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Taste Lovers vs. Nutrition Fact Seekers: How Health Consciousness and Self-Efficacy Determine the Way Consumers Choose Food Products

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ABSTRACT

This article identifies consumer segments that differ in the way they consider health-related and health-unrelated food properties when making food choices. The paper makes two assumptions: first, the level of health consciousness determines the quality of the attributes (health-related vs. health-unrelated) these segments consider important; and second, the degree of nutrition-related self-efficacy subsequently defines the quantity of health-related attributes considered important. Two studies measure preferences for food attributes (Study 1: n = 54, 12 attributes, conjoint analysis; Study 2: n = 162, 25 attributes, constant sum scales). In both studies, cluster analysis identifies two major segments (taste lovers and nutrition fact seekers) which are determined by consumers' level of health consciousness. Study 2 demonstrates that nutrition-related self-efficacy determines how many health-related attributes nutrition fact seekers consider important. Consequently, they can be split into a 'heavy' and a 'soft' subsegment. The study also identifies a segment that lacks a clear food choice strategy due to incompatible beliefs. The paper guides marketers and producers in developing healthy food products tailored to the needs of different target segments. Considering the enormous health expenditures, the studies' results are also beneficial to policy-makers and governmental organizations to design social marketing campaigns.

KEYWORDS

Health marketing, decision making, food consumption, conjoint analysis, cluster analysis.

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INTRODUCTION

The health care systems of most industrialized countries increasingly face the prevalent challenges of diet-related diseases, such as obesity, coronary heart disease, diabetes mellitus type 2, hypertension, and hyperlipidemia. The direct costs of these diseases account for an enormous proportion of the total health expenditures in the world (e.g., diabetes mellitus type 2: 11.6%; International Diabetes Federation, 2009). In the UK, for example, the economic burden of diabetes is expected to increase by 24% in 2040 compared to the year 2000 (Bagust *et al.*, 2002). Since the economically active age group is steadily declining, the increase in health care costs will be even more dramatic (40 to 50%). Additionally, these diseases are related to impaired quality of life and increased mortality (Klein *et al.*, 2004). Despite or even because of these problems, there is a shift in consumption patterns in some parts of the industrialised societies. Transformative consumer research has emerged as a new discipline analysing why and how consumers change their behaviour to enhance their well-being and, in turn, societal welfare (Mick, 2007). The present study adds to this growing body of literature by focusing on health-related food consumption.

Healthful eating is a cornerstone to prevent chronic diet-related diseases (Jebb, 2007). In this way, healthy food consumption contributes to individual health and reduces health expenditures. So far, marketers and policy-makers are not sufficiently equipped with a sound understanding of how consumers differ in their food choices. To design food products that support healthy nutrition and to develop social marketing campaigns, it is necessary to improve our knowledge about how different groups of consumers make food choices. Scholars have to answer two crucial questions. First, how do consumers differ in their preference patterns? Second, why do consumers emphasize different food attributes?

Most previous studies consider only a limited set of product attributes. Partial-profile designs, however, are too narrow in scope to fully answer the first question (e.g., Balasubramanian and Cole, 2002; Kozup *et al.*, 2003; Luomala, 2007). The present article follows a broader approach to overcome this restriction. To answer the second question, we explore the underlying motives of consumer food decisions. Based on social-cognitive theories of health behaviour and the Elaboration Likelihood Model, we propose that a two-step process defines the quality and quantity of the food attributes being considered important in consumption choices. First, the motivational concept of health consciousness determines the quality of the food attributes consumers consider (health-related or health-unrelated). Afterwards, the post-intentional concept of self-efficacy determines how many attributes consumers take into account. Since we propose that the question of whether a consumer can transfer health motivation into healthy eating behaviour largely depends on their perceived abilities in this specific area, we consider nutrition self-efficacy in terms of a domain-specific construct (Schwarzer, 2004).

This paper reports two empirical studies that analyse our assumptions. We assess the relevance of a comprehensive set of food properties (12 and 25 attributes) for food choices using the example of yogurts. Both studies apply decompositional techniques (adaptive conjoint analysis, constant sum scales) to identify the most influential attributes. We use cluster analysis to reveal key consumer segments that use distinct decision strategies. Next, we relate the specific ways of making food decisions to the underlying psychological processes in terms of health consciousness and nutrition self-efficacy. This approach enables us to derive useful implications for managers and policy-makers. Finally, we pinpoint directions for future research.

