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Moving towards a healthier assortment in secondary and vocational school food environments

Perspectives of Dutch students and school food policy professionals

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Abstract

Purpose – In many countries, schools move toward healthier canteen assortments by limiting the supply of unhealthy foods. The question arises whether this gives any undesirable side effects with students (e.g. compensation in purchases from school to outside retailers, reactance) and how to handle these so that operating school canteens remains financially viable. The purpose of this paper is to identify perspectives toward healthy school food assortments held by vocational education students and professionals within secondary and vocational schools with responsibility for school food policy (e.g. school canteen workers, teachers, school directors) in the Netherlands.

Design/methodology/approach – Four focus groups were conducted with students at a vocational school ($n = 25$ in total). A semi-structured interview guide was used to conduct discussions. The interview guide also included three school canteen scenario's (A: 100 percent healthy food, B: 50 percent healthy/50 percent unhealthy foods and C: 100 percent unhealthy food) and a set of nine intervention strategies. A brief survey included questions on the same three scenario's and nine intervention strategies. A web-based survey was conducted among 68 professionals responsible for school food policy and included their evaluation of the same canteen scenarios and interventions. Survey data were analyzed using descriptive statistics and content analysis. Content analysis was done on the qualitative data.

Findings – School food professionals were highly supportive of Scenario A (100 percent healthy food), as this formed a better fit with their policies and was believed to stronger encourage healthy eating. They did worry about financial feasibility given lower affordability and student reluctance to accept the assortment. Students were less in favor of Scenario A. Students discussed getting value for money and remaining freedom to make unhealthy choices. The authors discuss implications for policy makers who aim to implement measures to improve young people's eating habits.

Originality/value – This study contributes to the literature on creating healthier school food environments. This study uniquely examines a healthier school canteen from a viability perspective, including the views of students as primary customers. Given the need to progressively increase the number of foods complying to dietary guidelines in canteen assortments, this study provides insights into how and why assortment changes best can be implemented.

Keywords Government policy, Adolescents, Consumer Attitudes, School canteen, Healthy food environment, Intervention acceptability

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Introduction

The historically rapid rise in overweight and obesity levels among adolescents in the past decades is a serious and pressing public health threat. Worldwide, an estimated 42 mchildren, including adolescents, is overweight. Beyond emotional and physical consequences, unhealthy eating habits of children and adolescents are a "time bomb" for future demands on healthcare (Ng *et al.*, 2014; Lobstein *et al.*, 2015). Food choice decisions are frequent, situational, dynamic and multi-layered (Sobal and Bisogni, 2009). Several studies have revealed that environmental factors such as food availability, accessibility and affordability are key determinants of unhealthy food choices and purchases (e.g. Pitt *et al.*, 2017). Hence, comprehensive approaches in prevention increasingly focus on collective action in advancing healthy food environments (Lencucha *et al.*, 2018).

School food environments are considered to be an ideal setting to implement interventions to halt the rise in overweight. Throughout childhood, children spend more time at school than at any other environment away from home and based on USA data, it is estimated that they consume there up to 50 percent of their total daily calories (Story *et al.*, 2009). In the past decade, around the world school-nutrition standards and guidelines are being updated requiring or urging schools to serve healthier foods and drinks (e.g. fruits, vegetables, whole grains) and put restrictions on what to sell or provide to its students (e.g. sugary soft drinks in vending machines) (Welker *et al.*, 2016). Although nutrition standards and guidelines are the basis for improving nutritional intake, they do not guarantee that young people will actually make healthier choices within the school. Adolescents may compensate for reduced consumption at school by increasing consumption at retail stores and (fast food) restaurants outside of schools (Devi *et al.*, 2010; Williams *et al.*, 2014). This is particularly the case at schools where young people have the freedom to buy food elsewhere or bring it from home.

Changes in the assortment of their canteen may come with financial implications for schools. More healthy foods and drinks are relatively more expensive than less healthy ones due to shorter shelf life, resulting in higher costs and potentially higher losses (Rao *et al.*, 2013; Jones *et al.*, 2014). In addition, energy-dense foods with long shelf life (e.g. chocolate bars, chips and soft drinks) are known for their higher margins and sales (Stuckler and Nestle, 2012).

Making the canteen assortment healthier may mean that certain popular products can no longer be sold, even though these popular products often contribute substantially to the turnover of a canteen. This missed turnover is not necessarily compensated by a higher turnover of new products that fit dietary guidelines, because students can obtain their food in a different way. This can have a negative effect on the financial viability of the school canteen. Anecdotal evidence even indicates that schools may bring back unhealthy foods in their assortment if the rate of changes in the healthfulness of food assortment is too fast. This is done to prevent monetary losses due to students' purchase of fast food outside the school (McDougal, 2009).

