The snack that has it all: People's associations with ideal snacks

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ABSTRACT

Although many people intend to eat healthily, their actual snacking behavior is often marked by a high consumption of calorie-dense, unhealthy snacks. One reason for this discrepancy may be that people tend to associate unhealthy food with tasty food, preventing them to follow up on their healthy snacking goals. To support people in snacking more healthily according to their intentions, there is an urgent need to better understand how people perceive the 'ideal snack', which may eventually be used to make healthy snacks more attractive. In the present research, we aim to elucidate conceptions of ideal snacks without loaded connotations of healthy and unhealthy, and subsequently compare them to features that are associated with healthy and unhealthy snacks. A Dutch community sample (N = 1087) was asked to generate conceptions of their ideal snack, and name features of what they considered to be (un)healthy snacks. The results revealed a multitude of idiosyncratic ideal snack conceptions. Commonalities were sensory characteristics and the notion of 'healthy'. Healthy and unhealthy snacks were primarily associated with their positive or negative consequences for health. These findings may inform the design and marketing of healthy, nutritionally balanced snacks that are palatable and attractive to the very people that make food choices.

1. Introduction

Many people nowadays have adopted the goal of eating healthily (de Ridder, Kroese, Evers, Adriaanse, & Gillebaart, 2017; Delaney & McCarthy, 2014). However, they often fail to act upon this intention (Adriaanse, Kroese, Gillebaart, & De Ridder, 2014; Verhoeven, Adriaanse, Evers, & de Ridder, 2012). As a result, they consume more unhealthy foods (high-caloric foods that are rich in fat, sodium, and refined carbohydrates) than they want to, especially unhealthy snack foods (Kuntz, Fiates, & Teixeira, 2012; Nielsen, Siega-Riz, & Popkin, 2002; Piernas & Popkin, 2010; Popkin & Gordon-Larsen, 2004). Indeed, most of the increase in caloric intake during the last few decades stems from calories consumed while snacking (Cutler, Glaeser, & Shapiro, 2003), defined here as food consumed in between meals (Jacquier, Gatrell, & Bingley, 2017; Wang, Van der Horst, Jaquier, Afeiche, & Eldridge, 2018). Consequently, a large number of people, especially in industrialized countries, are now overweight and suffer from associated risks of chronic illnesses such as cardiovascular diseases, type 2 diabetes, and cancer (Cecchini et al., 2010; Heymsfield & Wadden, 2017).

The finding that people do not act upon their intentions for healthy snacking may partially be due to failures in their capacities to self-regulate (Verhoeven et al., 2012). Unhealthy snacking behavior seems primarily predicted by habit strength rather than conscious intentions to eat unhealthily (Verhoeven et al., 2012; see also; Kumanyika et al., 2000), which may lead people to snack less healthily than they would want to. Moreover, unhealthy snacking has also been related to the omnipresence of unhealthy foods in the so called "obesogenic" environment (de Ridder, De Vet, Stok, Adriaanse, & De Wit, 2013). In this environment, food marketing suggests to consumers that food features such as sweet, salty, and fat (i.e., unhealthy foods) represent tastiness (Kirk, Penney, & McHugh, 2010; Swinburn, Egger, & Raza, 1999; Townshend & Lake, 2017). Taste expectations are among the main drivers of food decisions (Kourouniotis et al., 2016; Li, Streletskaya, & Gómez, 2019). The marketing of unhealthy foods as tasty makes it therefore very difficult for people to follow up on their healthy eating goals (Glanz, Basil, Maibach, Goldberg, & Snyder, 1998). This eventually results in diets of poorer nutritional quality, higher consumption of energy dense foods, and lower fruit and vegetable intake (Kourouniotis et al., 2016). Considering that many people want to eat more healthy foods (whole grains, fruits and vegetables, low in fat,

sugar, and salt), there is an urgent need for healthy snacks that make an appeal to taste, just as unhealthy snacks do, to support people in eating as they want (Mai & Hoffmann, 2015).