THEORETICAL BACKGROUND

Relevance of health (un-)related attributes

Previous research has identified several product attributes that are relevant in the food decision process. Consumers consider, among others, several intrinsic properties, such as aroma, flavour, and texture (Schutz, 1999). Additionally, consumers take into account extrinsic properties, such as price (Murphy *et al.*, 2004), brand (Levin and Levin, 2010), production method (Deliza *et al.*, 2005), nutrition information (Aboulnasr and Sivaraman, 2010), or certification (Fotopoulos and Krystallis, 2003). Both intrinsic and extrinsic properties can either be health-related or health-unrelated (Figure 1). Health-related attributes promote or hamper consumers' state of health, whereas health-unrelated attributes do not affect their state of health.

Figure 1. Food product properties

	Intrinsic	Extrinsic
Health-related	fat content, sugar content etc.	health claim, nutrition labelling etc.
Health-unrelated	taste, aroma etc.	price, brand etc.

An extensive review of Iop and colleagues (2006) revealed that food studies look at four attributes on average. Partial-profile designs isolating a few food attributes (mostly price or brand), however, lead to overestimating the preferences for the attributes under study. To overcome this limitation, we include a larger number of health-related and health-unrelated attributes. This study additionally links consumer preferences to the underlying cognitive process to develop a deeper understanding of consumption choices.

Cognitive determinants of food decision strategies

Consumers differ in the way they process food information (Aboulnasr and Sivaraman, 2010;

Hughner *et al.*, 2007). Previous studies have already attempted to identify segments that apply distinct food decision strategies (Ares *et al.*, 2008; Honkanen *et al.*, 2004). However, most studies only show which attributes are important for food preferences but fail to explain the underlying variables that exert influence on *which* and *how many* attributes are important for consumers' food choices (e.g., Enneking *et al.*, 2007; Johansen *et al.*, 2010; Luckow *et al.*, 2005).

Several models, such as the Health Belief Model (Rosenstock, 1974), the Theory of Planned Behavior (Ajzen, 1991), the Transtheoretical Model of Behavior Change (Prochaska *et al.*, 1992), or the Health Action Process Approach (Schwarzer, 2008), suggest more or less complex patterns of social-cognitive factors driving health behaviour. These models can be differentiated into motivational and volitional approaches (Armitage and Conner, 2000). *Motivational* models regard intentions as the core predictor of the decision process (Ajzen, 1991). Numerous studies, however, reveal only little correspondence between intentions and behaviour (e.g., Webb and Sheeran, 2006). To explain this gap, *volitional* models focus on the factors that follow intention formation (Bagozzi, 1992). This article looks at both motivational and post-intentional factors of food choices. As we focus on healthy nutrition, we consider motivation in terms of health consciousness and the post-intentional assessment of one's ability to perform the required actions in terms of nutrition-related self-efficacy.

Health consciousness

Health consciousness is defined as the motivational component that stimulates consumers to undertake health actions (Jayanti and Burns, 1998; Michaelidou and Hassan, 2008). Health-conscious consumers are concerned about their health. They strive to enhance and/or sustain their state of well-being by engaging in healthy behaviours, such as consuming healthy food.

Previous research revealed that health consciousness fosters preventive health care (Jayanti and Burns, 1998), attitude towards organic food (Hughner *et al.*, 2007), and purchase intentions (Lockie *et al.*, 2002). Hence, we expect health consciousness to strengthen the relevance of health-related food attributes.

Hypothesis 1: The more health-conscious consumers are, the more they focus on health-related food product properties.

Nutrition self-efficacy

The construct of self-efficacy stems from the Social Cognitive Theory (Bandura, 1977, 1986) and describes the degree to which a person is convinced that (s)he is able to achieve and sustain a desired goal. With increasing levels of self-efficacy, people are more likely to exert effort to obtain a certain goal (Judge *et al.*, 2007). The construct of self-efficacy is included in most of the wide-spread social-cognitive models of health behaviour, such as the Protection Motivation Theory (Rogers, 1983), the Transtheoretical Model (Prochaska *et al.*, 1992), and the Health Action Process Approach (Schwarzer, 1992). Health promotion research has frequently found that self-efficacy strongly predicts health behaviour (Holden, 1991).

According to Luszczynska *et al.* (2005), self-efficacy can be considered on a general level as a trait-like construct that describes "the belief in one's competence to cope with a broad range of stressful or challenging demands". Similarly to several other consumer constructs (e.g., consumer innovativeness, Hoffmann and Soyez, 2010; Midgley and Dowling, 1978), self-efficacy can be conceptualized as a domain-specific construct as well (Schwarzer, 2004), such as physical activity self-efficacy or smoking self-efficacy. Domain-specific measurements usually yield greater explanatory power than general measurements (Lastovicka and Joachimsthaler, 1988). Several researchers have already used self-efficacy with respect to the domain of nutrition

behaviour (e.g., Renner and Schwarzer, 2005; Renner *et al.*, 2000; Schwarzer and Renner, 2006). We adopt the construct of nutrition self-efficacy from these authors. It is defined as a person's belief in his/her ability to overcome the barriers that are associated with healthful eating. Note that this construct is always related to *healthy* nutrition behaviour although the relevant literature terms it only nutrition self-efficacy. Previous research has shown that nutrition self-efficacy predicts healthy nutrition patterns, such as decreasing fat intake, weight control, preventive nutrition, and increasing consumption of fruits or vegetables (e.g., Anderson *et al.*, 2007; Schwarzer and Renner, 2000).