The worldwide call for healthier school food environments is getting stronger (Hawkes *et al.*, 2015; Berge *et al.*, 2017). Next to schools themselves, school food service companies are also increasingly called on to take responsibility to offer a healthier assortment to their customers. Both face challenges due to unforeseen demands and constraints of new policies and guidelines. For example, after the implementation of new school lunch program guidelines in the USA, food service directors reported increased food cost and labor (e.g. due to increased time required to prepare food from scratch), food sourcing challenges, decreased student participation and organizational barriers in implementation (Tabak and Moreland-Russell, 2015). While the importance of a healthy school food environment is widely recognized, studies on school food policy implementation typically cover mandatory or subsidized programs or policies (e.g. Taryn *et al.*, 2017; Pettigrew *et al.*, 2018). In many

countries, a school canteen is not subsidized by the government, but schools themselves must ensure a proper financial operation (Oostindjer *et al.*, 2017). The question then arises whether a more healthy canteen assortment is realistically obtainable without negatively affecting profitability. Research that examines a healthier school canteen from a viability perspective, including the views of students as primary customers, has been lacking. Given the need to progressively increase the number of foods complying to food based dietary guidelines in canteen assortments, it is therefore important to understand how and why assortment changes best can be implemented.

The objective of this study is to understand perspectives toward changes in the healthfulness of school canteen assortments and possible intervention strategies to encourage healthy eating, held by vocational school students and professionals within secondary and vocational schools responsible for school food policy. Using three canteen scenarios varying in assortment healthfulness, we systematically explored professionals' willingness to implement healthier canteens, their perceived effectiveness, and financial viability assessment in a survey. We contrasted these views with students' preferences obtained in focus group discussions. By doing this, we map the optimal action perspectives in which healthier canteens can be put into practice, leading toward a more healthy school food environment.

Methodology

Design and procedure

To understand responses to changes in assortment and policies, both students at vocational schools in the Netherlands and Dutch professionals working at secondary and vocational schools were exposed to school canteen scenarios varying in assortment healthfulness. Three possible school canteens including vending machines were developed (A–C, see the full scenario texts in the below list). Descriptions of available healthy and unhealthy foods were based on the food-based dietary guidelines of the Netherlands Nutrition Centre (2017). Canteen A constituted a fully healthy assortment in both the over the counter canteen and the vending machines. Half of the assortment of Canteen B consisted of healthy foods and drinks, while the other half consists of unhealthy foods and drinks. Canteens C constituted a fully unhealthy assortment.

Full-text scenarios presented to participants on paper during the discussion:

- School canteen and vending machines A.

  This canteen only sells healthy foods and drinks, such as brown and whole wheat sandwiches, (fruit) salads, wraps, soup, popsicle, popcorn, vegetable snacks, diet drinks such as diet coke, low-fat dairy without added sugar and fruit. You will not find fried snacks, white bread, chips or chocolate snacks, cookies or dairy and sodas with added sugar.

- School canteen and vending machines B.

  This canteen sells both healthy and unhealthy foods and drinks. For example, you will find: brown and whole wheat sandwiches, (fruit) salads, wraps, soup, popsicle, popcorn, vegetable snacks, diet drinks such as diet coke, low-fat dairy without added sugar and fruit. You will also find fried snacks, white bread, chips or chocolate snacks, cookies or dairy and sodas with added sugar.

- School canteen and vending machines C.

  This canteen sells only unhealthy foods and drinks. For example, you will find: fried snacks, white bread, chips or chocolate snacks, cookies or dairy and sodas with added sugar. You will not find brown and whole wheat sandwiches, (fruit) salads, wraps, soup, popsicle, popcorn, vegetable snacks, diet drinks such as diet coke, low-fat dairy without added sugar and fruit.

The presentation of scenarios was done in a series of focus groups (students) and a survey (professionals). In addition to the scenario presentation, participants were asked to evaluate potential cafeteria-based interventions that may encourage the healthy choice.

In the Netherlands, the context of the present study, there are no mandatory subsidized school meal programs in which foods and drinks are offered to students (Oostindjer *et al.*, 2017). Schools can voluntary decide to follow the recommendations on healthier offerings of the Dutch Healthy School Canteen program, developed by the Dutch Nutrition Centre. In 2015, 415 Dutch secondary and vocational school canteens (of 1904 school locations[1]) voluntary requested and obtained a School Canteen Award of the Healthy School Canteen Program (Geurts *et al.*, 2016).

