Portion size: a qualitative study of consumers’ attitudes toward point-of-purchase interventions aimed at portion size

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Abstract

This qualitative study assessed consumers’ opinions of food portion sizes and their attitudes toward portion-size interventions located in various point-of-purchase settings targeting overweight and obese people. Eight semi-structured focus group discussions were conducted with 49 participants. Constructs from the diffusion of innovations theory were included in the interview guide. Each focus group was recorded and transcribed verbatim. Data were coded and analyzed with Atlas.ti 5.2 using the framework approach. Results showed that many participants thought that portion sizes of various products have increased during the past decades and are larger than acceptable. The majority also indicated that value for money is important when purchasing and that large portion sizes offer more value for money than small portion sizes. Furthermore, many experienced difficulties with self-regulating the consumption of large portion sizes. Among the portion-size interventions that were discussed, participants had most positive attitudes toward a larger availability of portion sizes and pricing strategies, followed by serving-size labeling. In general, reducing package serving sizes as an intervention strategy to control food intake met resistance. The study concludes that consumers consider interventions consisting of a larger variety of available portion sizes, pricing strategies and serving-size labeling as most acceptable to implement.

Introduction

The prevalence of overweight and obese people is drastically increasing worldwide [1]. One of the main factors underlying the current obesity epidemic is an obesogenic environment that promotes an excessive food intake and discourages physical activity [2, 3]. Glanz et al. [4] have identified the consumer nutrition environment as a research priority in combating the obesity epidemic. The prevalence of overweight and obese people is drastically increasing worldwide [1]. One of the main factors underlying the current obesity epidemic is an obesogenic environment that promotes an excessive food intake and discourages physical activity [2, 3]. Glanz et al. [4] have identified the consumer nutrition environment as a research priority in combating the obesity epidemic.

Portion sizes, that is the sizes in which food is offered and immediately consumed, and consumer units, that is the entity in which a product is sold, of energy dense foods have increased during the past three decades in both the United States and Europe. Nowadays, portion sizes are in many cases larger than reference portion sizes as defined by US federal agencies [5].

Large portion sizes of energy dense food are problematic because they can lead to increased consumption. There is empirical evidence to support the position that large portion sizes enhance consumption in the case of amorphous food [6, 7], prepackaged food [8, 9], preportioned units [10] and even for food with a relatively unfavorably perceived taste [11]. The increased energy intake due to larger portions is not adequately compensated for at a later time [12]. The tendency to eat more when served larger portions has been found regardless of individual characteristics, such as...
body mass index (BMI), or a tendency toward dietary restraint or disinhibition [7, 8, 10, 12]. One explanation for increased consumption of large portions is the notion of value for money [9]. A low price per unit in the case of large portions stimulates purchase and leads, subsequently to increased consumption of a given product [9].

Portion sizes seem to be a valid starting point for the development of various environmental interventions directed at the prevention and treatment of obesity. Ledikwe et al. [13] identify a number of interventions targeted at portion size, including offering consumers a larger variety of portion sizes in order to give consumers the option to choose smaller portion sizes than the current standard sizes, reducing portion sizes in order to counter the trend toward upsizing food products and labeling serving sizes. Serving-size labeling identifies the number of recommended servings a package or portion consists of, combined with caloric information per serving. Serving-size labeling aims to tackle portion distortion, a phenomenon that can be described as perceiving large portion sizes as appropriate amounts to eat at a single eating occasion. Research has shown that portion distortion unfavorably affects portion sizes that people select [14]. Serving-size labeling is common in supermarket food products in some countries, such as the United States and Australia, but not in Europe. Furthermore, serving-size labeling could be expanded to other point-of-purchase settings such as fast-food restaurants, worksite cafeterias and recreational settings such as cinemas.

Nielsen and Popkin [15] added to the list of possible interventions by proposing that portion size should be controlled using pricing strategies, so as to prevent pushing consumers toward purchasing financially more attractive large portions. This can be done by establishing more proportional prices for small and large portions instead of value-size pricing or by offering consumers the possibility to determine their own portions and pay by weight without advantaging prices of large quantities.

Although it is assumed that interventions aimed at portion size can be effective in reducing people’s energy intake, to our knowledge no community-based intervention studies aimed at portion size are available to date. The feasibility of such interventions has not been assessed, either. This study will focus on interventions located in point-of-purchase settings, that is settings where food is sold. Supermarkets, fast-food restaurants, worksite cafeterias and cinemas are point-of-purchase settings that are taken into account in this study.