To bridge the apparent gap between healthy and tasty, the present study aims to examine what people perceive as ideal snacks and to compare these ideal snack conceptions with features of healthy and unhealthy snacks. With these aims, we want to contribute to a better understanding of how healthy snacks can be made more attractive. By focusing on ideal snack conceptions, we are able to avoid the existing emotionally charged labels of healthy and unhealthy that have strong connotations with (un)attractive foods. Concentrating on the ideal snack therefore allows us to identify features that may eventually be used for the design of attractive snacks that meet healthy food requirements.

1.1. The notions of healthy and unhealthy in relation to food

Previous research has revealed that the ideas about healthy and unhealthy foods are strongly associated with notions of what is desirable to eat and what is not. Unhealthy foods are often perceived as more tasty, even if no information about the tastiness of the product relative to other product options is available (Raghunathan, Naylor, & Hoyer, 2006; see also; Luomala, Laaksonen, & Leipamaa, 2004). In addition to being perceived as tasty, unhealthy foods are also considered to be more satisfying than healthy foods. For instance, people who were asked to sample a chocolate-raspberry protein bar that was presented as healthy, later reported more hunger and also ate more of the bar compared to when it was presented as tasty (Finkelstein & Fishbach, 2010). Importantly, this effect was moderated by participants' perception that healthy eating was mandatory. Only people who thought that the choice for a 'healthy' bar was imposed felt hungrier after having eaten from it. This effect was absent when they had chosen for this food themselves.

Similar observations on healthy choices being imposed rather than autonomous have been made in studies that suggest that the healthy food choice is often viewed as a wise choice that requires self-control rather than an indulgent choice (Cornil & Chandon, 2016). This phenomenon was therefore labelled as the 'moralization of healthy food' (Askegaard et al., 2014; Baker, Thompson, Engelken, & Huntley, 2004; Rozin, 1999). In line with this idea, research demonstrated that when people focus on the health facts of food, they tend to experience less pleasure from consumption (Rozin, 2005). Related to this, Vartanian and colleagues (Vartanian, Herman, & Polivy, 2007) reasoned that what and how much people eat can be used by the eater to convey a particular social impression, in which (un)healthy food is consumed out of social pressure rather than personal preference.

However, the observation that people tend to associate unhealthy with tasty is not universal. A study among a French sample found no evidence for the intuition that unhealthy equals tasty. This study rather revealed the opposite pattern such that unhealthy foods were associated with bad taste whereas healthy foods were perceived as tasty (Werle, Trendel, & Ardito, 2013; see also; Irmak, Vallen, & Robinson, 2011). One explanation for this finding could be that the French do not consider healthy food as a moral obligation. Moreover, this study also revealed that 'neutral' foods (i.e., foods that were pre-tested as neither perceived as healthy or unhealthy) that were labelled as healthy were considered tastier, more pleasurable and of better quality than when these foods were labelled as unhealthy (Werle et al., 2013).

In a similar vein, other studies have shown that many people are generally concerned with the health and food relationship (Rozin, Kitayama, & Cohen, 2007), and that health is among the most important motives of food choices (Grunert & Wills, 2007).

The previous research results clearly show that people have strong existing conceptions about (un)healthy food. For many people, the notion of health in food has come to be associated with giving up on the pleasure and taste of food. The labels of healthy and unhealthy do not

so much pertain to particular food characteristics but to what should be accomplished by consumption, namely the consequences for health. Thus far however, most studies that investigated how people think about snacks and their features have typically only focused on these morally charged healthy versus unhealthy associations. Such a research format prevents a good understanding of what an ideal snack that meets both health and hedonic criteria should be like. When attempting to synthesize the apparent contradictory features of health and taste, it is almost impossible to avoid these moralized associations of healthy and unhealthy. In the present research, we aim to better understand what an 'ideal' snack should be like by generating conceptions of this 'ideal snack'. This way, we will shed more light on what people think about an attractive snack without contaminating it with preconceptions about the perceived (un)healthiness of snacks. In addition, we will compare people's ideal snack conceptions with their notions of healthy and unhealthy snacks. The obtained results may eventually be used as a starting point for the design of healthy and appealing snack foods, by taking ideal snack conceptions into account while at the same time adhering to healthy diet guidelines.

