International Journal of Consumer Studies

International Journal of Consumer Studies ISSN 1470-6423

Healthy and tasty school snacks: suggestions from Brazilian children consumers

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Keywords
Child, choice, consumer, food, nutrition.

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doi: 10.1111/j.1470-6431.2011.01012.x

Abstract

Children do not choose what to eat based on health issues alone, and the high availability of non-nutritious food in the environment can be a barrier to the consumption of healthy foods. Brazilian children are consuming processed, savoury, rich in fat, sodium and refined carbohydrates rather than more nutrient-dense foods. Foods offered in public school meals and those sold in private school canteens in Brazil are subject to regulation, but not the snacks brought from home. This study identified the suggestions of public and private school students about the characteristics that a snack should present in order to be considered both healthy and palatable. A qualitative exploratory study using focus groups was conducted with 128 primary school students aged 7–10 years old. Interviews were transcribed and content analysis was conducted, generating three categories: (1) foods actually consumed during snack breaks; (2) examples of foods considered healthy and/or tasty for consumption during snack breaks; and (3) desired characteristics of a healthy and tasty snack. Foods of high energy density and low nutritional value were mentioned as the most consumed snacks, usually brought from home or purchased within/near the schools. Consumption of meals offered by the National School Meal Program was reported by only one-third of the public school students. Fruits, natural juices and vegetables were considered healthy foods; sweet-tasting preparations containing fruits were considered tasty; while fruits and natural fruit juices were considered both healthy and tasty. Sweet-tasting preparations containing fruits were mentioned as examples of snacks with the desired healthy/tasty characteristics. The disparity between what was actually consumed and what was reported as ideal leads us to question the availability in retail stores of healthy yet palatable foods that meet this population's desires.

Introduction

Children throughout the world are currently consuming more tasty and highly palatable foods (fat-rich, sodium and refined carbohydrates) and fewer healthy foods (whole grains, fruits and vegetables) than recommended (Enns *et al*., 2002; Smiciklas-Wright *et al*., 2003; Institute of Medicine, 2007). The majority of snacks available in the industrialized world are processed foods of high energy density that supply an average of 400–500 kcal/100 g, while most fruits and vegetables have much lower energy content (Graaf, 2006).

This situation is also found in Brazil, where studies indicate that most consumed children's school snacks have a high energy density and a low concentration of nutrients (Carmo *et al*., 2006; Mesquita *et al*., 2006).

Brazil has laws to determine which foods can be offered in public school meals (Ministério da Educação, 2009) and which can be sold in private school canteens (Santa Catarina, 2001), enabling schools to positively encourage and facilitate healthy food choices (Gould *et al*., 2006). Nevertheless, students are allowed to bring from home snacks that are not available in school, such as sandwich biscuits and artificially flavoured beverages (Muniz and Carvalho, 2007; Gabriel *et al*., 2008).

Because children tend to eat exclusively what they like (Birch, 1999), the fact that highly palatable foods rich in carbohydrates and lipids are widely available in the environment can lead to a situation of excessive consumption (Probart *et al*., 2005; Hang *et al*., 2007; Simon *et al*., 2008; Levy *et al*., 2009; Tester *et al*., 2010).

This study's objectives were to gain knowledge about students' actual consumption during snack breaks, as well as their opinions about healthy and tasty foods, and to gather suggestions about the characteristics an ideal snack should present in order to be considered palatable and yet healthy. Awareness of students' opinions could be useful in the development of nutritionally balanced yet palatable snacks, which might increase the likelihood of healthier choices among children.

Method

Study design

A qualitative exploratory study was conducted in two Brazilian schools, one private and one public. The study protocol was approved by the Federal University of Santa Catarina Human Research Ethics Committee (Licence No. 323/08), and informed consent was obtained from all those responsible for the students who agreed to take part in the study.

Research was conducted in both public and private schools so that any differences relating to types of snacks available could be identified. The private school had a canteen, subject to regulation that prohibits the sale of packaged savoury snacks, fried goods, sweets, soft drinks and sweetened juice drinks (Santa Catarina, 2001). The public school participated in the National School Meals Program, a nationwide governmental strategy aimed at distributing meals during school hours to supply at least 20% of the students' nutritional needs. Such a policy also contributes to a reduction in truancy levels, an increase in the learning of skills and the adoption of good eating habits (Ministério da Educação, 2009).