The feasibility of point-of-purchase interventions aimed at portion size depends not only on the willingness of the settings to implement them but also on the willingness of consumers to accept them. According to McIlveen [16], consumer attitudes are important factors in food product development, and point-of-purchase settings base many corporate decisions on them. In addition, a longitudinal study [17] showed a positive relationship between consumer satisfaction, for example with respect to the food that was offered, and company profits in a US fast-food restaurant chain. A first step in assessing the feasibility of interventions aimed at portion size and the purpose of this qualitative study is to reveal, therefore, what a general group of Dutch consumers varying in socioeconomic status think of current portion sizes, their acceptance of interventions aimed at portion size and under what conditions they would endorse such interventions.

### Methods

**Participants and procedure**

Focus group discussions were chosen for data collection as they stimulate interaction between participants, which enhances the generation of new ideas [18]. Eight focus groups, with between five and eight participants in each, were held with a total of 49 participants in both urban and rural regions in the Netherlands. Each focus group discussion lasted for approximately 2 hours. Procedures proposed by Morgan and Krueger [19], for example concerning participant recruitment and moderation strategies, guided the organization and moderation of the focus group discussions.

Before the start of each focus group, participants were asked to complete a short questionnaire containing questions about their age, sex, profession,
height and body weight. Participants were recruited by means of announcements in local newspapers, on radio, on the Internet, in community centers, in supermarkets and in libraries. This variety of information channels was used in order to reach a broad audience. The recruitment announcements said that the focus group discussion topics would be consumer opinions about the food supply in point-of-purchase settings. People younger than 18 years and older than 65 years were excluded from participating. The study results were analyzed on an anonymous basis. This study was deemed exempt by the VU University Medical Center Institutional Review Board.

Theoretical framework
According to Rogers [20], an innovation is an idea, practice or object that is perceived as new by an individual—consumers, in the case of this study—or other unit of adoption. Interventions aimed at portion size can be considered innovations. The diffusion of innovations theory (DOIT) states that the implementation of an innovation among the general public is a challenge and is partly dependent on the attributes of an innovation [20]. In this study, DOIT was applied to consumer behavior, which means that we wanted to assess whether consumers would accept such interventions. The DOIT attributes were discussed in light of the consumers’ viewpoints regarding their potential use of portion-size interventions in point-of-purchase settings. Because consumers, as opposed to an organization, were the unit of adoption, not all DOIT attributes were considered relevant. Within the scope of this study, the following three attributes were incorporated into the interview guide. The first attribute was relative advantage, that is the degree to which an innovation is perceived as better than the idea it supersedes. The second attribute was complexity, which is the degree to which an innovation is perceived as difficult to understand and use, and the third attribute was the time it takes to use the innovation.

In addition to how participants perceived the attributes of interventions aimed at portion size, that is offering a larger variety of portion sizes, portion size reduction, pricing strategies and serving-size labeling, barriers that would prevent consumers making use of portion-size interventions were discussed during the focus group discussion.

Interview topics
The focus group discussions were conducted in Dutch and started with participants providing opinions of current portion sizes and their consumption patterns related to large portion sizes. Subsequently, the different portion-size interventions were discussed. For each intervention, participants expressed their perceptions of its attributes, such as relative advantages, complexity and time. Lastly, participants’ opinions regarding portion-size interventions in general were discussed.

The focus group discussions followed a semi-structured format and participants were asked to discuss the different topics and share their opinions. Each focus group discussion started with a short introduction. Table I provides an overview of the interview topics. The discussion was structured around five topics that were related to portion sizes and possible interventions. After each topic, the moderator asked participants if there were any remaining issues to be discussed. If not, the moderator introduced the next topic.

Data analysis
Focus group discussions were held until data saturation was reached. Data saturation was defined by a quotation count displaying a list of codes per interview. Subsequently, a percentage was calculated from the total number of codes that were generated from all interviews (i.e. 130). The cumulative percentages showed that, after the sixth discussion, almost 80% of the new codes were generated, and around 95% after the seventh interview. During the last discussion, no significant new information was revealed. The method that was used to define data saturation has been described by Guest et al. [21].