We argue that scholars need to take into account the interplay of health consciousness and nutrition self-efficacy to fully understand food decision making. We consider health consciousness as the motivational construct that drives health behaviour. Nutrition self-efficacy, on the other hand, captures the consumer's post-intentional assessment of whether (s)he is able to actually eat more healthy. We expect that health consciousness and nutrition self-efficacy jointly determine the way consumers decide about food products. We more specifically suggest that health consciousness determines the *quality* of attributes consumers consider as important when making food choices (health-related vs. health-unrelated attributes). Individuals who want a healthy diet (health consciousness) have to assess the healthiness of food products. A healthy food choice requires a deeper and more rational decision making process for food products. Whether or not health-conscious consumers actually engage in a healthy diet depends on their beliefs in their ability (nutrition self-efficacy) to find and chose healthier foods (Anderson *et al.*, 2000). As explained below in more detail, nutrition self-efficacy therefore determines the *quantity* of food attributes considered important. Health-conscious consumers with low nutrition self-efficacy focus on a reduced set of cue attributes, whereas those with high nutrition self-efficacy

engage in extensive comparison.

The assumption that nutrition self-efficacy determines whether a consumer focusses on a few health-related cues or considers a larger set of health-related attributes important is based on the basic tenet of the Elaboration Likelihood Model (ELM, Petty and Cacioppo, 1986). The ELM suggests that the individual's motivation (here: health consciousness) and ability (here: nutrition self-efficacy) influences the extent of elaboration in information processing. Under low motivation and ability conditions, consumers apply simple decision rules, such as relying on one or few proxy attributes that they consider particularly important (peripheral route). Under high motivation and ability conditions, by contrast, they engage in a more detailed processing of an object (central route). Marketing research has widely confirmed the dual-processing hypothesis in different domains. Consumers with low motivation and ability are more likely to base their decision on heuristic cues, such as product country of origin (Gürhan-Canli and Maheswaran, 2000), promotion signals (Inman *et al.*, 1990), price (Mitra, 1995), website interactivity (Liu and Shrum, 2009), third-party seals (Yang *et al.*, 2006) and others. All of these studies confirm that consumers with high motivation and ability elaborately consider a larger set of attributes.

Transferred to our study, the ELM would predict that individuals with low health consciousness (= low motivation) do not engage in assessing a product's healthiness. They primarily focus on health-unrelated attributes independently of their level of nutrition self-efficacy. The crucial question that arises is how health-conscious consumers (= high motivation) differ in their decision making process with regard to varying levels of ability. We expect that the health-conscious consumer's ability to achieve and maintain healthy eating behaviour determines whether (s)he relies on heuristic information processing (peripheral route) or engages in more extensive information processing (central route). Given a high level of health consciousness, we expect that

individuals are apt to take the peripheral route if nutrition self-efficacy is low. They tend to put a high emphasis on one or a few key product attributes. By contrast, if health consciousness is high and nutrition self-efficacy is high, they tend to process information via the central route. Hence, they consider a larger set of product attributes when making food decisions.

