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Influence of package and health-related claims on perception and sensory acceptability of snack bars

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ABSTRACT

Concerns for health can lead to healthier food choices, especially if the consumer is well informed. This study aimed to evaluate the importance of package and health-related claims on Brazilian consumers' acceptance of snack bars. In order to evaluate package attributes, in focus groups discussions, 19 consumers chose the most important factors that influence their purchase decisions. Next, 102 consumers evaluated six commercial brands of snack bars in a three-session acceptance test: the first with no information about the product, the second containing the product package and the third with information on health-related claims associated with consumption of the bar. In general, package attributes, price and flavor were the most important factors that influence the purchase of snack bars. Health claims positively influenced consumer acceptance, but information concerning the absence of gluten and lactose did not significantly alter sensory acceptance. The presence of omega-3s, sugars, preservatives, flavorings and colorings have the potential to improve acceptability, because they were able to raise the acceptance of the seed bar, removing it from the rejection region. Protein and nut bars are not well known to the general public and the lower mean acceptance of the seed and protein bars demonstrated the need for sensorial improvement.

1. Introduction

Visual or non-verbal elements (e.g. graphics, pictures, colors, lettering sizes, shape of package) and information or verbal elements (e.g. labeling, brand information) comprise package attributes (Miraballes, Fiszman, Gámbaro, & Varela, 2014; Silayoi & Speece, 2007). They play a vital role in decision making, since a specific combination of quality attributes determines expected quality. An informed consumer aggregates knowledge about food from various available sources and compares it with the information on the product labels (Verbeke, Frewer, Scholderer, & De Brabander, 2007; Wyrwa & Barska, 2017).

Package characteristics can lead the consumer to purchase a product, while sensorial characteristics confirm acceptance and can determine repeat purchases (Della Lucia, Minim, Silva, Minim, & Ceresino, 2010). Studies have shown that consumers consider sensorial characteristics to be the most important factor in choosing foods, but non-sensory attributes are becoming increasingly important and may affect flavor perception (Ares, Giménez, & Gámbaro, 2008; Vidigal, Minim, Carvalho, Milagres, & Gonçalves, 2011). Therefore, the combination of sensory and non-sensory factors may generate more complete and realistic information about consumer behavior in purchasing situations (Asioli et al., 2017).

A range of studies has explored the interaction between information and taste. For example, Ares, Barreiro, Deliza, Giménez, and Gámbaro (2010) report that consumer expectations of chocolate milk desserts enriched with antioxidants significantly affected their responses when tasting the desserts. Milagres et al. (2014) concluded that milk containing information about the high concentration of melatonin and its health benefits had higher sensory acceptance compared to a blind test. Torres-Moreno, Tarrega, Torrescasana, and Blanch (2012) showed that the acceptance of dark chocolates depended not only on the expectations generated by product information, brand and type, but also primarily on the sensory characteristics of the product. On the other hand, Di Monaco, Ollila, and Tuorila (2005) observed that price and health claims were incapable of altering hedonic responses to functional chocolate bars. Miele, Monaco, Cavella, and Masi (2010) report that

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health claims failed to affect the sensorial acceptability of a walnut oil-enriched mayonnaise. Vidigal et al. (2011) concluded that consumers are generally not willing to sacrifice sensory pleasure for health benefits in a food with unpleasant taste like camu-camu juice. Therefore, foods are consumed in specific contexts or situations that greatly affect their acceptability, considering inherent aspects of the consumer and food types.

1.1. Importance of health information on consumer perceptions

Nutrition-related diseases, such as diabetes, heart disease and obesity, are among the most challenging health concerns of this time. This increase is partly attributed to the fact that advertising increasingly appeals to convenience as food choice motive and such convenience food typically contains excessive amounts of substances (e.g. saturated fats and sugar), some of which is portrayed as unhealthy (Anschutz, Engels, van der Zwaluw, & Van Strien, 2011; Arrúa et al., 2017; Pavey & Churchill, 2017).

Previous studies have shown that health information was of low importance in foods considered unhealthy (Della Lucia et al., 2010; Di Monaco et al., 2005; Miele et al., 2010). Therefore, the favorable perception of products accompanied by health claims depends on the relevance of the claim, product category or ingredients, the production method involved to enrich the product (Lähteenmäki, 2013; Lähteenmäki et al., 2010) and on the consumer, because often the health information that accompanies foods is unknown to consumers (Vidigal et al., 2011). Thus, the strategy of providing health information will not always be a potential factor influencing purchasing decisions.

Health is one of factors that drive Brazilian food trends (Fiesp, 2014). The role of health information on product perception has been the focus of more research, although this does not imply that consumers are primarily focused on health. Some authors consider it unlikely that a food will is accepted if consumers do not enjoy its taste, even if the nutritional value and health benefits are highlighted (Lalor, Madden, McKenzie, & Wall, 2011; Vidigal et al., 2011). The influence of information on health benefits may however reduce dissatisfaction with flavor and improve sensory acceptability.

1.2. Snack bars and health

Although traditional diets can remain very diverse across continents, consumer taste towards snack products is more universal, giving manufacturers the opportunity to build global labels and products (EUROMONITOR, 2013).

Snack bars form a category that grows at an average of 2% per year worldwide (Nielsen, 2016). From 2013 to 2014, the average growth of this category in Brazil was 7.5% in volume (Souza, 2014). According to Palazzolo (2003), the catalyst for the growth of the snack bars category, from the last decade, is due to products with focus on convenience and health. The healthy food segment has grown 98% in the last five years in Brazil, surpassing the United Kingdom and Germany, thus becoming the fourth largest market for healthy products since 2014 (DATAMARK, 2015).

Although snack bars are not seen as functional foods because they include nutrient-poor products, a lot has been done to introduce new varieties and bioactive components, with the potential of being healthy to consumers. A number of studies related to the consumption of cereal bars as meal substitutes have demonstrated its effectiveness in weight loss (Heber, Ashley, Wang, & Elashoff, 1994; Noakes, Foster, Keogh, & Clifton, 2004; Sung et al., 2014) and snack bars that offer low energy density, satiety or even low glycemic response are being researched (Gutkoski, Bonamigo, Teixeira, & Pedó, 2007; Lobato et al., 2012).

Bamford (2016) points out that, in addition to the increasing inclusion of different nuts varieties in the snack bar composition, it is possible to observe a wider insertion of vegetables as an industrial strategy to further boost the healthy snack industry. In addition, researchers have been striving to improve the microbiological and sensory quality of snack bars as well as their processing stability (Banach, Clark & Lamsal, 2014; Barakat & Rohn, 2014; Suhem, Matan, Matan, Danworaphong, & Aewsiri, 2015; Suhem, Matan, Matan, Danworaphong, & Aewsiri, 2017). This behavior reinforces the potential of this food to leverage the segment of healthy products and increase the interest to evaluate the impact of health claims, which are main forms of communication with the consumer.