Design and procedure focus groups among vocational education students

The group discussions took place at school and lasted about 1–1.5 h. Written consent was obtained upfront from all participants. Discussions were structured using an interview guide (Table I). As a warm-up, participants were asked to tell their name and study program. The discussion started with an open question about what participants thought about the canteen at school. A trained moderator led the discussions.

In the second part of the discussion, participants were asked to read the three scenarios on how a canteen at their school could look like in terms of the healthfulness of the assortment. They were instructed to imagine that the school was reconsidering redesigning the canteen. At the time of the study, the school had a canteen food service delivered by a commercial caterer. After reading all three scenarios, participants were asked to indicate individually which canteen they preferred at school, the second-best option and the least preferred option. Participants were then in plenary asked about the reasons for their preferences.

Third, participants were asked to fill in a questionnaire consisting of nine possible intervention strategies (Figure 1) to encourage consumers to choose healthy in a canteen, based on the archetypical intervention strategies proposed by Bos *et al.* (2013). For each intervention strategy, participants had to indicate whether they thought it was promising, not promising or "do not know." After filling in this questionnaire, the moderator in a plenary discussion setting probed for reasons behind the answers. In the final part, participants were asked what their ideal canteen would look like. The moderator probed on their ideas.

At the end of the discussion, participants filled in a questionnaire consisting of demographic questions and questions about their use of the canteen and competitive food outlets. First, they were asked "how many days a week are you at school?" In the next set

Topic	Sample questions
Part 1: introduction and welcome	
Explanation of discussion topic and rules Free associations on "canteen"	What do you think of when you hear the word "canteen"?
Part 2: hypothetical canteens (full-text scenarios presented to participants on paper during the discussion)	
Responses to three canteen descriptions varying in the healthfulness of the assortment	Which canteen is most attractive to you?
Part 3: intervention strategies	
Participants were asked to rate nine interventions individually on whether these are promising Participants were probed for the underlying reasons for their answer	Why do you think this intervention is promising?

Table I.
Interview guide for students' group discussion

of questions, participants had to indicate whether they got their lunch, drinks and snacks at school. The answer possibilities were: completely bought at school (in the canteen and vending machines), partially bought at school (in the canteen and vending machines), and completely brought from home or bought somewhere else. Next, they had to indicate for their current canteen, vending machines, snack food outlets near school and a supermarket near their school how often they bought something to eat or drink to be used directly at school: once or month or less, two or three times a month, once a week, two or three times a week or every day. The possibility of adding another place to purchase food was included.

Design, procedure and measures of survey among Dutch professionals

An online-administered questionnaire was used to carry out a survey of a sample of Dutch professionals responsible for school food policy. After providing informed consent and reading instructions, participants were exposed to the same three scenarios (full-text scenarios presented to participants on paper during the discussion) as the student participants on what a school canteen looks like in terms of the healthfulness of its assortment. After that, they were asked to categorize the same set of interventions as the ones the students rated during the focus group. The interventions had to be categorized on the extent to which professionals considered them promising to encourage healthy eating habits among students. Open-ended questions were included to probe for reasons why answers were given. Finally, a set of background questions was asked to describe the sample.

Measures. Canteen assortment scenarios. After reading each scenario, participants were asked to report their "Willingness to offer the assortment in the canteen" in their current school by the question: "Would you be willing to offer this assortment in one or more of your canteens at school?" The question could be answered using a five-point scale (1 = definitely not to 5 = definitely). "Healthy eating encouragement" is defined as the extent to which the canteen assortment leads to positive changes in food and drink choices at the short and long-term. It was measured for each scenario by three items all starting with "A canteen with this assortment […]" followed by "[…] is effective in encouraging healthy choices of students at school," "[…] is effective in teaching healthy eating habits of students at the long term," and "[…] stimulates students to purchase healthier foods and drinks" ($\alpha = 0.96$). "School policy fit" aimed to capture the extent to which implementation would be supported by management, and being anchored in the broader school policy and capacities (Wesseling *et al.*, 2016). The construct was measured by three items all starting with "A canteen with this assortment […] " followed by "is feasible in terms of support and capacities at school,"