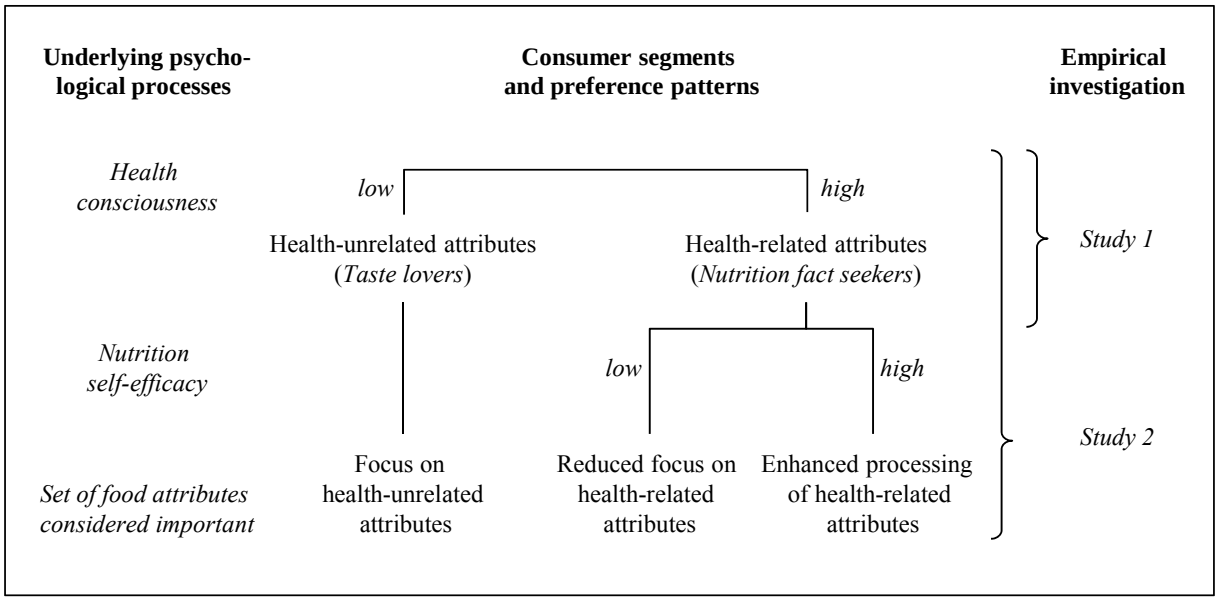
Taken together, health consciousness and nutrition self-efficacy jointly define prototypical food decision strategies. The most rational and health-supportive processing of food attributes will only occur under the following two necessary conditions: A high level of health-consciousness and a high level of nutrition self-efficacy.

Hypothesis 2: Health consciousness and nutrition self-efficacy jointly determine the quality and quantity of food attributes considered important: Consumers who are high in health-consciousness but low in nutrition self-efficacy consider fewer health-related attributes than those who are high in nutrition-self efficacy, whereas there are no differences in the number of health-related attributes considered for those who are low in health-consciousness.

Overview of empirical studies

We explore consumer preferences for health-(un)related attributes in two empirical studies. In Study 1, adaptive conjoint analysis examines preference patterns with regard to 12 food product attributes. Cluster analysis then distinguishes two major consumer segments. To test the first hypothesis, we explain the distinctive nature of both segments on the basis of their level of health consciousness. Study 2 expands the first study in multiple ways. Constant sum scales are applied to analyse a broader set of 25 food attributes. Consequently, the cluster solution is more diverse than the one in Study 1. To explore the second hypothesis, the resulting segments are explained by the interplay of health consciousness and nutrition self-efficacy (Figure 2).

Figure 2. Conceptual model and flow of analysis



For several reasons, we use the example of yogurt. First, yogurt is a relevant product. Male and female individuals of different age groups and different income levels in almost all countries and cultures consume yogurt (Luckow *et al.*, 2005). Second, yogurt is generally associated with healthy nutrition (Ares *et al.*, 2008), which is within the scope of our study. Finally, the compositions of different yogurts vary across several health-related (e.g., fat, sugar) as well health-unrelated attributes (e.g., brand, price).

STUDY 1: TASTE LOVERS VS. NUTRITION FACT SEEKERS

Objective

Study 1 explores the relevant attributes in food decision making. We subsequently determine distinct consumer segments. Finally, we analyse whether diverging health consciousness levels is the underlying reason constituting these segments. Hence, Study 1 aims at answering Hypothesis 1.

Design

Pretest

A pretest was conducted to develop a list of criteria that consumers consider when choosing yogurt. We ran two rounds of group discussions, one with six experts (marketers, food chemists, and nutrition scientists) and one with ten consumers. We asked the participants of both groups to name health-related and health-unrelated attributes of yogurt. We combined the two lists and excluded redundancies. The final list consists of 25 criteria.

Food attributes

Study 1 applied conjoint analysis. As this method can only handle a limited number of criteria, we restricted our analysis to 12 attributes (we consider the full list of 25 attributes in Study 2). Thus, we selected health-(un)related attributes which were expected to be particularly relevant for consumers' decision making.

Health-related attributes: We included *nutrition facts* as an extrinsic attribute of special interest because they are directly related to health (Aboulnasr and Sivaraman, 2010; Chandon and Wansink, 2007). As intrinsic attributes, we added several key determinants of obesity, such as *add-ons* (e.g., chocolate chips), *fat content* and *sugar content* (Jebb, 2007; Johnson *et al.*, 2007). Due to the fact that consumers fear side effects of genetically modified food (Qin and Brown, 2008), we adjoined *no genetic engineering*. Finally, *probiotics* were deemed relevant because consumers usually believe they are important to digestive health.