Participants

All 363 students from second to fourth elementary grades from the two schools were invited to participate. Of these, 128 (69 male students) returned the consent form signed by their parents. Non-participation in the study was due to failure in returning the signed consent forms or absenteeism on the day of the focus group interview. The students attended school for half-days, either mornings or afternoons, and had snack breaks around 10:00 am or 3:30 pm.

Data collection

The focus group technique (Krueger and Casey, 2009) was chosen because it promotes generation of ideas and minimizes direct questioning. This is especially important with children because they respond not only to the researcher but to the other members of the group as well (Heary and Hennessy, 2002; Green and Thorogood, 2004). Twenty-six focus group sessions (10 in the private school and 16 in the public school) were conducted during March and April 2009, with the participants divided by age and gender. Homogeneity with respect to gender is recommended when conducting focus group interviews with children because they often dislike the opposite sex in a way that may hinder group productivity (Krueger and Casey, 2009). Groups consisted of four to six students and were moderated by the first author with the aid of an interview guide containing open questions:

1 Do you normally eat something during the school break? What?
2 Where does it come from (home, canteen, School Meals Program, other)?
3 Which foods do you consider healthy?
4 Which foods do you consider tasty?
5 Can you give an example of healthy and tasty food to be eaten as a snack?
6 If you could create a healthy and tasty food to be eaten as a snack, what characteristics would it present (taste, ingredients, colour, temperature, use of utensils)?

An observer took notes during the sessions, which lasted approximately 30 min.

Sessions took place within the school settings, during school hours in a specially selected room with little furniture and distraction. Each group was informed of the goal of the study and the importance of expressing their opinions. It was also made clear that participation was voluntary and that the information would remain classified. Responses were recorded with a digital audio device.

Data analysis

A total of 9.4 h of interviews was recorded and transcribed verbatim to produce a manuscript. Notes taken by the observer during focus group sessions were incorporated into the manuscript, previous to content analysis. With this method, ideas or trends were coded in the transcript margin; then, they were selectively retrieved, reassembled and grouped according to common themes using the cut-and-paste technique (Bardin, 2004). Words and phrases used by participants were analysed to determine the degree of similarity among responses. We considered the frequency of comments to measure the significance of specific topics. Frequencies were used only in the broadest of terms (for example, many, some, a few).

Results

Students' ages ranged from 7 to 10 years (mean age 8.5 years). Eighty-two (64%) students were from the public school and 88 (69%) students went to school in the afternoon. The characterization of the participants is presented in Table 1. There were no special-needs students, most were white and lived near their schools. After content analysis, the statements of the students were organized into three categories: (1) foods actually consumed during snack breaks; (2) examples of foods considered healthy and/or tasty for consumption during snack breaks; and (3) desired characteristics of a healthy and tasty snack (Table 2).

Foods actually consumed during snack breaks

Most private and public school students indicated that they had a habit of eating something during snack breaks. Half of the private school students mentioned that they brought a snack from home and the other half bought it at the school canteen. The most cited snacks by students from the private school were cheese bread, stuffed baked pastries and savoury crackers. Roughly one-third of the public school students reported consuming the meal provided by the National School Meals Program. The others either brought something from home or bought items from a shop in front of the school, mostly sandwich biscuits or packaged snacks (corn chips or potato crisps).

Examples of foods considered healthy and/or tasty for consumption during snack breaks

Most students from both schools mentioned fruits, natural juices and vegetables as examples of healthy snacks. A remarkable number of public school students also mentioned the combination of rice and beans. Fruits, chocolates and sweets in general (sweets, lollipops and chewing gum) were equally mentioned by private school students as the main examples of tasty snacks. Public