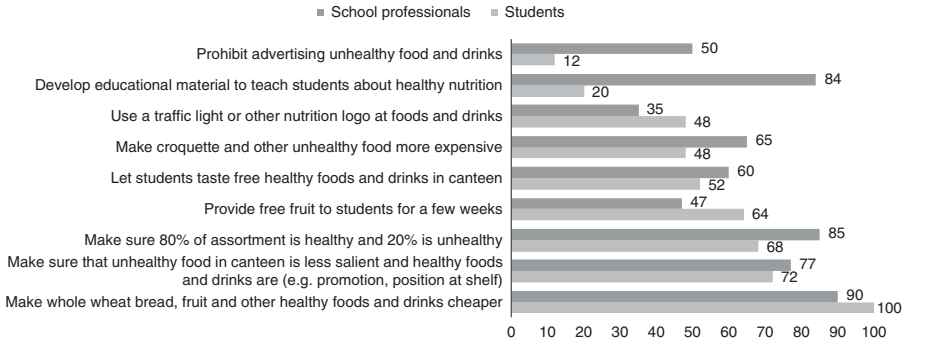

Figure 1.
Percentage of students ($n = 25$) and school professionals ($n = 68$) considering intervention promising

"fits within the current school policy," and "will be supported by management" ($\alpha = 0.79$). Finally, four single items were included about the consequences of canteens with the indicated assortment (e.g. "A Canteen with this assortment is cost-covering," see Table IV for all items). All items could be answered using a five-point Likert scale (1 = totally disagree to 5 = totally agree).

Promising interventions to encourage healthy eating. After responding to the scenarios, participants were asked to drag the same nine possible intervention strategies as students evaluated (see Figure 1 for a list of all interventions) to one of three boxes: promising measures, I am not sure/neutral, not promising measures. This task was introduced by the text "below you find nine measures that have been suggested by professionals to implement at schools with the goal to encourage healthy eating among students. What is your opinion about each of the measures?" After this task, a comment field for explanations was included with the text "if you wish, you can explain your choices below."

Additional measures. Next, professionals were asked to indicate to what extent healthy eating habits of students are the responsibility of school, of the students, or a balance between these two. Participants answered this question by answering a nine-point bipolar scale, anchored by "entirely the responsibility of the student" to "entirely the responsibility of school."

Two open-ended questions followed with the text "Imagine, you have an unlimited budget. What would your ideal school canteen look like? Do you have ideas about this?" and "Given your current budget and possibilities, what would your ideal school canteen look like. Do you have ideas about this?" We also asked "What is the current policy within your school regarding canteens?" The answer possibilities were: encouraging healthy nutrition is not included in the current policy, encouraging healthy nutrition is a small part of the current policy, encouraging healthy nutrition is a large part of the current policy and the entire current policy is based on encouraging healthy nutrition.

Additional measures included age in years, gender, type of school (vocational, secondary, both or different), size of school (less than 300 students, 300–1,000 students, 1,000–3,000 students, 3,000–10.000 students, more than 10,000 students). Finally, they were given the opportunity to write down further remarks about the study in a text box at the end of the questionnaire.

Participants

Participants of focus groups among vocational education students

Students attending one of the two included vocational schools were invited to participate via information leaflets and an announcement in a newsletter. Students were recruited using convenience sampling methods, although efforts were made to recruit a diverse group based on type of training and gender. Four focus groups, consisting of three till eight participants each, were conducted at two school locations. The total sample consisted of 25 students (14 females) representing age groups 16–23 years (mean age 18.8 years). Table II lists the participants' characteristics. Based on the questionnaire filled in after the discussion, participants followed a variety of educations, such as in security, teaching assistant, desktop publishing, healthcare assistant and tourism. About half of the participants (13 out of 25) indicated to make a purchase from the canteen once a month or less. About one-third of the participants (9 out of 25) bought something once a week. On average, participants spent 3.9 days (SD = 1.3) per week at school. As a reward for participation, participants received a gift voucher.

Participants of survey among Dutch professionals

Professionals were recruited using different approaches. Contact information was obtained from a list of DUO (Education Executive Agency of schools in the Netherlands).

Characteristic	Total sample
Where do you get your lunch?	
Everything at school	0 (0%)
Partially from school	9 (36%)
Everything from home or somewhere else	16 (64%)
Where do you get your drinks[a]?	
Everything at school	1 (4%)
Partially from school	4 (16%)
Everything from home or somewhere else	19 (76%)
Where do you get your snacks[a]?	
Everything at school	0 (0%)
Partially from school	9 (36%)
Everything from home or somewhere else	15 (60%)
How often do you make a purchase in the canteen to consume directly?	
Once a month or less	13 (52%)
2 till 3 times a month	2 (8%)
Once a week	9 (36%)
2 till 3 times a week	1 (4%)
Every day	0 (0%)
How often do you make a purchase from the vending machines to consume directly?	
Once a month or less	18 (72%)
2 till 3 times a month	6 (24%)
Once a week	1 (4%)
2 till 3 times a week	0 (0%)
Every day	0 (0%)
How often do you make a purchase from a snack food outlet near school to consume directly?	
Once a month or less	24 (96%)
2 till 3 times a month	1 (4%)
Once a week	0 (0%)
2 till 3 times a week	0 (0%)
Every day	0 (0%)
How often do you make a purchase from a supermarket near school to consume directly?	
Once a month or less	8 (32%)
2 till 3 times a month	4 (16%)
Once a week	5 (20%)
2 till 3 times a week	8 (32%)
Every day	0 (0%)
Age (mean, SD)	18.8 (2.0)
Gender	
Male	11 (44%)
Female	14 (56%)