1.3. Research goal

This study aimed to evaluate the importance of package and information on health-related claims on the acceptance of snack bars. Although consumer perception of health claims and nutrition information has been studied widely (Dean et al., 2012), to the date, there is no qualitative and quantitative study that explores Brazilian consumer perception and expectations of different types of snack bars, taking into consideration tasting of the products and consumer reaction to the broad spectrum of health-related claims.

2. Material and methods

2.1. Snack bar samples

Following previous works, the purpose of this study was to show the influence of package and health claims on improving sensory acceptance and encouraging healthier choices (Ares, Giménez, & Gámbaro, 2009; Bimbo et al., 2017; Gravel et al., 2012; Meier-Dinkel, Gertheiss, Schnäckel, & Mörlein, 2016; Oliveira, Ares, & Deliza, 2017; Russell, Burke, Waller, & Wei, 2017; Tan, van der Beek, Kuznesof, & Seal, 2016; Vidal et al., 2013). Six types of snack bars were collected from the market in Viçosa, Minas Gerais State, Brazil, selected based on the following criteria:

i) Health claims on the front of the package – Bars were chosen that present three front-of-package claims in order to avoid favoring bars with a higher or lower number of claims. Based on this, a seed bar (brand B), fruit bar (brand C), protein bar (brand E) and nut bar (brand F) were chosen. Following the literature, we assumed that consumers of snack bars are influenced by health factors (Boustani & Mitchell, 1990; Kim, Greve, & Lee, 2016; Mahanna & Lee, 2010).
ii) Market research – This study is part of a larger project, which included a marketing phase, involving the study of snack bar consumers (a representative sample of the population of Viçosa, Minas Gerais State, Brazil). Details of this step will not appear in this article. In market research, consumers were asked which brands of snack bars were more and less known to them. Based on the consensus among the researchers, the choice of bars B, C, E and F was confirmed in this study and it was decided to include two cereal bars (brand D – most consumed; brand A – least consumed) under the premise that the brand awareness could have positive or negative influence on sensory evaluation.
iii) Flavor – Aiming to have sample types that can be consumed by all, it was decided to vary the more familiar flavors (e.g. chocolate) with uncommon flavors (e.g. apricot).

2.2. Recruitment of participants

Participants for the current study were recruited through advertisements posted in locations such as the Federal University of Viçosa, gyms and natural products stores. Nineteen volunteers were recruited to form the focus groups and 102 consumers to comprise the sensorial team for acceptance tests, which consisted of residents of the city of

Table 1
Focus group questions.

General introduction
■ Do you look at the labels of the products you consume? What do you notice?
■ What grabs your attention most?
■ Do you understand the expression "snack bar"?
■ Did you know there are different types of snack bars on the market?
■ What grabs your attention most when you want to consume a snack bar?
Presentation of snack bars
■ What do you consider important on the package?
■ Which claims are most appealing to you and why?
■ Would you like to see other information on the label?
■ What information on the package grabs your attention most?
■ Is there any health information that would make you buy this product?
■ If you could rank these packages in order of importance (from the most important to the least important), how would you do it and why?

Viçosa between 18 and 55 years of age (68% women). The research was conducted according to the guidelines of the Helsinki Declaration and all procedures involving human subjects were approved by the Committee on Ethics in Human Beings Research of the Federal University of Viçosa (n° 1.581.561). The criteria for selecting the participants were: consume snack bars at least once a month, have a habit of going to supermarkets and observing food labels, at least sporadically.

2.3. Focus group

Six individuals (3 males and 3 females) participated in the first session, with 6 (4 women and 2 men) in the second session and 7 (6 women and 1 man) in the third session. The sessions consisted of a discussion of approximately 90 min in a suitable room, in accordance with the procedures proposed by Della Lucia and Minim (2013), following a script (Table 1) specified by the moderator. In addition, the package of the products used in the sensory analysis test was evaluated. The package was handled with the contents intact, exactly as they were found at the point of purchase. The sessions were recorded on audio and video, and two assistants took notes on the questions and observations addressed in each session.

The moderator explained the purpose of the session, emphasizing the importance of each participant's opinion, making clear there was no right or wrong answer to the issues addressed and that what was most important was for the consumer to express his or her opinion.

The description of the six packages that were presented randomly in each session is shown in Table 2.

2.4. Influence of package and health-related claims on sensory acceptance

2.4.1. Information shown on the package

The messages on the package, such as verbal or non-verbal elements, affect how consumers perceive the product, generating different expectations concerning its potential consumption (Miraballes et al., 2014). In the present study, consumers had the opportunity to observe all the elements contained on the front and the back of the package (Table 2).

2.4.2. Sensory acceptance

The acceptance tests were performed at the Sensory Analysis Laboratory of the Federal University of Viçosa and the consumers had an interval of three days between each session. Consumers were given evaluation sheets for each sample to record their acceptance of the product. Sensory acceptance in relation to overall impression was evaluated on a 9-point hedonic scale (1 = dislike extremely, 5 = neither like nor dislike, 9 = like extremely).

Six samples were presented monadically, in each session, randomly, with each sample appearing in each position the same number of times. Each consumer represented one repetition of the design. In the first session (Session 1, or blind test), before the start of the test, consumers filled out a health consciousness questionnaire (Health Consciousness Scale) validated for the Brazilian population (Dantas, Minim, & Deliza, 2003), in order to assess health concerns (Table 3). In this session, consumers tasted samples served on quadrangular acrylic plates marked with a three-digit random code without obtaining any prior information about the snack bar being evaluated (Fig. 1).

In the second session (Session 2, or package test), the acceptance of the package of the samples served in Session 1 was evaluated. This procedure allowed the consumer to evaluate package attributes such as color, brand and nutritional information.

In the third session (Session 3, or the test with information on health-related claims), the acceptance of sample bars whose front package fixed in a frame-like apparatus, containing information describing the claims on the packages, was evaluated (Table 4). Consumers were asked to taste and judge the bars, knowing that the sample came from the same package presented. Thus, in Session 3, two types of information were provided: the product corresponded to the package and the descriptive information referred to the claims on the package.

Thus, instead of presenting all the package in the third session, it was decided to provide only the front of the package, leading the consumer to direct his or her gaze towards the provided information. Therefore, the relationship between Sessions 2 and 3 was disregarded, since the package was presented differently in each session. An illustration of the sessions in which consumers evaluated the bars is shown in Fig. 2.

2.5. Data analysis

2.5.1. Focus group

Three researchers, using the traditional approach of reading the transcribed original audio and video recordings, analyzed the transcripts (Braun & Clarke, 2006; Greenwood, Kendrich, Davies, & Gill, 2017).

Content analysis was done individually in a silent environment and the transcript was based on the frequency at which a term appears. This allowed the comparison of different answers, analysis of patterns from the session results (Filho, Della Lucia, Lima, & Scolforo, 2015) and obtaining emergent themes for each of the main questions and identification of codes of the focus group discussion (Graham, 2009; Machín, Giménez, Curutchet, Martínez, & Ares, 2016). Thematic coding was performed by each researcher looking for patterns in the data, grouping 'like' concepts as they related to each other and core themes generated (Greenwood et al., 2017).