We conducted a large field study by employing a quantitative survey in a large Dutch community sample to systematically investigate conceptions of an ideal snack. We asked people to describe their ideal snack and to generate word associations with healthy and unhealthy snacks. We then systematically compared word associations of ideal, healthy and unhealthy snacks to examine to what extent they correspond. The word association technique has previously been proven as an effective method for gathering information on peoples' notions of various food concepts (Guerrero et al., 2010; Roininen, Arvola, & Lähteenmäki, 2006). Due to this non-restricted associative design, we expected that participants would be able to identify unbiased features of an ideal snack that are not driven by preconceptions about the health and taste characteristics of (un)healthy snacks. This exploratory design did not allow us to formulate specific hypotheses.

2. Method

2.1. Participants

We recruited a large community sample from a city in the Netherlands (N = 1087) of whom 55% was female, and 35% male (10% did not report their gender). Most participants (41%) were recruited at a consumer fair about wellness products, whereas the others were recruited at public places (19%), local high schools (11%), university campus (16%) or via social media (13%). Participants' mean age was 35.40 years (SD = 17.91; range 14–81 years). Adolescents (< 18 years) participated in the study as being part of their educational program. Education level was distributed such that 16% of the participants had a university degree, 22% had finished higher vocational education, 18% higher general secondary education, 16% intermediate vocational education, and 15% completed lower general secondary education, and 13% had a foreign degree or did not report their education. Adolescent participants were categorized according to their current school enrolment.

2.2. Procedure

Data was collected at 15 occasions, at eight different locations such as the train station, city centre restaurant, shopping streets, a consumer fair, higher education schools, a university campus, and social media between fall 2017 and spring 2018 during office hours. Participants were randomly approached face-to-face (and 13% online) by research assistants either individually or as part of smaller groups (i.e., classrooms, restaurant tables, groups passing by) that ranged from 2 to 20 people. After agreeing to participate by signing an informed consent form, participants completed a short survey on 'Snack offers' that took about 5 min to complete. The full instructions can be found in Appendix

A. All appendices can be found in the online supplementary materials. At the different recruiting locations, the survey was either part of a bigger survey on food (i.e., consumer fair) or the participants were informed that filling out the survey would eventually help to improve food offers in the city (i.e., the remaining locations and social media). When it concerned small groups, participants were asked not to interact with each other when filling out the questionnaire. There was no participation compensation.

2.3. Materials

2.3.1. Snack association survey

Participant conceptions of their ideal snack and their associations with healthy and unhealthy snacks were assessed with three open ended questions. To examine their conceptions of ideal snacks, participants received the following instruction: "*Imagine that you are on the go (for example, from work to home, or from school to home), and feel like a snack. What would this be then? Describe your ideal snack below. You can think of what this snack looks like, how it tastes, whether it is hot/cold, hard/soft, sweet/salty, anything you think about when you think about this snack*". After participants had provided a description of their ideal snack conceptions, they also rated this snack on healthiness, ranging from 1 "*very unhealthy*" to 5 "*very healthy*". Subsequently, they were asked to provide word associations with healthy and unhealthy snacks ("*Which three words come to your mind when you think of a healthy [unhealthy] snack?*"). Finally, participants reported on demographic questions about age, gender and highest completed education level (current level of education when it concerned adolescent participants).

2.3.2. Composition of data set

First, all the word associations and sentences that people had provided in their description of the ideal snack were screened by one of the authors and a trained research assistant with the aim of removing irrelevant features (see below). After independent screening, the two coders met to agree on the final dataset of features.

Only adjectives and descriptive phrases such as 'sweet', 'salty', 'cold', 'warm', 'low in calories' were included because these words mark distinct features of snacks (see Ares & Deliza, 2010 and Pontual et al., 2017 for a similar selection procedure for word associations). First, we excluded the description of snack products like 'snack tomatoes' or 'hamburger' and analysed their naming frequency in a separate analysis.

