. Thirdly, although the questionnaire was based on validated attributes, this specific survey was not validated. The Cronbach’s alphas of result demonstrability
and complexity of working with the choices signs were below 0.7, which is usually considered minimally acceptable. Validation in future studies is recommended. Fourthly, this study did not investigate whether the impact of the Choices intervention can be related to the extent of implementation, possibly interesting for future studies. Finally, the frequency implementation measure was defined by the frequency of offering any freshly prepared Choices products. No information was collected on the quantity of the products that were offered. Therefore, a cafeteria that offered only one freshly prepared Choices product has received the same score as one that offered for example ten freshly prepared Choices products. Future studies should collect more detailed information about the quantity and the type of Choices products which were offered in order to assign a relatively higher implementation score to cafeterias offering a large amount of Choices products.

Conclusions
Despite these limitations, this study provides unique insights in which perceived attributes influence the degree of implementation of a nutrition logo in worksite cafeterias. In order to increase the implementation, the Choices logo should seek to ensure that it is in-line with catering managers’ ideas about healthy food. The workload of implementing the logo should be limited, in order to avoid the implementation taking up too much time. Further, catering managers should be able to perceive and communicate the advantages of implementation, such as that using labeling makes healthy products more recognizable for the worksite visitors. It could be recommended to incorporate the logo in the health policy of the caterer in order to increase the implementation.

Conflicts of interest and authors’ affiliations
There were no conflicts of interest. The authors are employed by the Department of Health Sciences and the EMGO Institute for Health and Care Research, VU University Amsterdam, the Netherlands.

References


APPENDIX I

Questionnaire measuring the perceived attributes of the Choices program (all measured on a five-point Likert scale; strongly disagree = 1, strongly agree = 5)¹.

Complexity of working with the Choices recipes for freshly prepared products
1. I have to think carefully when using the Choices recipes for freshly prepared products.
2. In general, I think it’s easy to use the Choices recipes in my worksite cafeteria.
3. It was easy to learn how to prepare fresh Choices products.
4. It was difficult to teach my employees how to use the Choices recipes when preparing fresh Choices products.

Complexity of working with the Choices signs for freshly prepared products
1. I have to think carefully when using the Choices signs for freshly prepared products.
2. In general, I think it’s easy to use the Choices signs in my worksite cafeteria.
3. It was difficult to teach my employees how to use the Choices signs for fresh Choices products.

Complexity in the sense of time
1. The introduction of the Choices logo takes more time than I actually have.
2. Using the Choices logo in my worksite cafeteria takes little time.

Compatibility
1. Using the Choices logo in my worksite cafeteria is compatible with the way I like to work.
2. Using the Choices logo in my worksite cafeteria is consistent with my ideas about healthy food.

Trialability
1. I had enough time to practice with using the Choices logo during the Choices training.

Voluntariness
1. My supervisor did not oblige me to introduce the Choices logo in my worksite cafeteria.
2. I am voluntary using the Choices logo in my worksite cafeteria.
3. My supervisor expects me to use the Choices logo in my worksite cafeteria.

Result demonstrability
1. I am able to explain the consequences of using the Choices logo in my worksite cafeteria to others.
2. The results of using the Choices logo are clear to me.
3. It’s difficult for me to explain why I’m using the Choices logo in my worksite cafeteria.
5. Implementation
evaluation worksites

Relative advantage
1. It’s an advantage of the Choices logo that healthy products become more recognizable for the worksite visitors.
2. My worksite visitors are more aware of healthy eating, because my worksite uses the Choices logo.
3. It’s an advantage of the Choices logo that the sales of Choices products increase.

Knowledge about the meaning and use of the Choices logo
1. I know why some products are carrying the Choices logo and others are not.
2. I know where to place the Choices signs in my worksite cafeteria.
3. I know how to prepare fresh Choices products.

All items are based on the validated questionnaires of Moore and Benbasat (10), Pankratz and colleagues (11) and Steenhuis and colleagues (12). All items were translated from Dutch.