Finally, the researchers discussed the results, proposing improvements in transcription, themes and codes. A professional translator proofread the English and scientific writing.

2.5.2. Data analysis in the sensory tests

The analysis of the hedonic mean scores obtained in the three sessions was performed according to pre-established acceptance intervals (Vidigal et al., 2011):

- Interval 1 (acceptance zone): scores of 6–9 (located between the hedonic terms "like slightly" and "like extremely"), indicating consumers liked the sample;
- Interval 2 (rejection zone): scores of 1–5 (located between the hedonic terms "dislike extremely" and "indifferent"), indicating consumers disliked the sample.

2.5.2.1. Descriptive statistics of health consciousness. With regarding to health concerns, in order to categorize the participants, the sum of the individual values of each item of the questionnaire of health consciousness was ranged from 0 to 9. In order for the highest values

Table 2
Description of the package used in the study and information presented to participants on the health claims described on the package of the analyzed bars.

Product	Front-of-package	Back of the package
Cereal bar (A)	Cereal bar (Brand A). Flexible package with white and orange colors. Information on the front panel in white: brand, "trans-fat and cholesterol free", "source of fiber", "low in saturated fats", light (40% reduction of total fats), 66 kcal; in blue: Net wt. 20 g, cereal bar with banana, oats and honey, contains synthetic flavoring identical to natural, Brazilian industry; in orange: light and banana, oatmeal and honey; in black: cereal bar and expiration date. Illustrations present on package: product, banana, honeycomb and honey.	Nutritional information[a] EV: 3%; CH: 4%; SU: [b]; ST: [b]; PO: [b]; P: 2%; TF: 2%; SF: 2%; MUF: [b]; PUF: [b]; DF: 10%; Na: 2%. Ingredients Oat flakes, sugar, glucose syrup, rice flakes, banana raisin, crisp cereals (wheat, rice, corn and oats), banana pulp, palm fat, wheat bran, maltodextrin, honey, malt extract, salt, cinnamon powder, polydextrose (stabilizer), humectant sorbitol and glycerin, antioxidant soy lecithin, flavoring, chlorophyll coloring, natural red 4 and annatto and acidulant citric acid. Contains gluten. Contains soybean. Manufactured in a machine that processes: peanut, nuts, sesame and milk.
Seed bar (B)	Seed bar (Brand B). Flexible package in matte red. Information on front panel in white: new package, crunchy, "high omega-3 content", "no added sugars", "no preservatives, flavors and colors", "this is not a food low in saturated fats", "this is not a low energy density food", Brazilian industry, 42 kcal; in red: seeds, net wt. 10 g; in black: seed bar sesame and quinoa. Illustrations present on package: seed bar and a container with seeds.	Nutritional information[a] EV: 2%; CH: 2%; SU: [b]; P: 2%; TF: 4%; SF: 2%; MUF: [b]; PUF: [b]; ω − 3: [b]; DF: 3%; Na: 1%. Ingredients Sesame, quinoa, maltodextrin, iodized salt, natural sweetener isomalt and antifouling sodium bicarbonate. Contains gluten. This product may contain traces of peanut and cashew nuts.
Fruit bar (C)	Fruit bar (Brand C). Bar with strawberry and yogurt flavor coating. Flexible package green in color. Information on the front panel in white: strawberry and yogurt, net wt. 25 g, 83 kcal, illustrative photos, "gluten-free", "lactose-free"; in green: "Activios", "with Triflora" (in rectangular yellow box); in black: expiration date. Illustrations present on package: fruit bar and strawberries.	Nutritional information[a] EV: 4%; CH: 5%; P: 1%; TF: 5%; SF: 10%; DF: 18%; FOS: [b]; Na: 1%. Ingredients Dehydrated strawberry, yogurt flavor coating (vegetable fat, maltodextrin, sugar, soy extract, isomalt, soy lecithin emulsifiers and polyglycerol polyricinoleate and natural yogurt flavor), fructooligosaccharides, rice flakes (rice flour, sugar, salt and caramel dye), maltodextrin, glucose, sorbitol, palm oil, hydrolyzed collagen, isomalt, salt, gelatin, tricalcium phosphate, soy lecithin emulsifier, flavoring, carmine cochineal dye and natural antioxidant tocopherol. Does not contain gluten.
Cereal bar (D)	Cereal bar (Brand D). Flexible package in white color. Information on the front panel in white color: 78 kcal, "source of fibers"; in yellow and white: "made with whole grains"; in pink: "low-sodium"; in green: cereal bar, hazelnut with chocolate, net wt. 20 g, contains synthetic flavoring identical to natural, energy value 78 kcal, percentage of daily values based on a 2000 kcal diet, illustrative image. Illustrations present on package: hazelnut, chocolate and whole grain symbol and body of a woman in dark green.	Nutritional information[a] EV: 4%; CH: 4%; P: 2%; TF: 5%; SF: 5%; DF: 10%; Na: 1%. Ingredients Oat flakes, chocolate, wheat flakes, glucose syrup, rice flakes, polydextrose, hazelnut, invert sugar, palm fat, vegetable fat, sugars, cocoa liquor, salt, humectants sorbitol and glycerin, flavoring, antioxidants soy lecithin and tocopherol, acidulant citric acid and natural dye carotene. Contains gluten, contains milk. Contains traces of almond, peanut, cashew nut.
Protein bar (E)	Protein bar (Brand E). Flexible package in brown, white, silver and purple. Information on the front panel in white: 11 g protein (33%), "whey + collagen + soy protein", "protein source", net wt. 33 g, flavor chocolate; in black: product designation in two languages (Portuguese and Spanish) and MAXI SPORT; in red: protein. Illustrations present on the package: an orange X.	Nutritional information[a] EV: 7%; CH: 4%; P: 15%; TF: 10%; SF: 17%; DF: 5%; Na: 3%. Ingredients Chocolate flavor coating (sugar, fractionated vegetable fat, whey powder), cocoa powder, skimmed milk powder, cocoa paste, soy lecithin emulsifiers and polyglycerol polyricinoleate and flavoring, sorbitol, whey protein concentrate, hydrolyzed collagen, soy protein isolates, palm fat, fructooligosaccharide, fructose, rice flakes with cocoa, glucose, cocoa powder, malt extract, soy lecithin stabilizer, caramel dye, flavoring, antioxidants BHA and BHT. Contains gluten. May contain traces of nuts, peanuts, nuts and hazelnuts.
Nuts bar (F)	Nuts bar (Brand F). Flexible package in black and orange. Information on the front panel in white: "apricot + 7 nuts" written in three different languages (English, Portuguese and Spanish); in black color: "0% glucose syrup", "sweetened with honey", written in three different languages (English, Portuguese and Spanish), net wt. 0.88 oz. (25 g). This package allows you to view the product. Illustration of a green leaf. Unlike the other packages, this one allows the product to be viewed.	Nutritional information[a] EV: 6%; CH: 3%; P: 5%; TF: 13%; SF: 5%; DF: 11%; Na: 1%; V: C (3%); M: Fe (38%); Ca (1%). Ingredients Honey, peanut, apricot, almond, toast soy, sesame, sunflower seed, acacia gum, sunflower oil, macadamia, pistachio, Brazil nut, cashew nut, hazelnut, emulsifier: soy lecithin, cinnamon, salt. Does not contain gluten.