Table 1 Characteristics of focus group participants

	Boys ($n = 69$)	Freq. (%)	Girls ($n = 59$)	Freq. (%)	Total ($n = 128$)	Freq. (%)
Age						
7	14	11	10	8	24	19
8	19	15	15	12	34	27
9	26	20	18	14	44	34
10	10	8	16	12	26	20
Class period						
Morning	14	11	26	20	40	31
Afternoon	45	35	43	34	88	69
Type of school						
Private	21	46	25	54	46	36
Public	48	59	34	41	82	64

Table 2 Examples of foods mentioned by the students according to content analysis categories

Category	Examples
Actually consumed	'. . . packaged savoury snacks and cookies, sometimes I bring them from home, from the canteen or from the bakery . . .' (Girl, 8 years old, public school)
	'. . . some days I eat cookies, some days bread . . .' (Boy, 7 years old, private school)
Healthy	'. . . cabbage, everything planted from seeds, which are leaves, are good . . .' (Girl, 7 years old, public school))
	'. . . orange, apple, pear, guava, lettuce, tomato, watercress, rocket . . .' (Boy, 9 years old, private school
Tasty	'. . . I like fruits very much . . .' (Girl, 8 years old, private school)
	'. . . chocolate, sweets, chewing gum, packaged savoury snacks . . .' (Girl, 10 years old, private school)
	'. . . pasta with sausage, lasagne, polenta, pizza . . .' (Girl, 9 years old, public school)
Healthy and tasty	'. . . a whole lot of fruit . . .' (Girl, 8 years old, public school))
	'. . . fruit salad, with lots and lots of fruit . . .' (Boy, 7 years old, private school
Ideal	'. . . a banana, apple and milk smoothie . . .' (Boy, 9 years old, public school)
	'. . . a cake with lots of fruits, fruit bread . . .' (Girl, 8 years old, private school)
	'. . . orange, lemon, carrot cake . . . maybe with an apple topping . . .' (Girl, 9 years old, private school)
	'. . . fruit with healthy chocolate . . .' (Girl, 10 years old, private school)

school students also mentioned fruits as examples of tasty snacks, but also savoury preparations such as pasta and bread. No vegetables were mentioned by either public or private school students as examples of tasty snacks. Regarding the possibility of a snack being healthy and tasty at the same time, students from both schools agreed that fruits and natural fruit juices were good examples.

Desired characteristics of a healthy and tasty snack

When asked about the characteristics that a food should present in order to be considered a healthy and tasty snack, students from both schools mentioned sweet-tasting preparations containing fruit chunks, such as cakes, ice cream and smoothies.

Private school students suggested that the ideal food should not require utensils ['Paper wrapper . . . in a box . . . to be eaten with the hands . . .'], while the public school students stated otherwise. Students from both schools agreed that foods should be eaten at the right temperature – hot foods should not be served cold and vice versa. In terms of the ideal colour, private school students preferred dark brown ['. . . because of the chocolate . . .'] and yellow. In the public school, the preference for brown and yellow was also present, but the characteristic of multiple intense colours was also mentioned.

Discussion

The most widely consumed snacks were foods of high energy density and low nutritional value (cheese bread, stuffed baked pastries, savoury crackers, sandwich biscuits, corn chips or potato crisps). Fruits, natural juices and vegetables were considered healthy; fruits, chocolate, sweets, pasta and bread were considered tasty, while fruits and natural fruit juices were considered both healthy and tasty. Sweet-tasting preparations containing fruits were chosen as examples of snacks with desirable healthy/tasty characteristics.

Snacks brought from home or purchased at retail outlets inside or near the schools were the options chosen by the majority (half of the private school students and two-thirds of the public school students). Our results are consistent with other studies examining student behaviour in the school food environment (Bellisle *et al*., 2007; Simon *et al*., 2008; Fox *et al*., 2009; Tester *et al*., 2010). Some authors have highlighted the fact that such snacks are not subject to any type of control or regulation, and therefore could be contributing to children's rather inadequate food choices (Probart *et al*., 2005; Story, 2009; Waynforth, 2010). Indeed, sweet and savoury snacks of high energy density and low nutritional value were the foods most frequently consumed during snack breaks by the students interviewed in this investigation. Results are in agreement with previous studies conducted in Brazil and in other countries (Bower and Sandall, 2002; Mesquita *et al*., 2006; Gabriel *et al*., 2008). Over the last decade, nutritional transition has modified the eating habits of adults and children in many developing nations, including Brazil. As a result, ingestion of whole milk, natural juice, cereals, vegetables, fruits, meats and fish was reduced, while ingestion of soft drinks, sweetened juice drinks, cakes, cookies, corn chips, pretzels, sweets and processed meats increased. Intakes of total fat, saturated fat, sugar and sodium rose accordingly (Monteiro *et al*., 2000; Popkin, 2001; Instituto Brasileiro de Geografia e Estatística, 2004).