Second, synonymous words were changed into a single descriptive category derived from a list of word meanings and synonyms of the freely available Dutch online repository www.synoniemen.net. For example, in case of ideal snack descriptions, the adjectives 'tasty', 'tasteful', 'flavourful', 'delicious', 'palatable' were merged into the word feature 'tasty'. Similarly, for healthy snack descriptions, features such as 'low in calories', 'few calories', 'no calories', '0% calories', 'reduced calories' were changed into the word feature 'low calories'. For unhealthy snack descriptions, answers 'fried', 'browned', 'frizzled', 'panfried' were categorized into the word feature 'fried'. After exclusion of product categories and the merging of synonyms, the final dataset comprised 35 unique word features for the ideal snack (35% of the original descriptions; $M_{words\ per\ person}$ = 1.30, SD = 1.54), 49 unique word features for the healthy snack (33% of the original descriptions; $M_{words\ per\ person}$ = 1.35, SD = 1.22), and 25 unique word features for the unhealthy snack (23% of the original descriptions; $M_{words\ per\ person}$ = 1.10, SD = 1.16). More details of the exclusion procedure can be found in Appendix B.

2.3.3. Data analysis

It is unclear whether there is a universal conception of the ideal snack, or whether there are large individual differences. If these conceptions diverge between individuals, there may still be clusters of people who have overlapping ideal snack conceptions. To examine if people's ideal snack conceptions can be clustered into definable groups, we first performed a latent class analysis on the final dataset (poLCAR package; Linzer & Lewis, 2011). We had no a priori expectation for the number of ideal snack clusters. The model fit of the latent class analyses (i.e., log likelihood, BIC, and AIC) and the content interpretation of one, two, three, four, and five clusters models were therefore compared.

Second, to compare which word associations were most often reported for ideal, healthy and unhealthy snacks, frequency analyses were performed on the final dataset of word associations for all three snack types. Additionally, we also looked at the frequency of named snack products to see what kind of existing snack products people associate with ideal snacks. Third and last, to investigate how the word associations for ideal, healthy and unhealthy snacks correspond to each other, a correspondence analysis (CA) was conducted (Greenacre & Belsius, 1994) with the FactoMineR package in R (Lê, Josse, & Husson, 2008). CA is a descriptive, graphical technique designed to explore relationships among categorical variables. Within this technique, variables of rows (word associations) and columns (ideal, healthy, tasty) are represented spatially to provide a visual representation of the data (da Silva et al., 2014). The data and matching syntax of all analyses can be downloaded by following this link: https://osf.io/nh6wm/?view_only=916a62c786ef4623815942c570716cd5.

3. Results

3.1. Latent class analysis of people's ideal snack conceptions

To assess the kind of conceptions that people have in mind when thinking about an ideal snack and to determine how many subgroups of people with their own ideal snack concept exist, a latent class analysis was performed. The model fit statistics for one, two, three, four, and five cluster solutions are displayed in Table 1. When comparing the model fit statistics for selecting the best model, none of the models consistently fulfilled better model fit criteria over another model (full details of this analysis can be found in Appendix C). The Bayesian Information Criterion, Akaike Information Criterion and Log Likelihood were about the same for each model. We therefore conclude that people hold such idiosyncratic conceptions of ideal snacks that they do not lend themselves for a classification into one or more clear general ideal snack conceptions.

Notwithstanding the absence of clear categories of ideal snack conceptions and the apparent idiosyncratic nature of ideal snack conceptions, it is notable that the conception of 'healthy' is present in all models, implying that in general, people do think of ideal snacks in terms of healthy snacks to some extent (cf. Mai & Hoffmann, 2012). The notion that ideal snacks are not at odds with being good for health is also manifest in the healthiness ratings of ideal snacks with participants evaluating the descriptions of their own ideal snack as neither healthy, nor unhealthy (M = 3.07, SD = 1.41).

3.2. Comparing people's associations of ideal, healthy and unhealthy snacks

To compare people's ideal snack (word) conceptions with their word associations of healthy and unhealthy snacks, three frequency analyses were conducted. The results of these analyses are shown in Figs. 1–3.

Table 1
Model fit statistics for the latent class analyses.

	df	LL	BIC	AIC
1-Cluster	1056	−5006.72	10258.27	10083.45
2-Cluster	1020	−4697.63	9891.89	9537.26
3-Cluster	984	−4625.78	10000.01	9465.56
4-Cluster	948	−4564.49	10129.25	9414.98