Each focus group was recorded and transcribed verbatim. The framework approach, which is especially suitable for policy-relevant qualitative research, was used to analyze the data [22].
framework approach starts deductively from preset theoretical background and objectives but also uses inductive analysis to reflect the original discussions [22]. The analysis consisted of several phases and started with familiarization with the data through reading the transcripts. After that, a thematic framework was identified in two steps:

(i) deductively (by using the intervention attributes and types of barriers that were determined beforehand) and
(ii) inductively (by identifying additional themes derived from the data).

Next, the quotes were indexed using this thematic framework. The last phase in analysis consisted of rearranging the data per theme and interpreting and summarizing it. Analysis was performed using the software package Atlas.ti version 5.2 (Atlas.ti Scientific Software Development GmbH, Berlin, Germany).

### Results

In total, 49 respondents (11 men and 38 women) participated in the focus group discussions (mean age = 47.1 years, SD = 12.4, mean BMI = 23.5, SD = 3.6). Based on self-reported height and body weight, 64.6% (n = 31) had a normal body weight (BMI 18.5–24.99), 29.2% (n = 14) were overweight (BMI 25.00–29.99) and 6.3% (n = 3) were obese (BMI ≥ 30.00). In the general Dutch population, 34.3% are overweight and 11.2% obese [23].

Occupations were used as an indicator for socioeconomic status. Participants’ occupational level was measured with the International Socio-Economic Index [24]. This index categorizes different occupations ranging from 10 (low prestige) to 90 (high prestige). The occupation of each participant was looked up in this index and coded. In this sample, scores ranged from 30 to 82 (mean = 56.26, SD = 13.04) and were considered representative of the Dutch population.

### Table I. Main interview topics

<table>
<thead>
<tr>
<th>Purchase and consumption patterns related to portion size</th>
<th>What is your opinion about current portion sizes in different point-of-purchase settings?</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>What do you think of the value-for-money ratio between small and large portions and does value for money guide your purchasing behavior?</td>
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<tr>
<td></td>
<td>How do you deal with large portion sizes and consumption units?</td>
</tr>
<tr>
<td>Attitudes toward the attributes of point-of-purchase interventions aimed at portion size (i.e. a larger variety of portion sizes, reduction of portion sizes, pricing strategies and labeling of serving sizes)</td>
<td>What are the (dis)advantages of this intervention and how important are they? (relative advantage)</td>
</tr>
<tr>
<td></td>
<td>Would it be complex to use this intervention and how important is this? (complexity)</td>
</tr>
<tr>
<td></td>
<td>Would it be time consuming to use this intervention and how important is this? (time)</td>
</tr>
<tr>
<td></td>
<td>What factors would prevent you from using this intervention? (barriers)</td>
</tr>
<tr>
<td></td>
<td>What settings are suitable for this intervention?</td>
</tr>
<tr>
<td>General opinion of portion-size interventions</td>
<td>Would portion-size interventions cater to your personal needs?</td>
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<tr>
<td></td>
<td>Would portion-size interventions help combating obesity?</td>
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<tr>
<td></td>
<td>Which interventions aimed at portion size would you suggest?</td>
</tr>
<tr>
<td></td>
<td>How do you think that interventions aimed at portion size should be communicated to the general public?</td>
</tr>
</tbody>
</table>
Opinions about current portion sizes in various point-of-purchase settings

In general, participants stated that portion sizes have increased during the past decades and are, in their opinions, larger than required. A number of specific products were mentioned in particular: candy bars; sweets; soft drinks; potato chips; popcorn and the increased prevalence of all-you-can-eat restaurants, where people can eat as much as they want for a fixed price. It was also mentioned that many companies advertise products with large portions, suggesting that they are the norm. Participants mentioned the following points about consumer units in supermarkets. First, according to the participants, discount supermarkets sell mainly pre-packaged and large consumer units that are more suitable for families than for single- or two-person households. Second, many consumers noticed that packages of potato chips, cookies, soft drinks and ice cream have become larger in the past years.

Furthermore, participants believed that, in restaurants, portions sizes are larger than the portions they serve themselves at home. In addition, participants noticed that in restaurants, small portions of vegetables are served compared with the portions of meat. A majority of the participants thought that in fast-food restaurants, portion sizes have increased and are too large. Some participants stated that there is a choice in portion size, although they also observed that large portions offer more value for money than small portions. With respect to worksite cafeterias, participants were satisfied with portion sizes, as in general consumers were offered the opportunity to define their own portions. At the cinema, many participants considered the portions of popcorn as extremely large, although others said that there is a choice. A last aspect that was mentioned in relation to portion size was that some participants experienced portion distortion. One woman said:

I think that sometimes we have lost sense of what a normal portion size is. Actually, I think that I don’t know what it is.