Health-unrelated attributes: We included *taste* because food preferences strongly depend upon sensory properties (Toepel *et al.*, 2009). Additionally, we included *no preservatives* as our pretest indicates that consumers value this criterion. Further, we added *price* and *brand*, which are the most frequently studied extrinsic food attributes (Iop *et al.*, 2006). Given that marketers often try to foster the "liking" of food products by providing positively connoted cues, we

included *organic seals* and *quality seals* (Hughner *et al.*, 2007).

Sample

Several sociodemographic (e.g., age) and socioeconomic criteria (e.g., income) were shown to impact food consumption (Kiefer *et al.*, 2005; Qin and Brown, 2008). To rule out the influence of these confounding variables, we gathered a homogeneous student sample in this first study (Calder *et al.*, 1981). We collected data using the software package SSI Web (*Sawtooth Software*). Half of the 54 participants were male. The average age was 25 years (*SD*=2.31). All respondents reported consuming yogurt.

Method and measures

To investigate individual preferences, we applied decompositional rather than compositional methods for the following reasons. First, decompositional methods have higher ecological validity. Compositional methods assess single attributes separately. Hence, they do not reflect real-life buying situations and they provoke an inflation of expectation. Second, healthy nutrition is a sensitive issue. Compositional methods may therefore encourage socially desirable responses that overstress the relevance of sensitive attributes (Louviere and Islam, 2008). Decompositional techniques help to overcome these shortcomings (e.g., Carroll and Green, 1995). Respondents decide between alternatives of a controlled set of product profiles. On the basis of these evaluations, the (implicit) utility of the product attributes is statistically extracted (Melles *et al.*, 2000).

Given that numerous attributes come into play in food choices, we applied the computer-based Adaptive Conjoint Analysis (ACA), which reliably estimates preferences for several attributes. After having completed the ACA, the subjects answered a short questionnaire that measured health consciousness using a four-item Likert scale (Cronbach's α=.85, *M*=.80, *SD*=1.11) that was taken from Gould (1988).

In the next step, we used hierarchical cluster analysis to segment respondents based on

the utilities for the 12 attributes. We conducted cluster analysis to identify consumer segments that are internally homogenous in the food decision strategies they apply and that are externally heterogeneous in such a way that the food decision strategies largely differ across segments. We first applied Ward's method (squared Euclidean distance) because it minimizes within-group variance. To determine the adequate number of meaningful clusters, scholars usually look at the loss of precision when fusing clusters. They further examine the arrangement of the clusters pictured in a dendrogram. As these two criteria are relatively subjective, we additionally applied Mojena's (1977) stopping rule (Milligan and Cooper, 1985). In a second step, the centroids of both clusters were employed as starting seeds for the non-hierarchical k-means algorithm in order to obtain the final cluster solution.

Reliability and validity

The reliability of ACA-estimated utilities and part-worths was fairly high (R^2=.68). We assessed internal validity by a holdout choice task that consisted of three options (Melles *et al.*, 2000). The respondents' first choices were well distributed across the three product options (37.7%, 34.0%, and 28.3%). The observed hit rate of 63.3% (expected hit rate, 33.3%) indicates that the estimated part-worths predict the respondents' choices in the holdout task exceptionally well.

Results

Relevance of health-(un)related product attributes

The aggregated scores of the conjoint analysis (Table 1) demonstrate that consumers attach most importance to the health-unrelated attributes taste (21.4%) and price (14.5%). Next, they consider three health-related attributes: fat content (10.3%), add-ons (8.7%), and sugar content (7.9%).

Table 1. Importance and part-worths of different yogurt properties

Attribute	Nature	Importance	Level	Part-worths		
Taste	health-unrelated	21.4	fruit / vanilla / chocolate	88.4	-32.9	-55.5
Price	health-unrelated	14.5	0.79€ / 0.99€ / 1.29€	84.2	1.4	-85.6
Fat content	health-related	10.3	0.1% fat / 1.5% fat / 3.8% fat	10.9	16.9	-27.8
Add-on	health-related	8.7	chocolate chips / cereals / no chocolate chips or cereals	16.5	-7.3	-9.2
Sugar content	health-related	7.9	no added sugar / 30% less sugar / with artificial sugar	28.7	9.1	-37.8
Brand	health-unrelated	6.8	Landliebe / Danone / Allnatura	9.2	3.6	-12.8
No genetic engineering	health-related	6.1	no genetic engineering / [no information]	30.1	-30.1	
Nutrition	health-related	6.1	52 kcal/100g / 74 kcal/100g / 113 kcal/100g	19.5	2.9	-22.4
No preservatives	health-unrelated	5.7	no preservatives / [no information]	31.8	-31.8	
Organic seal	health-unrelated	5.0	organic seal / [no information]	25.6	-25.6	
Quality seal	health-unrelated	4.4	quality seal / [no information]	24.2	-24.2	
Probiotics	health-related	3.1	probiotics / [no information]	9.9	-9.9	