EV: energy value; CH: total carbohydrates; SU: sugars; ST: starch; PO: polyols; P: proteins; ω − 3: omega 3; TF: total fat; SF: saturated fat; UF: unsaturated fat; MUF: monounsaturated fat; PUF: polyunsaturated fat; DF: dietary fiber; FOS: fructooligosaccharides; Na: sodium; M: minerals; and V: vitamins.

[a] Percent daily values are based on a 2000 calories diet.

[b] Percent daily values not established.

to correspond to high health consciousness, items 7, 8, 9 and 10 were reversed, subtracting 9 from the score given by the participants (Filho, 2015). The consumers were assigned to three segments, representing low (0 to 47.18), average (47.19 to 76) and high (76.01 to 92) concern for health. The ranges for each segment were obtained from the sum of the values of all questions (61.59), plus or minus one standard deviation (SD = 14.41). This categorization is commonly used in studies involving neophobia (Filho, 2015).

2.5.2.2. Analysis of variance and t-test for paired samples. The acceptance data were subjected to variance analysis (ANOVA), considering consumers and sample type as sources of variation. When H_0 was rejected (at least two means differed in acceptability), the Tukey's test was used to compare means in order to determine differences in the acceptance of the samples in each session (Della Lucia et al., 2010). In order to evaluate the expectations generated by the package and the effect of health information on sample acceptance, the differences between the hedonic scores for the package test and the blind test (Session 2 − Session 1) and the information test and blind test (Session 3 − Session 1) were calculated for each bar. The hedonic terms obtained for each session were converted into scores for each bar sample and *t*-test for paired samples was used to compare the mean of the differences obtained for each bar between sessions (Della Lucia et al., 2010).

The data were processed with the aid of Microsoft Excel® 2013 and Statistical Package for the Social Sciences (SPSS) 20.0®, licensed to the Federal University of Viçosa.

Table 3
Items assessed on the health consciousness questionnaire (n = 102) (Health Consciousness Scale).

Health Consciousness items[a] (α_C = 0.871)	Mean ± SD
I have the impression that I sacrifice a lot for my health	2.7 ± 2.3
I consider myself very health conscious	6.3 ± 2.0
I am prepared to live a lot, to eat as healthy as possible	5.9 ± 2.1
I think that I take health into account a lot in my life	6.3 ± 1.9
I think it is important to know how to eat healthy	7.9 ± 1.2
My health is so valuable to me that I am prepared to sacrifice many things for it	5.9 ± 2.1
I have the impression that other people pay more attention to their health than I do	4.1 ± 2.8
I do not continually ask myself whether something is good for me	3.0 ± 2.6
I don't often think about whether everything I do is healthy	3.5 ± 2.8
I don't want to constantly ask myself whether the things I eat are good for me	3.6 ± 2.5
I often dwell on my health	5.7 ± 2.2

Note: Items were assessed using the unstructured scale of nine centimeters (0 cm - strongly agree; 9 cm - strongly disagree).
[a] Adapted from Schifferstein and Oude Ophuis (1998).

Fig. 1. Samples of snack bars on quadrangular acrylic plates coded by three digits.

3. Results

3.1. Qualitative study of package factors on purchase intention of snack bars

Three main themes were created: interpretation of health-related information, individual perceptions when choosing snack bars and package attributes for selecting snack bars. The codes and citations identified in the analysis, corresponding to the themes obtained, are shown in Table 5.

Different attributes were evaluated by asking what most attracts the consumer in buying snack bars. Most showed price and flavor were most important, but some also considered the nutrient and non-nutrient content, ingredient list, shelf life, and package attributes (Table 5).

3.1.1. Interpretation of health-related information

Most consumers read labels often, but some consumers were not willing to purchase a product simply because of the claims offered. In addition, the participants appeared to disregard claims that did not demonstrate a self-directed benefit. Much has been said about certain nutrients (e.g. protein, iron) being important allies in specific contexts (e.g. physical activity) but they are not very effective in influencing participants' purchasing decisions. A variety of ingredients has been highlighted as attractive, especially those that are exotic and confer health benefits, making them capable of attracting consumer curiosity.

On a scale of importance, the consumers preferred to rank the bars according to higher contents of nuts and omega-3s and lower amounts of sugars, saturated fats, and sodium. The bars cited as most important were the fruit and nut bars; the least important were seed and protein bars. Cereal and fruit bars were cited as most consumed and the preferred flavors were chocolate, strawberry and hazelnut. Nutritionists and food engineers were more informed about the products being evaluated however, emphasizing that they realized that protein and nut bars were more expensive and less accessible for daily consumption.

Proven benefits to health and the body could lead to consumers sacrificing price for health. In general, this study showed that individuals have stated that health information does not determine

Table 4
Information presented to participants on the health claims described on the package of the analyzed bars.

Snack bar	Information
Cereal bar (A)	"Trans-fat free" – Fat associated with increased LDL-cholesterol levels and increased risk of cardiovascular disease. "Source of fibers" – Fibers improve intestinal transit, reduces blood glucose levels, levels of total cholesterol and LDL-cholesterol. "Light" – This food has a 40% reduction of total fat.
Seed bar (B)	"High omega-3 content" – Fatty acid associated with reduced total cholesterol, increased HDL-cholesterol and relief of symptoms of rheumatoid arthritis and inflammatory bowel disease. "No added sugars" – Sugars are caloric supplements that, if consumed in excess, can lead to problems like diabetes, high blood pressure, obesity and cavities. "No preservatives, flavorings and colorings" – Food additives intended to preserve and enhance flavor, odor or color. Adverse effects such as allergic reactions and hyperactivity are associated with these substances.
Fruit bar (C)	"With Triflora" – Triflora is a compound containing fructooligosaccharide, a molecule of plant origin that assists in proper bowel functioning. "Gluten-free" – Gluten is a vegetable protein, present in cereals like wheat. Its exclusion is necessary for individuals with celiac disease, allergies or sensitivity to the nutrient, resulting in inflammation. "Lactose-free" – Lactose is a sugar from milk that provides energy to cells and acts in synergy with calcium, improving its fixation. Lactose intolerant individuals should avoid sugar because it causes diarrhea, flatulence, and bloating.
Cereal bar (D)	"Made with whole grains" – Whole grains contain all parts of the whole grain, including vitamins, minerals and nutrients and have a higher fiber content than refined cereal. "Low-sodium" – Sodium acts in the transport of many nutrients in the small intestine and kidneys in the normal functioning of nerve and muscle cells. Excess sodium may lead to increased water retention and blood pressure. "Source of fibers" – Fiber improves intestinal transit, reduces blood glucose levels, levels of total cholesterol and LDL-cholesterol.
Protein bar (E)	"Collagen" – A fibrous protein that contains essential and non-essential amino acids in the body and is responsible for building bone, cartilage, tendon and skin tissues. "Soy protein" – Protein with amino acids essential to the body, associated with the reduction of blood cholesterol and the incidence of coronary diseases. "Whey protein" – Whey protein that has high nutritional value and high content of amino acids, calcium and bioactive peptides.
Nuts bar (F)	"0% glucose syrup" – Glucose syrup is a composition of sugars with the function of sweetening and joining the cereals of the bars. Excessive consumption of these sugars can lead to hyperglycemia and diabetes. "Sweetened with honey" – Honey is composed of simple carbohydrates that provide energy to the body. It is rich in vitamins, minerals and amino acids. "Apricot" – Fruit rich in beta-carotene and vitamin C, which play a role in antioxidant action in the body. In addition, apricot contains iron, vitamin A, vitamin E, potassium and fiber.