Notes: $n = 25$. [a]Response of one participant is missing

Table II. Characteristics of focus group participants

E-mails were sent to contact persons of 249 secondary and 92 vocational school locations in the Netherlands. In the e-mail, we asked to forward the e-mail to those involved in school canteens. In addition, a call for participation was put in the monthly newsletter of the Dutch Nutrition Center aimed at school professionals. 68 participants (39 females, 57 percent) filled in the questionnaire. The majority of the participants (70 percent) worked at a secondary school. More than a quarter of the participants worked at a vocational school, which sometimes also included a secondary school. Participants from both vocational and

secondary schools were recruited as there is an age overlap between students of these types of schools. Vocational students start their education around the age of 16, while other secondary education streams are completed around the age of 18.

Participants had an average age of 47.8 (SD = 10.8, range 18–64). The majority of participants took part in the Dutch Healthy School program. At about half of the schools, the school canteen was internally organized, while at the other half a catering company was responsible for the school canteen. Participants had a variety of functions within school, such as facility manager (27 percent), canteen holder (13 percent), director (9 percent) and a number of other functions such as teacher, policy officer and concierge (Table III).

Data analysis

Data analysis of focus groups among vocational education students

All discussions were audiotaped and transcribed verbatim. Transcripts were analyzed and grouped into recurring themes by two independent researchers. The goal of this interpretive analysis was to explore the range of opinions across the groups and participants. The themes discussed below emerged from the qualitative analysis of the full transcripts. Quotes from participants are included to exemplify the results.

Characteristic	Total sample
Type of school	
Secondary school	48 (70%)
Vocational school	12 (18%)
Both secondary and vocational	6 (9%)
Different (e.g. school caterer)	2 (3%)
How large is your school or school organization?	
Less than 300 students	10 (14%)
300–1,000 students	23 (34%)
1,000–3,000 students	25 (37%)
3,000–10,000 students	4 (6%)
More than 10,000 students	6 (9%)
What is the current policy within your school regarding canteens?	
Encouraging healthy nutrition is not included in the current policy	3 (4%)
Encouraging healthy nutrition is a small part of the current policy	14 (21%)
Encouraging healthy nutrition is a large part of the current policy	36 (53%)
The entire current policy is based on encouraging healthy nutrition	15 (22%)
Way in which school canteen is provided for	
Internally organized	31 (46%)
Catering organization	31 (46%)
Different	6 (8%)
Participation in Healthy School canteen program	
Yes	58 (85%)
No	6 (9%)
Do not know	4 (6%)
Age (mean, SD)	47.8 (10.8)
Gender	
Male	29 (43%)
Female	39 (57%)

Note: $n = 25$

Table III. Characteristics of Dutch professionals

Data analysis of survey among Dutch professionals

To determine whether there were differences in responses to the three canteen scenarios on all included constructs and single items, we conducted a repeated measures ANOVA followed by Bonferroni correction to account for multiple comparisons. In case Mauchly's statistic was significant, degrees of freedom were adjusted with the Huynh–Feldt statistic. Partial eta-squared (partial η^2) was used as a measure of effect size. Data were analyzed using the SPSS 23.0 statistical package (SPSS Inc., Chicago, IL, USA). Answers to open-ended questions were content analyzed.

Results

Evaluation of canteen assortment scenarios

Professionals were generally willing to offer assortment A (all healthy), in that they saw a fit with their school policy and they believed it would encourage healthy eating. Means, standard deviations and test statistics for these responses of professionals regarding the three canteen scenarios are provided in Table IV. "Willingness to offer the assortment in canteen" differed significantly between the three canteens, being the highest for Canteen A, followed by Canteens B (mixed) and C (all unhealthy). Scores for "healthy eating encouragement" and "school policy fit" showed significant differences in a similar pattern, in that the healthier the assortment was described, the higher the canteen was believed to encourage healthy eating and the better the fit with the school policy.