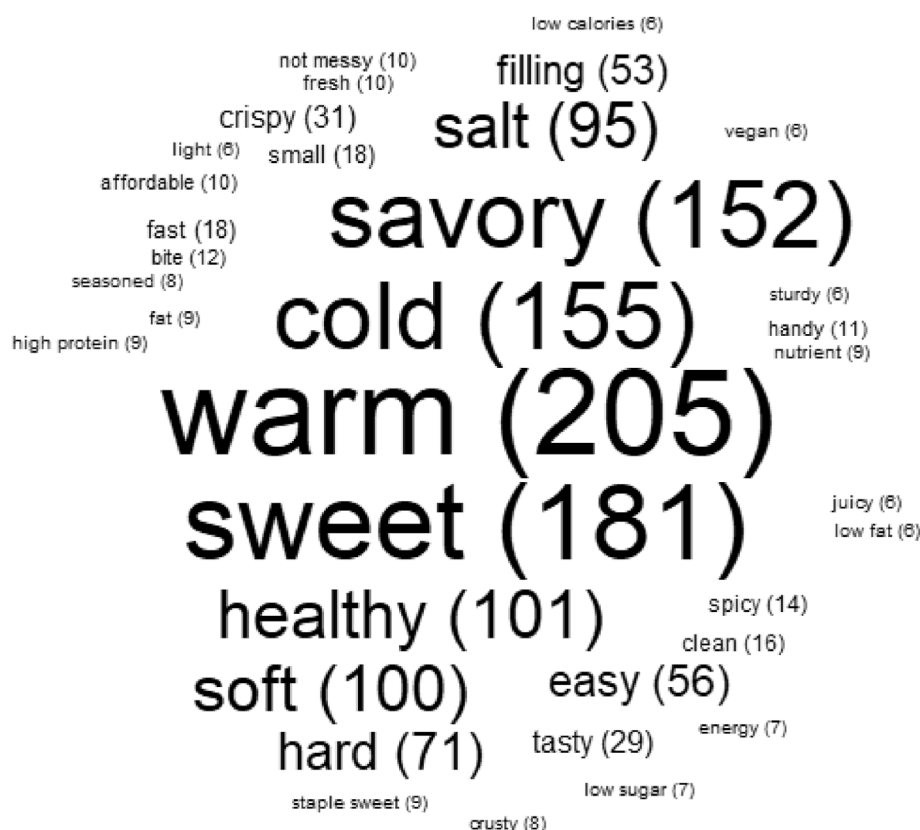* LL = Log likelihood, BIC = Bayesian Information Criterion, AIC = Akaike information criterion.

Fig. 1. Word cloud of the word-features of the ideal snack. Numbers within brackets are the frequency with which the word was named. Only words named more than 5 times are displayed.

Fig. 2. Word cloud of the word-features of the healthy snack. Numbers within brackets are the frequency with which the word was named. Only words named more than 5 times are displayed.

Fig. 3. Word cloud of the word-features of the unhealthy snack. Numbers within brackets are the frequency with which the word was named. Only words named more than 5 times are displayed.

Additionally, we calculated the frequency of the snack products that people named in the ideal snack question, because the ideal snack was often described by naming such snack products. This information is further interesting, because it could give more insight into whether products that are already on the market are seen by people as ideal.

First, Fig. 1 displays the frequency analysis of the ideal snack word-features and shows that the five most frequently named words for the ideal snack description are 'warm' (n = 205; 14% of all named words), 'sweet' (n = 181; 12% of all named words), 'cold' (n = 155; 11% of all named words), 'savory' (n = 152; 10% of all named words), and 'healthy' (n = 101; 7% of all named words). The latter word echoes the finding that people have 'healthy' in mind when thinking about their ideal snack.[1]

This idea is also supported by the named snack products. Specifically, 84% of the participants named at least one snack product in their ideal snack description. On average, people named 1.5 word features and 1.4 snack products in their ideal snack descriptions. Hence, features and snack products were named almost equally often by each participant (ratio of 1.1:1, word features: snack products). The results of the frequency analysis can be found in Fig. 4. Fig. 4 shows that the five most frequently named snack products for the ideal snack are broader food categories, namely 'sandwich' (n = 232; 14% of all named products), 'grain bar' (n = 145; 9% of all named products), 'fruit' (n = 127; 8% of all named products), 'cake' (n = 115; 7% of all named products), and 'chocolate' (n = 114; 7% of all named products). The top three most named products are products that mayfall under category healthy, namely '(healthy) sandwich', 'fruit', and 'grain bar'.