Identification of consumer segments

Hierarchical cluster analysis segmented individuals into groups with similar preference patterns. Two very "dense" stems in the dendrogram indicate two major clusters of consumer preferences. Additionally, fusing the last two clusters markedly increases the loss of precision (in terms of the squared Euclidean distance). Mojena's (1977) critical threshold of $\tilde{\alpha}$=2.75 confirms the extracted two-cluster solution as well (Table 2) which was refined using k-means clustering.

Table 2. Optimal number of clusters

Number of clusters	2	3	4	5	6	7	8	9	10
Stopping rule									
Sum of squares (in 10 ^ 3)	25.22	19.80	17.21	15.52	13.92	12.42	11.48	10.63	9.80
Mojena	3.67	2.64	2.23	1.93	1.64	1.37	1.20	1.05	0.90

Based on their distinct preferences, we termed Segment 1 as *taste lovers* (TL) and Segment 2 as *nutrition fact seekers* (NFS). ANOVA demonstrated that the respondents assigned to the TL segment had a great preference for taste ($F_{[1,52]}$=36.423; M_{TL}=31.3% vs. M_{NFS}=16.5%, η^2=.41, $p\leq$.001). Contrarily, the respondents in the NFS segment chose food on the basis of fat content

($F_{[1,52]}$=9.960; M_{TL}=6.1% vs. M_{NFS}=12.4%, η^2=.16, $p\leq$.01) and sugar content ($F_{[1,52]}$=8.792; M_{TL}=5.3% vs. M_{NFS}=9.2%, η^2=.15, $p\leq$.01). NFS were less price sensitive ($F_{[1,52]}$=27.349; M_{TL}=22.8% vs. M_{NFS}=10.3%, η^2=.35, $p\leq$.001) and put higher relevance on genetic engineering-free food products ($F_{[1,52]}$=5.238; M_{TL}=3.8% vs. M_{NFS}=7.3%, η^2=.09, $p\leq$.05) and brands ($F_{[1,52]}$=4.973; M_{TL}=4.7% vs. M_{NFS}=7.8%, η^2=.09, $p\leq$.05). With regard to the remaining attributes, the clusters did not differ (p>.05).

Differences in health consciousness

Hypothesis 1 suggests that different levels of health consciousness lead to qualitatively distinct decision strategies. Accordingly, ANOVA confirmed that taste lovers were less health-conscious than nutrition fact seekers ($F_{[1,52]}$=6.955; η^2=.12, $p\leq$.05). Consequently, when TL decide about food they disregard factors that trigger obesity and diabetes. NFS, on the contrary, attach more importance to attributes that are known to foster harmful effects on health, such as fat and sugar content. These results support Hypothesis 1.

STUDY 2: HEAVY VS. SOFT SUBSEGMENTS

Objective

Study 1 revealed that health consciousness determines the health quality of attribute preferences. Health quality is the underlying reason for segmenting consumers into taste lovers and nutrition fact seekers. Study 2 tests Hypothesis 2, which postulates that nutrition self-efficacy determines the quantity of health-related food properties consumers perceive as relevant. We explore how health consciousness and nutrition self-efficacy jointly determine the cluster solution. To gain a more holistic view of the food decision process, we incorporate a larger set of attributes. Conjoint approaches are not capable to handle this number of attributes without overloading re-

spondents' cognitive capacities. Therefore, we apply a two-step constant sum scale. Additionally, we generate a larger and more representative sample than in Study 1 to reveal more distinct decision strategies.

Design

Food attributes

In Study 2, we used the full list of 25 attributes developed in the pretest of Study 1. Based on a follow-up discussion with the experts, we organized the attributes into a set of five categories: nutrition facts, sensory properties, labelling, marketing and packaging, and production. Each category contains five attributes.

Sample

Data were gathered via an online survey. Whereas Study 1 used a homogenous segment to avoid potential confounds, this study was based on a more heterogeneous sample to incorporate a broad spectrum of attitudes. The 162 respondents ranged from 18 to 71 years old, with a mean of 29.4 years (*SD*=9.6). Sixty percent of the participations were female. Three out of four subjects shared their households with a partner or more persons. One fourth of the respondents had children.