Out of 24 students who indicated their most attractive canteen, the large majority (21 participants) considered Canteen B as most attractive. Removing the freedom to choose unhealthy foods and drinks was considered unappealing. The reason for this is that at times, participants felt a need for unhealthy foods, such as at the end of a long school day or in winter. One of the reasons discussed was that healthier foods are less filling. Healthfulness is associated with light and salad-type meals that do not help you through the day. Across focus groups, a frequent concern was that the unhealthy foods in the canteen are more attractive than the healthier options, due to lower prices, taste and the fact that they are freshly prepared throughout the day (deep-frying snacks).

Constructs/item*	100% healthy Canteen (A)	50% healthy Canteen (B)	100% unhealthy Canteen (C)	Repeated measures ANOVA statistics
Willingness to offer assortment in canteen	3.7 (1.3)a**	2.9 (1.3)b	1.1 (0.4)c	($F(1.6, 106.6) = 89.1$, $p < 0.001$; partial $\eta^2 = 0.57$),
Healthy eating encouragement	3.9 (0.9)a	3.0 (1.0)b	1.4 (0.8)c	($F(2, 134) = 144.7$, $p < 0.001$; partial $\eta^2 = 0.68$)
School policy fit	3.6 (0.9)a	3.2 (0.9)b	1.9 (0.7)c	($F(1.68, 112.5) = 74.6$, $p < 0.001$; partial $\eta^2 = 0.53$)
A canteen with this assortment […]				
[…] will lead to satisfied students	3.0 (0.9)b	3.8 (0.7)a	3.1 (1.0)b	($F(1.90, 127.7) = 18.3$, $p < 0.001$; partial $\eta^2 = 0.21$)
[…] will lead to resistance among students	3.5 (1.0)a	2.3 (0.9)b	2.5 (1.1)b	($F(2, 134) = 24.3$, $p < 0.001$; partial $\eta^2 = 0.27$)
[…] is cost-covering	2.7 (1.0)b	3.5 (0.7)a	3.5 (1.0)a	($F(1.70, 112.6) = 16.8$, $p < 0.001$; partial $\eta^2 = 0.20$)
[…] will lead to high revenues	2.5 (0.9)b	3.4 (0.8)a	3.6 (1.0)a	($F(1.60, 108.0) = 29.8$, $p < 0.001$; partial $\eta^2 = 0.31$)

Table IV.
Means (SD) of constructs evaluating three canteens

Notes: *Numbers represents means on five-points scales; **values with a subscript not sharing the same letter are significantly different ($p < 0.05$)

A strong reason for students to favor canteen B was that they believed that the decision to consider the healthfulness is one that you should take yourself. Many stressed that this should not be imposed on you as a student. They also indicated that students differ. Some of them are "into the hype of only eating healthy foods" while others only eat unhealthy foods. Only two participants judged Canteen A the most attractive as they indicated to actively strive for a healthy lifestyle. The majority, however, argued that such a canteen is not realistic as this would even increase prices and would drive customers to more appealing competitors, such as the nearby supermarket, sandwich bar or snack outlet. Alternatively, students would take food and drinks from home. One student participant stated: "Here at school you have to pay a lot more to eat healthy compared to eating unhealthy and that is the less attractive part of it." Only one participant favoured Canteen C because he loved the types of food mentioned, such as snacks. Moreover, he considered healthy eating as a concern for later in life, not now.

Two student participants found Canteen A the least attractive and one participant had no opinion about this. The large majority of participants considered Canteen C as the least attractive because they were motivated to eat healthy at least now and then. Healthy foods are believed to boost energy and improve the ability to focus at schoolwork or as one participant argued about eating unhealthy foods: "You get bad energy, all fake energy, while eating fruit and vegetables will make you feel better." It is not that higher prices stopped them from purchasing healthier foods, but it did concern some participants that other outlets are cheaper and offer better value for money. These competitive outlets were appreciated for having "everything you want" at walking distance. All student participants indicated to be negative about the high price levels in canteens when compared to supermarkets and other outlets. The majority of student participants were no heavy users of the canteen. As can be seen in Table II, most of them bring their own food and the supermarket is the biggest competitor of the school canteen. They explained that purchasing the majority of foods and drinks for the day in the canteen is not affordable. Even for warm snacks, some participants were fully aware of the higher prices in the canteen compared to what is on offer in supermarkets nearby. Some of them clarified that their income was limited and they wanted to spend it on foods and drinks that offer value for money. Supermarkets are also believed to offer more variety, which is a reason to go there if time allows. There was also criticism on the prices of particularly healthier foods in the school canteen. In addition, some of students expressed that the atmosphere in the canteen was not cozy and pleasant with mixed experiences regarding how canteen employees welcomed them.