Other participants added that large portion sizes have become the norm and that when they saw di-
etary portion-size recommendations, they seemed very small to them.

Value for money and portion size

Participants indicated almost unanimously that large portion sizes usually offer more value for money than small portion sizes. The fact that in supermarkets, generic brands are regularly sold in large consumer units, added to this. Furthermore, most participants indicated that value for money is quite a strong guide toward buying larger portions. One woman commented:

Consider McDonalds for instance. There you have a medium-sized menu and a mega menu, and the price differences between those meals are quite small. I don’t have specific information, but the mega menu is really mega! And I am easily tempted to choose the mega menu, because the price difference is small, while… I don’t need that mega menu at all, but it is tempting to buy it. Simply because you get more value for your money.

However, a minority said that their purchase decisions, sometimes as a result of experience, are guided by their needs and absolute prices and not by optimizing value for money. The fact that larger portions and consumer units of food offer more value for money seemed to occur to the participants as a natural economic pattern.

Consumption behavior with respect to large portion sizes

Three types of reactions can be discerned from the question of how participants dealt with large portion sizes and consumer units. First, for many participants, the amount they ate was guided mainly by portion size and, to a lesser extent, by an internal satiety cue. This was especially the case with tasty products such as potato chips, candies or cookies. One woman said, for instance:

For me, it [participant is referring to portion size] makes a difference. So, if I buy a king-size candy bar, then I finish that king-size candy bar. And
no, I definitely don’t quit eating before the last bite, rewrap it and store it in the fridge. And when I do try that, I end up finishing it ten minutes later.

Second, some people expressed difficulties too in relying on internal satiety cues, but they attempted to regulate the amount they ate deliberately by determining a certain portion size, and stocking the remainder. One woman said, for instance:

When we are not at home and our children want to eat potato chips, each of them takes one bowl. Then they close the bag with a clip.

Although some people were aware that it is theoretically possible to deliberately regulate portion sizes in this manner, they finished up not doing this, as one woman illustrated:

I think bags of potato chips are too big. Of course you can close the bag..., but in reality that doesn’t happen, especially not when the children are around. I think that when they would decrease the bag, you would also finish it, but you wouldn’t open another one.

Third, some participants said that the amount they ate uniquely depended on their feelings of satiety and not on the portion size. A male participant stated:

Well, I think that I have a built-in alarm clock. I don’t know what it is. For example, when I have… let’s say a candy bar, after a while, I just lose my desire for sweets. Then I am satiated.

For those who indicated that they were guided by portion size and not by an internal satiety cue, it seemed that the decisional moment regarding the amount they ate was ahead of eating. At purchase, when deciding whether or not to open a package, or during cooking, participants found it easier to regulate the amount they ate than once it was served. Participants stated that not until they had finished eating, did they realize that a smaller quantity of food would have been enough. One woman stated:

I never get the feeling that I am full, so I can eat large quantities. If I would get just a little, it would be enough, but if I get a lot I finish it just as easily.

Perceived attributes of portion-size interventions

This section describes participants’ attitudes toward the different point-of-purchase interventions aimed at portion size. An overview is provided in Table II.

A larger availability of portion sizes

Participants’ perceived many relative advantages with respect to a larger availability of portion sizes. Participants appreciated having the opportunity to choose. Another advantage was that less food is wasted and that the specific needs of different consumers (e.g. men and women) could be catered for. In addition, some thought that a larger variety of portion sizes would render them more conscious about the amount they ate. A disadvantage that participants mentioned was that, especially in supermarkets, more package material would be necessary, which had adverse environmental consequences.

A condition that some participants mentioned was information provision at the moment of choice in order to make an informed decision. For instance, if small, medium and large sizes would be available in fast-food restaurants, objective and specific information about the quantity, such as grams, milliliters or a displayed example of each portion size, was desired. According to the participants, suitable settings for a larger variety of portion sizes or consumer units were fast-food restaurants and supermarkets.