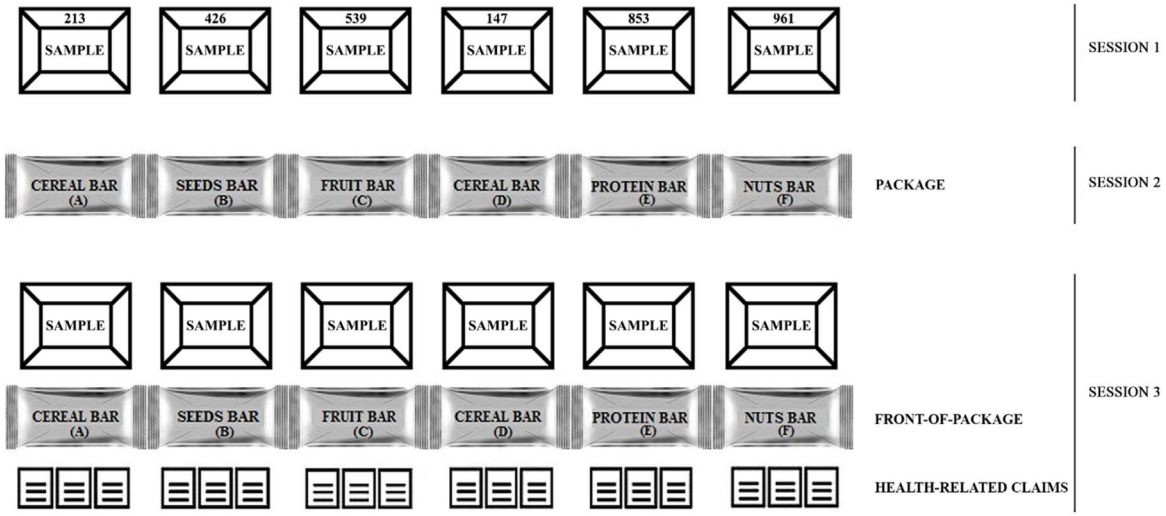

Fig. 2. Illustrative method showing the evaluation of the acceptability of the snack bars by consumers in three sessions. Six samples were presented monadically, in each session and randomly. Note: Session 1: blind test, where samples were served in quadrangular acrylic plates marked with a three-digit code; session 2: package test, where consumers evaluated packages attributes; session 3: test with information on health claims, consists of acceptance evaluation of bar samples whose front-of-packages are fixed in a frame-like apparatus, containing information describing the claims on the packages.

purchasing decisions except in cases of individual need or when a medical recommendation is warranted.

3.1.2. Individual perceptions when choosing snack bars

For all interviewees, a 20-gram bar is, on average, insufficient and does not stave off hunger between meals. Moreover, the participants mentioned that fruits, as substitutes for bars, are healthier, more satiating and lower in price. Participants said they would be willing to pay more for satiation because the existing options usually barely satisfy hunger and do not serve as meal bars, in addition to the non-compensatory price.

One participant, a stay-at-home mom, reported that her occupation is the reason she is unable to frequently consume snack bars. Even so, she consumes food bars because of her daughters. It was observed that, even though the mother is responsible for the purchasing household goods, it is the daughters, motivated by hedonism, who influence her consumption because she eats the same types of food bars she buys for children.

Hedonism was elicited from some participants who emphasized not being willing to sacrifice sensory pleasure for purported health benefits. Consumers listed chocolate as one of the most preferred flavors, whereas dry textures and hardness were considered unfavorable characteristics. One consumer with a restriction on consuming sugar said he did not find many varieties without carbohydrates, and those he does find are not palatable.

3.1.3. Package attributes for selecting snack bars

The consumers stated that they generally observe the labeling on the front of the package and that putting elements such as a green 'female body' or 'leaf' convey the idea of being healthy. It was also observed that there is a relationship between brands and health factor, especially when the brand name is associated with words referring to 'lightness' and 'health'. In addition, consumers questioned the high number of marketing tools placed on the front of the package, noting that health-related information is often described in small font size, barely visible and on the back of the package. There was also criticism about the ingredients labels being positioned under the seam of the package.

Another point that deserves highlighting is how the information is arranged on the front and back of the package. Consumers emphasized that information about nutrient contents, health benefits and risks should be on the front of the package, since it provides quick access to information. On one hand, the consumer prefers the main information to be on the front to facilitate quick access to the information of interest; on the other hand, it is necessary to emphasize the elements on the back of the package, which generally contain unattractive and barely legible information.

The consumers did not know that there were different types of snack bars on the market because they thought that any snack bar was a cereal bar. The possibility of viewing the bar as it is, means that the participant is able to see the product he is buying without deception.

3.2. Influence of health claims and expectations on the consumption of snack bars

Consumers generally showed moderate to high concern for health (76%). The comparison between the blind test and the test with information on health-related claims revealed an increase in the acceptance scores of those who liked the bars (scores between 6 and 9), with mean acceptance around the "like moderately" category. Analysis of variance performed on the data from each of the sessions showed a significant difference between the mean acceptances of bars (Fig. 3).

In the first session (Fig. 3a), mean acceptance ranged between 5.4 (for the seed bar) and 7.2 (for the nut bar), based on the hedonic terms "indifferent" and "like very much". In this session, the blind test, the seed bar (B) differed from the others ($p < 0.05$) by having the lowest acceptance; while the fruit and nut bars had higher acceptance. The most frequent comments for the seed bar included "hard", "bitter aftertaste" and "dry".

In the second session (Fig. 3b), the package test, mean acceptance ranged from 6.4 (protein bar) to 7.3 (seed bar and fruit bar), falling between the terms "like slightly" and "like very much". The difference in means shows that the package evaluated did not differ in acceptance, except in the case of the protein bar (bar E).