Professionals correctly observed this reluctance of students to canteen A, reflected in higher scores for the 100 percent healthy canteen for the item "A canteen with this assortment will lead to resistance among students." The differences in the item "A canteen with this assortment will lead to satisfied students" were also statistically significant, indicating that they expected more satisfied students when 50 percent of the canteen assortment is healthy compared to entirely (un)healthy. Professionals also foresaw revenue problems with the fully healthy canteen. Similar patterns of significant differences were revealed for the items "A canteen with this assortment is cost covering" and "A canteen with this assortment will lead to high revenues." The *post hoc* test showed that Canteen A was perceived to lead to lower revenues and is less cost covering.

School professionals only felt partially responsible for healthy eating of students, as indicated by the 5.3 mean rating (SD = 1.5) for the item measuring whether responsibility for healthy eating habits of students, slightly above the midpoint of the scale (implying shared responsibility between student and school). In contrast, students viewed the healthfulness of a canteen assortment as the responsibility of the school.

Intervention potential: what has to be done for successful implementation of a healthy school canteen

Figure 1 contrasts the percentages of students and school professionals considering various interventions promising. Students unanimously believed that the price of healthy foods should be reduced. This would make students stay inside schools without the need to go to the supermarket to buy cheaper products. It relates to the number one expressed concern that the current canteen is too expensive. Almost all professionals agreed with this. Similarly, the idea of "making unhealthy foods more expensive" led to mixed opinions between both groups of participants. In total, 11 students did not believe in it, as nearby supermarkets become even more attractive to go to, with the risk of students purchasing even more tempting foods and drinks. Others were more positive in that they expect that expensive products become less attractive. Professionals suggested that prices, particularly of healthier foods, should be reduced, although this is hard to achieve. To be able to do so, students could be involved in preparing and selling the foods. Covering all costs should be sufficient, instead of making profits, as one participant wrote.

The majority of both students and professionals were inclined to go for nudge-like measures such as making unhealthy food less salient and available. These measures retain the freedom of choice, and makes students feel less steered. As one professional stated: "Prohibiting or not offering unhealthy foods is of no use to the youth. Then they go to the supermarket and buy large packages. They often do things when they are not allowed. Informing them well and explaining why it is better to eat healthy can help make healthier choices, even outside the school. Outside the school they are also exposed to many temptations." Students and professionals had a different view on educational material to teach students about healthy nutrition. Students were not supportive, while the large majority of professionals considered it to be promising. Some professionals emphasized that offering healthy foods in the canteen should be interwoven with nutrition education in the lessons. For example, one professional stated: "I think that we have to teach our students to choose healthy and explain why rather than remove everything that is not good for them."

Even though half of the professionals considered it to be a promising intervention, restricting advertising of unhealthy products was not seen as promising by the large majority of student participants. Not only because everyone is already familiar with the assortment of fried snacks during lunch; these products sell themselves in a way. One 19-year old student participant said: "The smell welcomes you when you walk downstairs, that's already enough advertisement."

Ideal school canteens

Both groups of participants were asked for their thoughts about an ideal canteen. Professionals reported the optimal balance between healthy and unhealthy offerings. They argued that the majority of offerings should be healthy, although a small proportion can be unhealthy: "Bad is allowed, but not too often or too much" and "Many healthy things but also less healthy because students have to learn to choose." Thinking about an ideal canteen given an unlimited budget, professionals recommended creating a canteen environment that has a positive atmosphere, welcoming to students. The way of decorating should encourage students to primarily purchase healthy products ("Show what you sell and promote it"). In such canteens, personnel is helpful and friendly with enough places to sit. There should be a lot of fresh preparation of foods, plenty of things to see, hear (music) and do, like tasting, cooks in the canteen. The foods and drinks offered should be well presented to appeal to students, and not in a line buffet. Particularly healthy foods should be made more appealing and varied (attractive presentation, taste sessions). Several professionals mentioned involving students. By giving them responsibility to decide on the assortment, preparation and sales of products, canteens can be cost covering. For example, students can come up

with the "sandwich of the month." Professionals suggested to combine this with education on healthy choices and why this is important.

For students, healthy eating and drinking meant fresh, seducive and prepared while you wait-foods. Participants were negative about the pre-packaged sandwiches with a variety of toppings that were available at the school canteen. Concerns were expressed about the time the product had been on display before it is being sold. Several students indicated that they wish to customize the topping of their sandwich, have it prepared just before consumption and see who prepares it. Participants reported to be attracted to bakery stores that allowed them to have this kind of control. For example, a 23-year old participant stated: "Here we have sandwiches which are packed and that is not how it should be. At Bakker Bart (Dutch Bakery chain), you can choose from various vegetables." Students wanted to have the same experience at school as in their favorite restaurant outlet.