Reducing portion sizes

A theme that emerged from the focus group discussions was that a distinction should be made between explicit, that is noticeable for consumers and therefore relatively large, and implicit, that is not noticeable for consumers and therefore limited portion-size reductions. We asked participants what products and the extent to which they were suitable for implicit portion-size reduction. Participants
mentioned pizzas, candy bars and pancakes served in restaurants. According to some, the portion sizes of these products could be reduced by 15–30%.

With respect to explicit portion-size reduction of all available sizes, most respondents were reserved and perceived disadvantages. Most importantly, participants were afraid that this intervention would reduce their control over their food intake. Also, a substantial proportion of the participants considered this intervention as paternalistic.

**Pricing strategies**

*Proportional pricing of small and large portions.* According to many, proportional pricing of small and large portions would be an attractive, not a paternalistic, intervention. An advantage of removing value-size pricing of large portions would be that consumers could choose the portion size they actually wanted, instead of being directed toward larger quantities. Participants also mentioned that it would be fairer toward consumers if small portions were to be more attractively priced.

For large households, on the other hand, proportional pricing of consumer units sold in supermarkets would not be attractive. In addition, some participants distrusted the motives of companies using pricing strategies. According to these participants, the only motive for companies to use pricing strategies could be to make a profit; otherwise, such an intervention would not be feasible. Furthermore, some thought that this pricing strategy would lead them to buy several small portions instead of one large portion. Consumers suggested worksite cafeterias and fast-food restaurants as suitable settings.

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**Table II. Perceived attributes of point-of-purchase interventions aimed at portion size**

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Relative advantages</th>
<th>Relative disadvantages</th>
<th>Complexity/time</th>
<th>Barriers/condition</th>
<th>Suitable settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>A larger variety of portion sizes</td>
<td>Opportunity to choose; caters to individual needs; not paternalistic; less waste of food</td>
<td>More packaged material</td>
<td>No consensus</td>
<td>Lack of adequate information</td>
<td>Fast-food restaurant, supermarket and worksite cafeteria</td>
</tr>
<tr>
<td>Explicit portion-size reduction</td>
<td>Counters trend toward upsizing</td>
<td>Paternalistic; limitation of freedom</td>
<td>Not relevant</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Proportional prices</td>
<td>Not paternalistic; not being pushed toward large portions; fair</td>
<td>Distrusting corporate motives; unattractive for large households; could lead consumers to buy several small portions</td>
<td>Not relevant</td>
<td>Not relevant</td>
<td>Worksite cafeteria and fast-food restaurant</td>
</tr>
<tr>
<td>Possibility to determine own portion and pay by weight</td>
<td>Fair; being in control; less waste of food</td>
<td>Hygiene and freshness</td>
<td>Difficult to decide appropriate quantity; queues</td>
<td>Not relevant</td>
<td>Worksite cafeteria and fast-food restaurant</td>
</tr>
<tr>
<td>Serving-size labeling</td>
<td>Practical; enhances consciousness; being informed at point of purchase</td>
<td>Risks being paternalistic; information that is not tailored to consumers’ individual situations; confronting</td>
<td>More complex (only in the beginning)</td>
<td>Comprehensibility; position and readability; tone should not be to paternalistic</td>
<td>Supermarket and worksite cafeteria</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Supermarket, fast-food restaurant and worksite cafeteria</td>
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</tbody>
</table>

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Offering consumers the possibility to determine their portion size and pay per weight. Participants mentioned a number of relative advantages of offering consumers the possibility to determine their portion size and pay per weight without discounting larger quantities, for instance, in supermarkets or when eating away from home. Those advantages partly corresponded with the advantages that were already mentioned for pricing strategies. In addition, according to the participants, less food would be wasted. Lastly, some thought that it would be fun to determine their own portions and pay by weight. However, others thought that, when dining out, this intervention would lead to an unpleasant and unsociable dining experience. They preferred to be served and surprised about the presentation of a dish when dining out. With respect to supermarkets, especially, diminished hygiene and freshness were disadvantages that participants mentioned.

For many participants, complexity was an important issue. Some thought that it would be difficult to decide how much food would be an appropriate quantity, that is to meet their energy requirements. A last aspect that was mentioned was that this intervention would be time consuming due to longer queues in point-of-purchase settings.

Participants felt that worksite cafeterias would be appropriate settings for this type of intervention.