In the third session (Fig. 3c), where health-related claims were included along with the information on the front of the package and the sample to be tested, mean acceptance varied from 6.5 (bars B and E) to 7.9 (bar F), between the terms "like slightly" and "like very much". Bar F received a higher mean acceptance but did not differ significantly ($p < 0.05$) from bar C. Bar B, despite having the lowest mean acceptance in this session, had a significant increase over Session 1, which was sufficient to increase the mean acceptance by 1.5 points, which made it statistically tied with bars A, D and E in acceptance.

Table 6 shows the *t*-test for the paired samples, in order to show the

Table 5
Examples of the opinions obtained in focus groups during evaluation of snack bar package in relation to the themes and codes proposed.

Themes	Codes	Examples of the opinions of participants
Interpretation of health-related information	Ingredient content, claims and nutritional composition	The presence of protein should increase muscle mass, but I would consume only when I was practicing physical activity.
		It is interesting to contain protein and omega 3, but it is more important to be low in sodium.
		High iron content stands out. Mainly because it may be useful for children who have deficiency of nutrients.
		The 'nuts' claim refers to a more natural bar.
		The combination of ingredients such as apricot, nuts, pistachio and macadamia attracted me and aroused the desire to experience the taste, because it is exotic.
		The fact that it contains 7 nuts and 0% glucose syrup would make me buy this product.
		I do not see other bars with sunflower seed.
		I liked the sesame and quinoa because they are good for the intestine.
		Food additives translate the idea of more processed and unhealthy food.
	Physical activity	I do not feel part of the target audience, because the claim of "maxi sport" gives the impression that this product was made for physical activity practitioners.
		I would consume the protein bar if I practiced intense physical activity or needed high energy demand.
	Sensoriality and hedonism	I have a great restriction on eating something I do not like to the detriment of health. I'm not willing to sacrifice the taste.
		Snack bars without sugar are usually hard and unpalatable.
		I do not like very dry or hard snack bars.
		I like the chocolate flavored bars.
	Health condition	The health information would only influence me to buy these snack bars if I needed to consume it for some health condition.
		I do not frequently consume snack bars because I have a sugar intolerance; it is difficult to find snack bars without sugar.
		The absence of sugar is important information, but personally, it does not attract my attention because I have no restrictions on consumption.
	Economic factors	I would be willing to pay more for a bar that has a benefit directed for my health or my body.
		I would pay more for a bar if it helped in glycemic control.
		I observe that the bars containing oleaginous, protein, nuts, and chestnut have better nutritional contents; however, they are more expensive and less accessible.
	Cognition	I think that the expression 'snack bars' refers to a very industrialized food; but I associate 'cereal bars' with healthiness.
Individual perceptions when choosing snack bars	Attractiveness	I only look at the expiration date.
		What attracts me most when consuming a snack bar is taste and price.
		I look at colors, because if it is not attractive I do not even want to buy.
		What I observe most are the fiber and saturated fat contents.
		I look a lot at the list of ingredients and the presence of additives.
	Satiety and portion size	A portion of 10 or 20 g is very little. It seems that they have reduced the portion size more, but the price remains the same or increases.
		I would pay more for a bar if it promotes satiation.
		I consume snack bars when I do not have time to stop to eat something.
		It is a complement, not a meal.
	Needs of children	My consumption is low because I am a homemaker, but my daughters consume more because they are at university; I buy and consume only the types that they like.
Package attributes for selecting snack bars	Brand name	The brand name (bar A) tries to imitate the name of a well-known brand as a marketing strategy (bar D).
		The 'bio', 'light' or 'fit' (fitness) prefixes on brand name reminds of healthy lifestyle, nature, lightness.
		The term "Activios" refers to a very well-known familiar brand of yogurt.
	Graphic elements, colors and illustrations	The image of yogurt next to the bar (bar C) seems to be artificial.
		The green and white colors are intense, attractive and seem most healthy.
		The illustration of a female body outlined reminds me of health.
		The red color is very attractive; but the combination of purple, yellow and brown are not.
		I find it important to include the symbols of social networks, because it refers to a modern and good-looking package.
	Overall appearance of the package	Part of the package allows the bar to be seen inside the package, which is good.
		The possibility of observing the bar as it is through the transparency in the body of the package makes me trust the product.
		I try to look at why ugly package usually makes up a cheaper product.
	Type of bar	I know there are different kind of snack bars, but I do not think about choosing a bar by category, but by the kind, I have a habit of buying.
		The protein bar is the only one I have ever eaten.
	Legibility and provision of information	Information is on the front, which makes it easy to see. Detailed vertical information makes it easy to see.
		Nutritional information should be in the nutritional table and not described.
		There is important information written in lowercase that is impossible to see. The font size is too small.
		Ingredient labels positioned under the soldering of the package make them difficult to see and require effort to find them.
		The low sodium content attracts me because there are few foods that highlight this information on the front of the package.
		A good amount of vitamins, iron, calcium and honey are very attractive, but they should be highlighted on the front panel.

(continued on next page)

Table 5 *(continued)*

Themes	Codes	Examples of the opinions of participants
		I prioritize the amount of calories and this should be highlighted in the front-of-package. Much information in three different languages makes it difficult for me to access information that is really relevant to me.

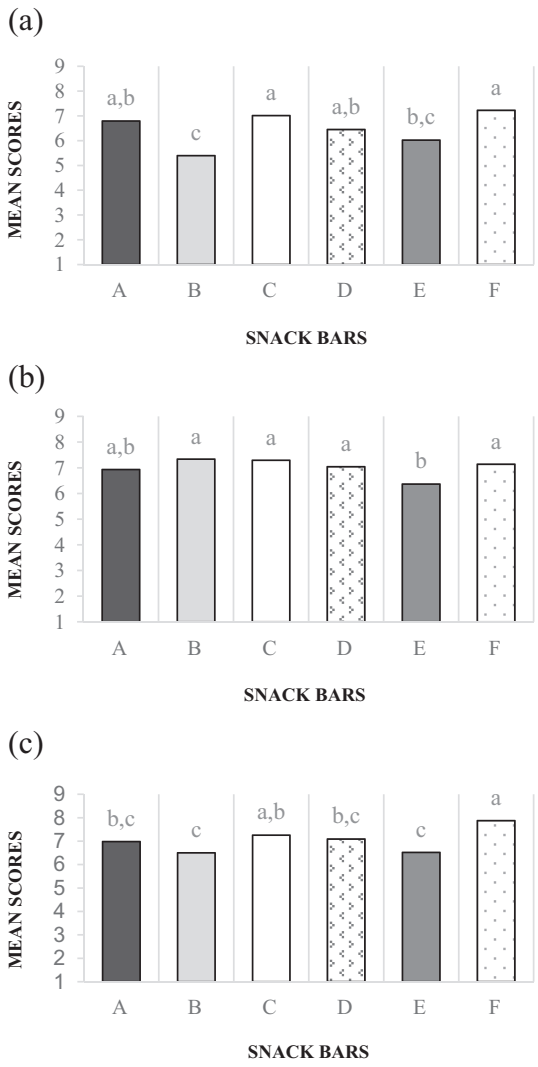

Fig. 3. Averages of acceptance of the six bars evaluated in the blind test (a), package test (b) and test with the information of health claims (c). Note: A – Cereal bar, B – Seed bar, C – Fruit bar, D – Cereal bar, E – Protein bar e F – Nuts bar. Pairs of means same letter do not differ by the Tukey test ($p > 0.05$).

differences between the scores obtained in the three test sessions. The columns represent the mean scores for each snack bar (columns 1, 2 and 3) and *t*-value calculated for the mean of the differences obtained for the health information test and the blind test (column 4), the package test and blind test (column 5).