Discussion

Many school food policies aim to increase the healthfulness of their food assortments by implementing stricter nutrition standards (Micha *et al.*, 2018). In this study, we contrasted students' perspectives on healthier school food assortments (consumer demand), with school professionals' perspectives (supply side). The views elicited from students and professionals were consistent in that both are positive about the need for healthier foods at schools. Professionals with responsibility for school food policy were supportive of more strict policies. There was a strong willingness to go for Canteen A as they believed this encourages healthy eating habits more than also including unhealthy foods in the assortment. Nevertheless, they did worry about feasibility in terms of profitability. For school food professionals, a fully healthy assortment does not seem to be realistically implementable due to their revenues being under pressure. This was attributed to students not purchasing healthier options, but rather visit food vendors near school to purchase their favorite items. In correspondence with previous research (Hermans *et al.*, 2017), these food vendors near school are key competitors of the school canteens as students feel that they can get lower prices and more value for money. Moreover, freedom of food choice is essential for students. They want to decide themselves whether to go for a healthy or less healthy choice. If a desired product is not present, then the walk to the nearest supermarket or lunchroom is easily made. This is in line with previous research that showed that autonomy in choice is of high importance to adolescents and young adults. Although Dutch adolescents fully agreed that healthy foods should be available at school, they also view it as their own responsibility to make independent choices on what to purchase and consume (Hermans *et al.*, 2017). When it comes to the motivation to eat healthy, adolescents' health orientation has been shown to be more directed toward sports and exercising rather than toward food consumption and feel that their diets are generally healthy (Bech-Larsen and Kazbare, 2014).

From the perspective of the school, limiting the assortment so that only healthy options are available is considered to be economically challenging. To address these challenges, school professionals embraced strategies to increase the likelihood of success such as creating an appealing atmosphere in the canteen to keep students inside the school boundaries, engaging students in canteen food preparation and addressing the presentation of the assortment. They also expressed the importance of complementing assortment changes with education in the classroom. For the majority of students, a fully healthy assortment is not appealing. They are willing to accept changes in the assortment, as long as freedom of choice is preserved. Students highlighted the critical importance of offering a compelling customer experience before, during and after a purchase, including customization options for the food. For them, rather than focusing on just the food, they want to feel valued as a customer rather than as a student.

The present study has several limitations that need to be acknowledged. A limitation of this study is the lack of professionals who do not participate in the Dutch Healthy Canteen

program as they could have shed light on the reasons why they do not participate. Secondary schools that participate in this program have been shown to offer more healthy products in their canteens and take more actions to improve students' choices than non-participating schools (Milder *et al.*, 2014). However, our sample allowed us to learn from professionals who can be considered to be frontrunners in their willingness to implement more strict nutrition guidelines. Full adherence to new nutrition policies typically takes years, as school stakeholders often encounter difficulties implementing policies, due to lack of management support and resources such as time and money (Samuels *et al.*, 2010; Taryn *et al.*, 2017). Therefore, results of this study may also have important implications for schools that are currently less far with implementing healthier school canteens.

The findings from this study are particularly relevant given recent calls for limiting unhealthy foods and drinks in the school food environment (e.g. Kim *et al.*, 2018). Despite problems and challenges in successfully implementing stricter school food policies, there is evidence of a positive impact on improved dietary choices of students (Chriqui *et al.*, 2014). However, compared to college students, students of vocational schools are a large and understudied group, even though they are considered to be a vulnerable group with respect to the development of unhealthy eating patterns and the onset of overweight (Stok *et al.*, 2018).

Future research could explore how to create a solid social support base to improve school food environments substantially. Research on the sales, diet and health impact of policies and programs targeting the school food environment is essential in this respect. Understanding how schools are coping when implementing multifaceted interventions like a school canteen program is as well required to achieve better outcomes.

These results are encouraging for public health policy makers considering more stricter policy measures. An exclusively healthy assortment is desired by many secondary and vocational schools, but not yet feasible in terms of their financial cost-effectiveness. At the same time, there is less support for a largely unhealthy assortment at school. Within these two extremes it is important to tempt students as much as possible to pick the healthier choice. Commitment and input from students themselves is essential here.

Note

1. A school location is not equal to a school organization, as one school organization often has more locations. In the Netherlands, there were 654 secondary school organizations and 67 vocational school organizations in 2015 (Geurts *et al.*, 2016).

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