Labeling. Some participants would appreciate serving-size labeling, so as to be informed about appropriate consumption quantities. Another advantage participants identified was that relevant information was provided at the moment of making food purchase decisions. Participants emphasized the importance of readable and visible presentation of the labels. A complicating factor according to the participants was how information could be made suitable, relevant and correct for different individual consumers (i.e. the appropriate serving size depends on the amount of physical activity, age, sex). Some preferred information about the content of the foods, rather than about reference quantities.

A number of participants expressed the opinion that information about serving sizes would be paternalistic and emphasize health too much. In contrast, other consumers thought that informing consumers would leave the ultimate choice to the consumers and was, therefore, not paternalistic.

With respect to time and complexity, participants mentioned that in the beginning reading and interpreting the serving-size labels would take some extra time and effort, but that, after a while, consumers would get used to it. According to the participants, supermarkets, fast-food restaurants and worksite cafeterias would be suitable settings for serving-size labeling. Restaurants were not considered appropriate settings, as going out for dinner should be enjoyable and not related to health and obesity.

General opinions with respect to portion-size interventions

Many participants supported portion-size interventions not because they perceived them as personally relevant but because they thought that they would help combating obesity in the Netherlands. A topic that emerged during the focus group discussions was that some asserted that how much one eats is an individual responsibility and that it would be paternalistic if the government interfered too much with this. For instance, one woman stated:

At the market place for instance. At 10 in the morning you can see people who are just calmly eating their French fries. Then I think, well of course you get fat, that’s what you can expect. The government doesn’t have to deal with that.

Participants who were against governmental interference considered freedom of choice important and feared more regulation. Others stated that as a result of marketing and advertising, people have difficulties in regulating their food intake and that producers have to take up their responsibility. Some participants thought that the government has a role in establishing a balance between commercial interests and providing a healthy consumer nutrition environment. Those participants stated that it could not be expected from companies to self-regulate portion sizes because the market economy did not allow them to. Furthermore, some participants thought that some (paternalistic) interference was justified by the high societal costs caused by
obesity. In general, most participants agreed that consumers have an individual responsibility in regulating their food intake but that they should be provided with sufficient information and choice.

Interventions suggested by participants
Participants suggested a few possible interventions. One suggestion was to offer consumers in restaurants the possibility to choose their servings of meat, vegetables and sauce. In this manner, consumers would have the option to order a large serving of vegetables and small servings of meat and potatoes. A second suggestion was offering consumers in restaurants the possibility to obtain take-out bags with the leftovers, something that is not customary in the Netherlands. A final suggestion that was given was reducing plate sizes so as to provide consumers with a visual cue and, therefore, with a norm toward smaller portions.

Communication of interventions
Participants did not reach a consensus about effective communication strategies concerning portion-size interventions. Some stated that it was necessary to explain the reasons for implementing portion-size interventions and that obesity should be mentioned in this respect. Others opposed the notion that, in general, consumers were not health oriented, and communicating health aspects of an intervention would not appeal to them, therefore. Furthermore, in the eyes of many participants, interventions aimed at portion size would have adverse effects on value-for-money perceptions. According to consumers, therefore, smaller portions should have lower prices, and communication of interventions aimed at portion size should be guided by financial arguments and not by health-related ones.

Discussion
From the eight focus groups that were held with various consumers, the following can be concluded. First, according to the participants, portion sizes and consumer units of certain energy dense food products, for example candy bars, sweets and soft drinks, have increased and are larger than acceptable. Second, participants observed that large portion sizes and consumer units have a better value-for-money ratio than small ones. Third, participants seemed to experience portion distortion.

With respect to the specific interventions aimed at portion size, it seems that consumers have a preference for a larger variety of portion sizes, combined with pricing strategies and serving-size labeling that does not have a paternalistic tone. Participants mentioned many relative advantages and few complexity and time constraints related to these three interventions. According to the diffusions of innovations theory [20], this increases consumers’ receptiveness toward these interventions.

The results, with respect to serving-size labeling, are in line with a study among 79 American fast-food restaurant patrons that indicated that 62.1% somewhat or strongly supported nutrition labeling. However, in this same study, only 34.2% somewhat or strongly supported a law affecting prices on small and large size food portions [25], an intervention that was appreciated by respondents in our study. The difference in acceptance of proportional pricing might be explained by the sample: fast-food restaurant patrons versus a general group of consumers.