Results showed *t*-test values for bars B, D, E and F, where it was observed that package information had a positive and significant impact ($p < 0.01$) on sensory acceptance. The higher values for bars B and F showed that health-related claims were most important to consumers, indicating higher mean acceptance. The positive *t*-test values indicate that the scores obtained in sessions 3 and 2 were higher than those obtained in Session 1 (except for bar F). In Session 2, these values were significant ($p < 0.05$) for bars B and D. Bar A obtained high mean hedonic scores in the three sessions.

Table 6
Estimates of the *t*-test between the second session (package test) and the first session (blind test) for snack bars, representing the expectations variable, and between the third session (test with health-related claims) and the first session, representing the healthiness variable (N = 102).

Snack bar	Mean scores ± SD			*t*-Value	
	Session 1	Session 2	Session 3	Session 2 − Session 1 (expectations)	Session 3 − Session 1 (healthiness)
A	6.8 ± 1.7	6.9 ± 1.6	7.0 ± 1.5	0.661^{ns}	1.374^{ns}
B	5.4 ± 2.4	7.3 ± 1.6	6.5 ± 2.2	9.687^{**}	6.795^{**}
C	7.0 ± 1.8	7.3 ± 1.5	7.3 ± 1.5	1.460^{ns}	1.961^{ns}
D	6.5 ± 1.8	7.0 ± 1.4	7.1 ± 1.1	2.482^{**}	3.749^{**}
E	6.0 ± 2.1	6.4 ± 1.7	6.5 ± 1.8	1.506^{ns}	2.460^{**}
F	7.2 ± 1.7	7.1 ± 1.7	7.9 ± 1.3	-0.393^{ns}	4.127^{**}

Note: A – Cereal bar, B – Seed bar, C – Fruit bar, D – Cereal bar, E – Protein bar and F – Nuts bar. ^{ns}no significant difference ($p > 0.05$).
** Significant difference ($p < 0.01$).

4. Discussion

In the focus group, the findings showed that the consumers associated verbal and non-verbal elements with health, caring little about the types of snack bars. Generally, the first element observed on the package was the description of flavor, with the consumer using touch to perceive texture. Contrary to these findings, Mahanna, Moskowitz, and Lee (2009) report that sensory claims were not important to snack bar consumers, but confirm the non-relevance of the category type involved.

The relationship between brands and health factors was even clearer on packages with softer and less intense white and green colors. Bimbo et al. (2017) report that brand influenced the choice of dairy products when associated with nutrition and health claim. This result is in accordance with previous studies that concluded colors (especially green) and pictures on the front of the package affected the perception of being healthy or not (Ares et al., 2011; Carrillo, Fiszman, Lähteenmäki, & Varela, 2014). In addition, the verbal elements did not arouse the same attention when in the presence of other distracting elements. Fiszman, Carrillo, and Varela (2015) also showed that health benefit-related images were more attractive to consumers of cereal bars than verbal information. Miraballes et al. (2014) concluded that consumers of meal-replacement bars only paid careful attention to nutritional information in the absence of distracting elements of the package design (colors, pictures, font size). This confirms that the package and its emblems go beyond aesthetics, with this being a more effective means of communication with these consumers.

The study showed that the most important information for the consumer should be highlighted on the front panel, but providing information in an objective and easily understood manner may prompt consumers to pay more attention to the back of the package. Wansink (2003) emphasizes that too much information can confuse the consumer and too little information can be deceiving, but combining brief health claims on the front of the package with full health claims on the back of the package leads consumers to more fully process and believe the claim.

Another issue worth mentioning is the portion size. If the consumer is not satisfied with the portion size, but prioritizes the price of products

during purchase, then a snack bar will be unlikely to be purchased, since the consumer knows there are other equally or even healthier options at a lower cost, such as a fruit. In this sense, information related to health loses its effectiveness when satiation or hunger is a priority. Therefore, if the intention is to design a gradual increase in bar consumption, including healthy varieties with the potential of providing nutrients for a complete meal, then bars must provide satiation at a reasonable price.

As shown in Fig. 3, non-sensory factors were relevant to increase the expectations generated by the consumers (Session 2), but these expectations were not exceeded, because the seed and protein bars received the lowest average acceptance when tasted. Despite the benefits associated with the information provided about the seed bar, it had the highest rejection frequency in the blind test (47%). The protein bar, which had similar behavior to the seed bar, demonstrated the need for improving sensory quality of the products.

Seed bars are composed mostly of sesame and quinoa seeds. The presence of saponins interferes negatively with the taste of quinoa (Navruz-Varli & Sanlier, 2016), while the tannin content in sesame is responsible for causing a severely bitter taste (Francis, Makkar, & Becker, 2001). Among the health-related claims, "high omega-3 content" and the absence of food additives are the possible causes of score increase. Kallas, Realini, and Gil (2014) evaluated the impact of providing information "enriched with omega-3" and showed that consumers tended to accept meat with a higher amount of visible fat if enriched with beneficial fatty acids. As observed in recent studies (Bearth, Cousin, & Siegrist, 2014; De Viegler, Collins, & Bucher, 2017), the focus group expressed that food additives are seen as signs of more processed and unhealthy food.

The protein bar contains soy protein in its composition. Despite the chocolate flavor being one of the most preferred flavors of consumers (38%), the protein bar was associated with expressions such as "bitter aftertaste" and "very bad taste". According to Tu, Husson, Sutan, Ha, and Valentin (2012), negative taste perception has been identified as one of the barriers to the acceptance of products containing soy in their composition.

According to Sabbe, Verbeke, and Van Damme (2009), when sensory tasting of a food is positive, it is likely that health benefit information will be positive. A bad experience with food however can inhibit the influence of information. Contrary to this statement, it was observed that the health-related claims significantly overlapped with sensory characteristics, thus increasing the sensorial acceptance of the protein and seed bars, although they were still responsible for the greatest percentage of sensory rejection in the test with health-related claims.