Method and measures

We used a two-stage constant sum approach to assess preferences for the 25 attributes. During this process, all respondents rated importance of all attributes. In a first step, the respondents divided a total of 100 points among the five main categories. In a second step, the subjects distributed 100 points across the attributes of each category. The following procedure of data transformation enabled us to aggregate the ipsatively measured preferences. We assigned a value of 100 to the most important attribute of each category. The values for less important attributes

were adjusted with respect to the relative differences of this attribute and the maximum. The final scores for each of the 25 attributes were derived by multiplying the normed value of the attribute's category and the attribute's normed value within the category. These scores indicate the importance of the 25 product attributes. In the pretest of Study 1, we assessed whether these attributes are health-related or health-unrelated. Taken together, this enables us to determine how important the respondents evaluate health-related and health-unrelated attributes, respectively. After completion of the constant sum scales, the respondents indicated their level of health consciousness using the same measurements as in Study 1. Additionally, we applied a five-item rating scale of nutrition-related self-efficacy adapted from Schwarzer (2004). To check the robustness of our results, the questionnaire covered several control variables (*Appendix*). Again, we applied hierarchical cluster analysis to determine the optimal number of clusters. We then performed k-means clustering to refine the final cluster solution that is used for further analysis.

Results

Relevance of health-(un)related product attributes

Constant sum scaling indicates that the most relevant main category is sensory properties (70.4 of 100 points on average; Table 3). Hotelling's T^2, which is the multivariate analogue of Student's *t*-test, demonstrated that the main categories differ in their mean scores (T^2=238.45, $p \leq .001$). Follow-up *t*-tests revealed three classes of importance: (1) sensory properties; (2) a joint class of nutrition facts, marketing and packaging, and labelling (differences are not statistically significant); and (3) production. According to the transformed and aggregated scores, the top five attributes are taste, best-before date, fat content, price, and sugar content (Table 4). Hence, this investigation confirms the consumer preference patterns extracted in Study 1.

Table 3. Importance of the main criteria

Main category	Weight	Frequency of most important attribute	T^2	p	*t*-tests			
			238.45	*.000*				
1. Sensory properties	70.4	49			*1*	*2*	*3*	*4*
2. Nutrition facts	50.5	35			***			
3. Marketing and packaging	47.6	19			***	n.s.		
4. Labelling	44.6	16			***	n.s.	n.s.	
5. Production	20.1	6			***	***	***	***

Notes. T^2= Hotelling's T-square; levels of significance (two-tailed): * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$; n.s. = not significant.

Table 4. Transformed scores of all criteria

Category/ Attribute	Normed weight		Product	Overall rank	T^2	*t*-test			
	Category	Attribute							
Sensory Properties	*.30*				*1,999.35*				
1. Taste		.46	13.8	1		*1*	*2*	*3*	*4*
2. Creaminess		.17	5.1	6		***			
3. Add-ons		.16	4.8	7		***	n.s.		
4. Aroma		.11	3.3	12		***	***	***	
5. Colour		.10	3.0	14		***	***	***	n.s.
Nutrition facts	*.22*				*268.71*				
1. Fat content		.32	7.04	3		*1*	*2*	*3*	*4*
2. Sugar content		.27	5.94	5		***			
3. No preservatives		.17	3.74	11		***	***		
4. Fiber		.13	2.86	15		***	***	***	
5. Probiotics		.11	2.42	17		***	***	***	n.s.
Marketing and Packaging	*.20*				*530.79*				
1. Price		.34	6.80	4		*1*	*2*	*3*	*4*
2. Packaging size		.23	4.60	9		***			
3. Brand		.20	4.00	10		***	*		
4. Type of packaging		.15	3.00	13		***	***	**	
5. Advertising		.08	1.60	23		***	***	***	***
Labelling	*.19*				*508.11*				
1. Best-before date		.41	7.79	2		*1*	*2*	*3*	*4*
2. Nutrition facts		.26	4.94	8		***			
3. Organic seal		.13	2.47	16		***	***		
4. Quality seal		.11	2.09	18		***	***	n.s.	
5. Health claim		.09	1.71	22		***	***	*	n.s.
Production	*.09*				*53.46*				
1. Regional producer		.26	2.34	19		*1*	*2*	*3*	*4*
2. No genetic engineering		.21	1.89	20		*			
3. Regional origin		.20	1.80	21		***	n.s.		
4. Organic production		.18	1.62	24		n.s.	*	***	
5. Production method		.15	1.35	25		***	***	***	*

Notes. T^2 = Hotelling's T-square; levels of significance (two-tailed): * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$; n.s = not significant.