Furthermore, participants seemed to be aware of the problem of obesity with which our society is confronted, which explains why their general attitude toward portion-size interventions was positive. Yet, in general, participants did not feel personally confronted with obesity and in need of interventions aimed at portion size. As more than one-third of the participants were overweight or obese, this is remarkable. However, this finding can be explained by previous research showing that one-quarter of people with a BMI between 25 and 30 underestimate their body weight and perceive their body weight as healthy [26].

During the focus group discussions, an interesting topic with respect to self-regulation of large portion sizes emerged. Some consumers seemed to be aware of the fact that large portion sizes of flavorsome food increases consumption. As a result, they attempted to regulate their consumption
beforehand, for example at the point of purchase or before opening a package, instead of during consumption, which was considered more difficult. An important opportunity for self-regulation is at the moment of purchase, therefore, when a choice can be made for smaller portion sizes or consumer units. However, self-regulation at the time of purchase is impeded by value-size pricing that guides consumers toward buying large quantities. All in all, self-regulating consumption is hindered at purchase through the value-for-money principle and hampered at consumption through large portion sizes providing consumers with a visual cue and temptation that is difficult to resist. It should be noted that consumers tend to perceive ‘value’ as a short-term attribute. In the long term, a healthy body weight is of more value to many people than a lower price per unit for large portion sizes. However, often people’s choices are guided rather by proximal than distal considerations. This is one of the biggest challenges of health-promoting interventions in general.

The last important issue that emerged during nearly every focus group discussion was whether obesity, and therefore, portion size, was an individual, corporate or governmental responsibility. Participants did not reach full consensus on this topic. Some felt very strongly that governmental initiatives with respect to such interventions are paternalistic. This corresponds with a broad national and international societal debate concerning public health policies [27]. Participants who held this opinion indicated that they would perceive corporate initiatives as less paternalistic than legislative actions. However, when interventions aimed at portion size were initiated by producers, some participants would feel deceived. According to participants, it is not lucrative for companies to sell smaller portions for substantially lower prices. They were inclined, therefore, to distrust motives of companies that implement interventions aimed at portion size. In general, most participants agreed that consumers have an individual responsibility for their food intake but that they should be provided with sufficient information and choice.

A limitation of this study was the recruitment of participants who were interested in issues related to food supply and eating behavior. Nevertheless, this study has provided important insights in consumers’ opinions about current portion sizes, their perceived attributes and acceptance of several point-of-purchase interventions aimed at portion size and conditions for implementation in different point-of-purchase settings. As this study was limited to point-of-purchase-based interventions, an interesting question is which portion-size interventions in home settings would be feasible and effective.

This study focused on the consumer perspective with respect to portion-size interventions. Insights from this study can be used by policymakers and companies to develop a more portion-size friendly environment. Although companies base their policies in large part on consumer research, it is also important to consider the possibilities, barriers and inclination of various point-of-purchase settings specifically, in order to adopt and implement interventions aimed at portion size. This has been done in another study [28], from which it was concluded that point-of-purchase settings considered offering a larger variety of portion sizes, serving-size labeling and, to a lesser extent, pricing strategies as most feasible to implement.

The current study, combined with the study on the point-of-purchase perspective, provide important insights into the feasibility of implementing interventions targeted at portion size. However, little is currently known about their effectiveness. As far as we know, no studies are available on the effectiveness of offering a larger variety of portion sizes. With respect to pricing strategies, one study showed that pricing strategies related to portion size did not affect food intake [29], whereas the results of another study showed that pricing strategies are potentially effective among people who are overweight [30]. With respect to serving-size labeling, several types of labeling are possible. For instance, labeling could be used in supermarkets to help consumers select appropriate packages or to provide them with information about reference serving quantities. Labeling could also be put in place settings where fast food is sold and where a large size portfolio is usually available. Ready-to-eat meals
could be labeled with reference portion sizes. So far, only two experimental studies [31, 32] have assessed the effectiveness of serving-size labeling on food intake, with both studies yielding mixed results.

In conclusion, environmental interventions aimed at portion size that are, in the eyes of consumers, most acceptable to implement, are a larger variety of portion sizes, pricing strategies and serving-size labeling. Furthermore, communication strategies with respect to these interventions should be carefully developed. Finally, future research should focus on portion-size interventions in home settings and on the effectiveness of portion-size interventions.

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**References**


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