Indeed, 20% of the participants who named sandwiches as their ideal snack explicitly mentioned 'healthy sandwiches'. Additionally, 50% of the snack products in the top ten were healthy products, namely 'fruit', 'grain bar', 'apple', 'nuts', and 'banana'. Moreover, fruit as a general product, specific fruits such as banana and apple, nuts, whole grain products and specific vegetables accounted for 39% of all named snack products. Unhealthy snack products such as chocolate, cake, fried snack, burger, chips, and pizza accounted for 36%. The remaining 25% snack products could not be unambiguously classified such as coffee, chicken, noodles, chewing gum, cracker, and shake. To examine any individual differences in naming frequency based on gender, education level or age, we also conducted several subgroup analyses on the ideal snack word-features. All analyses can be found in Appendix D. The top ten named words were the same for each subgroup and correspond to the main analysis, with some between-group variations in naming order.

Second, Fig. 2 describes the frequency analysis for the healthy snack associations. For the healthy snack, the five most frequently used words were 'tasty' (n = 96; 8% of all named words), 'low sugar' (n = 90; 7.5% of all named words), 'healthy' (n = 87; 7% of all named words), 'vitamins' (n = 56; 5% of all named words), and 'low calories' (n = 56; 5% of all named words). Third and last, Fig. 3 shows the five most frequently named words for the unhealthy snack, which are 'fat' (n = 426; 28% of all named words), 'sugar' (n = 229; 15% of all named words), 'salt' (n = 124; 8% of all named words), 'tasty' (n = 105; 7% of all named words), and 'harmful to health' (n = 90; 6% of all named words).

Together, people thus used different words to describe ideal, healthy and unhealthy snacks. This indicates that they have distinct associations with the three snack categories. Specifically, both ideal and healthy snacks were described with a multitude of features whereas unhealthy snacks were more uniformly described as 'fat' (28% of all named words) or containing 'sugar' (15% of all named words). Naming frequency has previously been linked to the strength or importance of a

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[1] To rule out that our findings could be driven by a recruitment bias, we also did a subsample analysis on the participants recruited at the consumer fair, because we were concerned that this subsample could have been more drawn towards healthy due to the fairs' wellness theme. The naming pattern in this group was very similar to the whole sample which made us to conclude that there was no recruitment bias. The full analysis can be found in Appendix D.

Fig. 4. Word cloud of snack products of the ideal snack. Numbers within brackets are the frequency with which the word was named. Only words named more than 5 times are displayed.

concept in a person's mind (Guerrero, Colomer, Guàrdia, Xicola, & Clotet, 2000). People thus seem to have stronger associations with unhealthy snacks than with healthy and ideal snacks.

Health considerations were present in the word features of all three snack categories, albeit relatively minor. Specifically, 6–17% of associations in all three snack categories were health related, either in terms of health features (ideal and healthy snacks; e.g., 'low in calories') or unhealthy features (unhealthy snacks; e.g., 'harmful to health'). However, the ideal snack was by most people also described in terms of a snack product (84%), where the majority (39%) of all named snack products were explicitly healthy products. Moreover, half of the top ten named snack products were healthy products. These results support the idea that the majority of participants care for healthy in their ideal snack, which is represented by naming the feature 'healthy' among the top five and the majority of explicitly named healthy snack products.

Explicit taste considerations were only present in the word associations with healthy snacks (8% of all named words) and unhealthy snacks (7% of all named words), showing that the word 'tasty' was equally often used for the description of healthy and unhealthy snacks. In fact, 'tasty' was the most frequently named feature when describing a healthy snack. Implicit taste considerations were present in ideal snack descriptions insofar sensory features were named. The majority of word features, however, related to the description of ingredients (unhealthy snacks) and the sensory characteristics of snacks (ideal and healthy snacks).