Students from both schools considered fruits and fruit juices as healthy, tasty or both. Vegetables were considered healthy but not tasty. This compares with other work in which it has been reported that consumption of fruits by children is more common than that of vegetables (Wind *et al*., 2005), and that children in this age group are prone to recognizing fruit as healthy (Bower and Sandall, 2002).

The combination of rice and beans, a typical Brazilian dish of nutritional value and high protein content, often served by the National School Meals Program (Ministério da Saúde, 2006), was also mentioned as an example of a healthy snack. Nevertheless, not many students from the public school reported consuming the meal provided by the program. In the US, the situation is no different – meals meeting the United States Department of Agriculture minimum nutritional standards for the National School Lunch Program are often substituted for easily accessible snack foods (Bauer *et al*., 2004; Briefel *et al*., 2009).

When examining the school nutrition environment, a distinction should be made between school meals, which must meet nutrient standards, be offered in defined portion sizes and be highly regulated, and competitive foods (those not provided by the school) that are only minimally regulated (Probart *et al*., 2005). In Brazil, even after the institution of proper legislation, most items available in school canteens continued to be of high caloric density and low nutritional value (Gabriel *et al*., 2009). This is a worrying situation, when previous research has shown that children appear to believe that school, and anything permitted at school, is inherently healthy (Hesketh *et al*., 2005). Among the barriers to the consumption of healthy foods, as identified by young people, is precisely the high availability of foods of low nutritional value in the environment (O'Dea, 2003; Bauer *et al*., 2004; Fox *et al*., 2009).

Students from public and private schools reported that the ideal snack should taste sweet and contain fruit chunks. Indeed, children tend to prefer sweet-tasting foods and drinks (De Moura, 2007; Warren *et al*., 2008), as their food preferences and choices appear to be largely affected by the sensory qualities of food (Mustonen *et al*., 2009). In a previous study conducted with Brazilian private school students, authors verified that very few among the subjects reported an intense rejection of fruits, and that restrictions mentioned specifically the addition of sweet toppings such as sugar and condensed milk (Fiates *et al*., 2008).

Students from both schools agreed that adequate temperature and agreeable colour were important features of an ideal snack. In this regard, it has been established that sensory characteristics, such as temperature and colour, can influence food intake and choice (Bower and Sandall, 2002; Stroebele and De Castro, 2004). Nevertheless, it is not common for students to be motivated to express their opinion about the foods offered to them at snack time (Muniz and Carvalho, 2007).

As with any qualitative study, the results presented here do not allow extrapolation to other populations. Furthermore, due to its exploratory character, the study included only two schools, although the results were based on the opinions of 128 students of different ages, gender and, possibly, social classes.

The main goal of the study was to obtain information regarding consumption of snacks, healthy and/or tasty foods, and the desirable characteristics that a snack should have. Most students reported that an ideal snack should taste sweet and contain fruit in it, differing substantially from what was reported as actually being consumed. The meals offered by the National School Meals Program, in spite of being healthy options designed to meet the student's nutritional requirements, were reportedly consumed by only a few of the public school students. The majority of public and private school students brought snacks from home or purchased them within/near the schools, a situation where no regulations can be applied. It is well established that children do not choose what to eat based on health issues (Birch, 1999), but we identified a clear preference for sweet-tasting preparations containing fruit. The observed disparity between what was actually consumed and what was reported as ideal could be a consequence of the unavailability of healthy yet palatable options that meet this population's desires, both in retail stores and in the National School Meals Program. Findings from the current study can help industries as well as nutrition and food science researchers in the development of such products, what might increase the likelihood of healthier choices in children.

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