The nut bar presented greater positive influence of health-related claims; which resulted from the pleasant sensation of different varieties of nuts, giving a unique texture and almond flavor. In addition, the presence of apricot in its composition provides vitamins and functional benefits. Some authors report that such oleaginous bars are more likely to be eaten as a snack than as part of a meal (Barbour, Stojanovski, Moran, Howe, & Coates, 2017). Despite an increase in demand, the consumption of nuts by Brazilians remains low (Fiesp, 2016). In addition, the high price of walnuts has resulted in an increase in the price of walnut bars on the market.

Although the acceptance of bar D in the blind test revealed the need to improve sensorial quality, consumers were strongly impacted by the health-related claims such as fiber and whole grains. The brand may have a positive influence on consumer expectations, because it is a well-known and established brand on the market. On the other hand, it is worth noting the positive influence of the sensorial and non-sensorial characteristics on the cereal bar (A), which, despite being considered a lesser-known brand, was well accepted in all sessions.

In Session 3, Bar C did not differ from bars A and D; which highlighted that information had a similar potential for influencing consumer acceptance (Fig. 3). The presence of prebiotic 'Triflora' associated with the pseudo-scientific name ('Activios') was not sufficient to alter sensory acceptance, even after providing the benefits through the descriptive information. Scientifically substantiated health claims generate credibility but are not always more attractive and effective in communicating with the consumer (Aschemann-Witzel & Grunert, 2015).

Although there is a significant increase in people who choose to follow an avoidance diet of gluten and lactose (Koidis, 2016) under the premise that they are healthier and will lead to weight loss, information regarding the absence of these nutrients did not alter sensory acceptance. According to Dean et al. (2012), information tends to be taken more seriously when the consumer can relate to the severity of a specific health risk, especially when the claim promises a targeted risk reduction with detailed information about function and health outcome. There is no proven scientific evidence that healthy people benefit from restricted gluten and lactose diets, but recent experimental data show possible deleterious effects of gluten-free diets on the intestinal microbiota, mainly due to the increased consumption of nutritionally poor gluten-free products and reduced consumption of whole grains and fibers (Pantaleão, Amancio, & Rogero, 2014). The concern is that the exclusion of these nutrients may lead to the serious disorders in the nutritional status of healthy individuals. In addition, the oscillation in demand for gluten-free and lactose-free products affects market policies and requires policymakers and nutrition experts to mitigate negative consequences of food choice. Therefore, although this study did not contribute to elucidating behavior with regard to food fads, future studies are recommended evaluate the effect of this information on consumer perception. This year, the Brazilian legislature introduced a law that requires the presence of lactose information with three types of labeling: 'zero lactose', 'low lactose' and 'contains lactose' (ANVISA, 2017). This obligation is already in place for gluten and guarantees quality information to the consumer, avoiding a false statement of 'lactose-free' as marketing strategy.

The results of the *t*-test (Table 6) showed that the bars that had a non-significant increase in mean acceptance score were those that received the highest mean acceptance in the blind test (with the exception of the protein bar). These findings demonstrate the extent to which package leads the consumer to relinquish sensory attributes.

The majority of consumers showed health consciousness ranging from moderate to high health concern, which probably explains the importance given to the health claims. Mai and Hoffmann (2017) found that the literature indicates consumers who are more aware of quality and concerned with their own physical appearance are more likely to make healthier food choices than less concerned individuals.

Ares et al. (2008) showed that the influence of brand, price and presence of health claims on choice of functional yogurts was significant and depended on consumer attitudes towards health related issues. These results confirm that consumers are more health conscious, making healthier and more nutritious food choices (Sabbe, Verbeke, Deliza, & Van Damme, 2009; Kallas et al., 2014; Miraballes et al., 2014).

The positive and significant *t*-test values showed that health-related claims and other non-sensorial factors of the package exceeded the taste, which can generate or increase consumer distrust of expectations and impair repurchase. On the other hand, in the case of sensorial characteristics satisfied (bars A and C) or higher than the expectations generated (bars E and F), the package had little effect on the acceptability of snack bars ($p > 0.05$). Several authors have concluded that health benefits are not sufficient to motivate the inclusion of exotic or whole foods, because they depend on the type of sensorial characteristic involved, which may or may not remove a food from the sensorial rejection region in addition to factors such as culture, type of food and the presence of other food competitors of the same category with better sensorial quality (Monge-Rojas, Mattei, Fuster, Willet, & Campos, 2014; Vidigal et al., 2011). Furthermore, health-related claims do not always guarantee real benefits for consumers, which means that some

consumers simply ignore the information provided on the package or do not have the motivation or knowledge to use the information in decision-making (Hung, Grunert, Hoefkens, Hieke, & Verbeke, 2017; Rotfeld, 2009; Rotfeld, 2010).

In sum, this study showed that taste and texture are the most important attributes to the consumer, but consumers were also influenced by health information (although this was not the case with all bars). The seed bar could be acceptable in buying situations because of its health information, it does not mean that it is sensory preferred; but it can represent the sacrifice of sensory pleasure for health.

4.1. Implications and future directions

First, it is necessary to overcome the limitations of the present study, as the sample size does not represent Brazilian consumers of snack bars. This sample is composed of health-conscious consumers, which facilitates the influence of health information. Therefore, it is necessary to evaluate the behavior of consumers with little concern for health to compare and determine the degree of importance of the health-reported claims.

In addition, this study used commercial brands. If the consumer had had a good or bad experience with any of the brands offered, sensory evaluation may have been influenced. The quantity of sample served to the consumer also did not represent the quantity that people usually consume.

Despite these limitations, this study aimed to investigate how consumers interpret different types of snack bars, proposing a wealth of information for this category of snacks that still requires additional studies to better understand consumer behavior. For future research, it would be interesting to allow comparisons between sessions 2 and 3, making it possible to study assimilation theory, confirmation and disconfirmation of expectations.

It is important to reorganize snacks on shelves at points of sale, since there are already indications that, when positioned in the middle, the choice for healthy snack bars increases (Keller, Markert, & Bucher, 2015). This is a viable option for schools, where children and young people often consume snack bars, helping these consumers to have healthier behavior, without much effort.

5. Conclusion

Package attributes, price and flavor were the most important factors that influenced the intention to purchase snack bars. Health information was able to positively influence consumer acceptance, highlighting the importance of the front panel. Among the factors that decreased the acceptance of snack bars were bitter aftertaste and unpleasant texture on the palate.

Results suggested the perception of health itself leads the consumer to make healthier choices and therefore tend to value non-sensory factors such as the claims on the food package. Protein and nut bars are still relatively unknown to the general public and are not consumed as much as cereal bars. This reinforces the need to improve the sensorial quality of the other types of bars on the market, in addition to the improving price, because nut bars are generally not affordable to all consumers, since they are the most expensive. This study showed the importance of non-sensory factors and can encourage policy makers to understand how lay people value health-related information. Results increased the content of health perception in the literature and confirmed the importance of package, especially the influence of health information on consumer sensorial acceptability.

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