3.3. Correspondence between people's ideal, healthy and unhealthy snack associations

To determine in what way the word associations for ideal, healthy and unhealthy snacks relate to each other, a correspondence analysis was performed (Greenacre & Belsius, 1994). For this analysis, we used words that were used > 10 times for the description of either ideal, healthy or unhealthy snacks (cf. Guerrero et al., 2010). In a

correspondence analysis, the maximum number of dimensions is the minimum of *rows -1* and *columns -1*. The scree plot analysis therefore revealed a two-dimensional factor solution for the data (see Appendix E, Fig. 1). On the first Factor 41.5% of the variance is displayed and on the second Factor 58.5%. To determine which words relate to which factor, the contribution plots were considered (see Appendix E, Fig. 2). The contribution plots show that the first factor is dominated by words such as 'fat', '(low) sugar', 'healthy', 'nourishing', 'good/harmful for body/health', 'vitamins', and 'low calories' - suggesting a dimension that relates to the nutritional quality of food and its implications for health. The second factor loads on words such as 'warm/cold', 'soft/hard', 'savory/sweet/low sugar', 'tasty', and 'low fat' - suggesting a dimension that relates to food sensory characteristics. Fig. 5 shows a
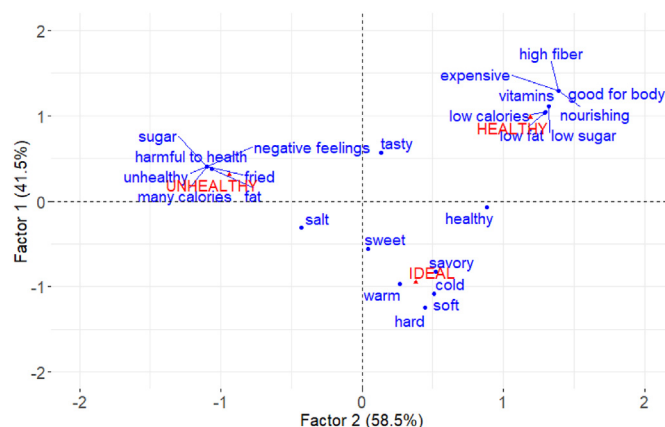

Fig. 5. Simple correspondence analysis (symmetric plot) of the word associations for ideal, healthy and unhealthy snacks. Words that are above the expected average contribution (EAC) are displayed (see contribution plots for the EAC in Appendix C).

joint plot of the rows and columns of the correspondence analysis. Words that represent the dimension of food sensory characteristics are closer positioned to the ideal snack, whereas words that represent the dimension of health implications are closer positioned to (un)healthy snacks (positive health words for the healthy snack and negative health words for the unhealthy snack).

The correspondence analysis thus implicates that ideal snacks are considered in terms of food sensory characteristics, while still meeting criteria for positive health consequences. In contrast, both healthy and unhealthy snacks are primarily perceived in terms of health consequences (either bad or good), and less in terms of food sensory characteristics. These results therefore speak to the need for greater consideration of tastiness when developing healthy snacks, so as to create snacks that are both healthy and attractive, and in that sense ideal.

4. Discussion

Many people intend to eat healthily, but are subjected to a food environment that encourages unhealthy snack consumption (de Ridder et al., 2017, 2013; Delaney & McCarthy, 2014; Swinburn et al., 1999). To be able to support people in their healthy eating goals, we need to gather input on how health and taste aspects of food can be combined into 'ideal snacks'. The current study aimed to take a first step in this direction. To better understand how people think about ideal snacks without preconceptions about perceived (un)healthiness of snacks, the present study investigated associations that people have with ideal, healthy, and unhealthy snacks separately. Subsequently, ideal snack conceptions were compared with people's associations of healthy and unhealthy snacks.

The results showed that people generated a variety of idiosyncratic ideal snack conceptions that were not further classifiable into categories or clusters. Specifically, ideal snacks were most often associated with sensory characteristics such as 'cold', 'warm', 'savory', and 'sweet'. However, 'healthy' was a consistent association with the ideal snack over the analyses as well, which was especially reflected in the snack products that people named as examples for ideal snacks. Healthy and unhealthy snacks generated less associations with sensory qualities that relate to taste. Instead, associations with healthy and unhealthy snacks were focused on the nutritional aspects of the snack (e.g., 'low sugar', 'vitamins', and 'low calories' for healthy snacks, and 'fat', 'sugar', and 'salt' for unhealthy snacks). Combined, these results suggest that whereas people associate their ideal snack with sensory experiences, their associations with healthy and unhealthy snacks are affected by the connotations that come with the healthy/unhealthy terminology. This is in line with the notion that labelling food as 'healthy' leads to a sense of moralization and absence of hedonic qualities (Askegaard et al., 2014; Belei, Geyskens, Goukens, Ramanathan, & Lemmink, 2012; Rozin, 1999, 2005; Vartanian et al., 2007).

Findings from previous research have demonstrated mixed evidence for the 'unhealthy = tasty' intuition, with some studies supporting the existence of this intuition (Luomala et al., 2004; Raghunathan et al., 2006), other studies showing no such intuition, or even the opposite, in other groups of participants (Irmak et al., 2011; Werle et al., 2013). Our results add to this body of research by demonstrating that even though 'tasty' was often mentioned as an association people had with unhealthy snacking, it was mentioned almost equally often as an association with healthy snacks. This underlines the importance of taste as a driving force in food choices (Kourouniotis et al., 2016; Li et al., 2019). Note that not surprisingly, taste was also named in the top fifteen words to describe the ideal snack. Together, this suggests that an ideal snack should be tasty but that being tasty does not equal unhealthy. It is also a quality assigned to healthy snacks.

4.1. Limitations and future perspectives

As any study, the current study comes with strengths and limitations. One of the most important strengths of this study was the decoupling of snacking associations from healthy and unhealthy when thinking about an ideal snack. Without these moralized, imposed conceptions, a natural concept of an ideal snack emerged. Furthermore, the non-restrictive design allowed for non-controlled, 'real' associations to develop, avoiding any artificial associations caused by instructions or controlled experiments.

A limitation of the current study is its generalizability. Although we included a large and diverse sample, we only tested Dutch participants. Research on the 'unhealthy = tasty' intuition has shown that cultural differences can be quite influential in how people view eating and snacking (Werle et al., 2013). As such, our results are not automatically generalizable to populations who have different cultural norms or associations with food, and seem to align most with studies that have examined populations who consider 'healthy = tasty' rather than 'unhealthy = tasty' (Kuntz et al., 2012; Werle et al., 2013).

Second, our study aimed to examine people's associations with snacks on the macro level among a large community sample. The advantage of this study design is that commonalities on the group-level can be studied. However, this design does not allow for studying individual differences in snack preferences. Possible subgroup analysis in snack preferences that take factors such as individual states (i.e., hunger levels), consumption moment, and desire for variety should therefore be a next research step.

Third and last, one of the ultimate aims of this study was to take a first step into the development of an ideal snack that adheres to nutritional guidelines, but also connects to what people hedonically desire in a snack. With regards to this aim, our results are not straightforward: the idiosyncrasy of the ideal snack conceptions suggests that there might not be one 'perfect snack'. Instead, there should be a certain amount of tailoring possible by either using pre-sets of different snacks or by allowing for customized choices at the point of purchase. In the current study, many people indicated to like their ideal snacks to be healthy. However, also many people described their ideal snack with an unhealthy snack product. The current food market foremostly advertises healthy products as healthy, which may avert people who may choose their snacks based on hedonic preferences, rather than healthiness. The challenge is therefore to turn ideal, unhealthy products into products that meet health and hedonic criteria and that are advertised as such. Our findings may thus be of interest to parties that aspire to design and market healthy, nutritionally balanced snacks that are palatable and attractive.

5. Conclusions

Obesity and concurrent public health issues are a global problem, and snacking plays an important role in people's (un)healthy diets (Heymsfield & Wadden, 2017; Nielsen et al., 2002). Therefore, changing people's snack choices is a promising avenue for an improved diet. However, educating consumers has not led to significant improvements or fundamental changes in food choices (Swinburn et al., 2011). Improving the availability of snacks that are not just healthy, but are also in line with people's preferences and associations with ideal snacks is therefore needed. Our study gives a first insight into what an ideal snack looks like to people without being biased by the loaded associations that come with labelling food as healthy or unhealthy. People want a healthy snack with sensory characteristics that fit their personal preferences. A perfect snack may therefore not be simple and straightforward, but should allow for different sensory experiences or individual tailoring. In other words, the utopian snack seems possible: healthy, yet tasty, and considered ideal by people looking for a snack.

Ethical statement in text (p. 6)

Ethical approval for this study was obtained from the ethical review board at Utrecht University.

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Appendix A. Supplementary data

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