Identification of consumer segments

Again, we used hierarchical cluster analysis to segment the participants. All three criteria (loss of precision, dendrogram, and Mojena's test with the threshold of $\tilde{\alpha}$=2.75) suggest distinguishing five clusters (Table 5). The next section demonstrates that these five clusters are a refinement of the two-cluster solution found in Study 1.

Table 5. Optimal number of clusters

Number of clusters	2	3	4	5	6	7	8	9	10
Stopping rule									
Sum of squares (in 10 ^ 3)	2,612	2,149	1,984	1,868	1,770	1,687	1,619	1,555	1,497
Mojena	4.31	3.38	3.05	2.82	2.59	2.46	2.32	2.19	2.08

When extracting two clusters, the segments markedly correspond to the two segments identified in Study 1. About half of the respondents showed a great preference for taste (*taste lovers, TL*). Contrarily, the other half of the respondents searched for health-related nutrition facts (*nutrition fact seekers, NFS*), such as labelling, sugar and fat content, and other nutritional information (upper part of Table 6).

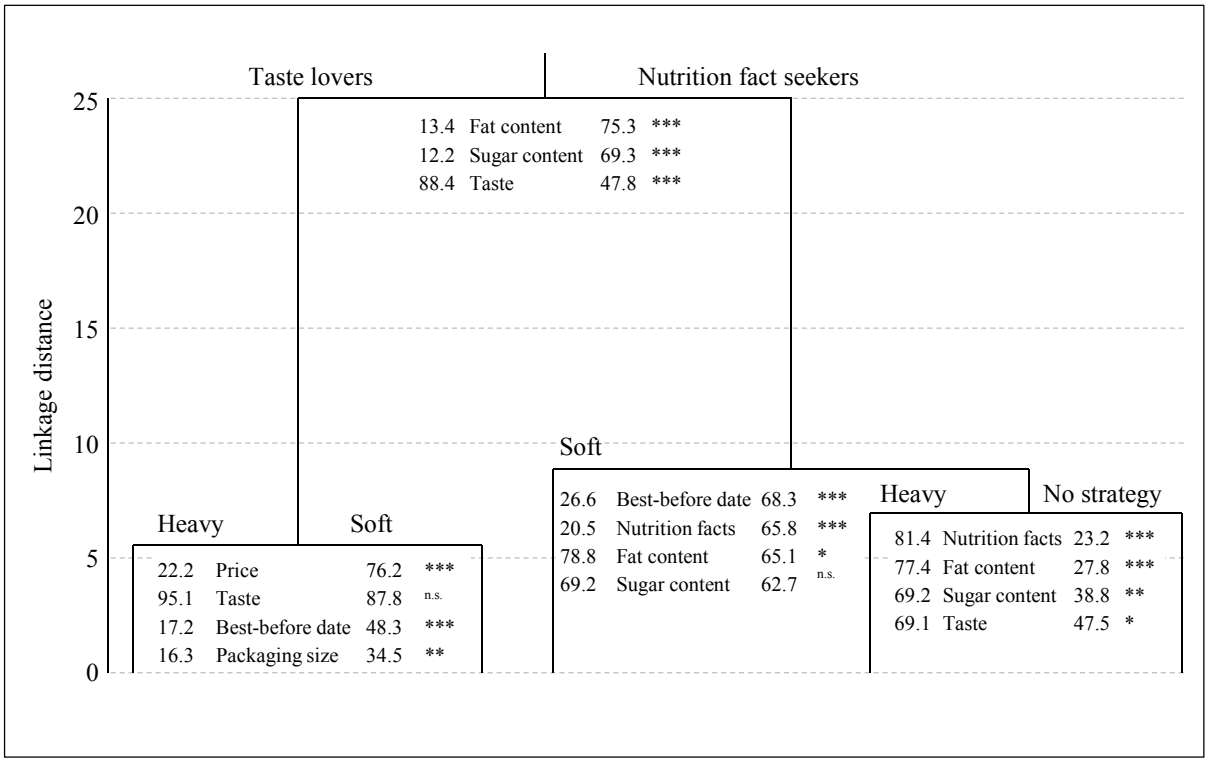
Table 6. Differences between segments with regard to the top 10 attributes

	Taste	Best-be-fore date	Fat content	Price	Sugar content	Creami-ness	Add-ons	Nutrition facts	Packag-ing size	Brand
Two-cluster solution										
Taste lovers (n = 89)	88	32	13	47	12	31	32	13	25	22
Nutrit. fact seekers (n = 73)	48	45	75	34	69	20	18	41	25	16
F value	*85.87****	*5.76**	*267.05****	*6.16**	*227.59****	*6.35**	*10.23***	*37.54****	*.01*	*2.88*
η^2	*.35*	*.04*	*.63*	*.04*	*.58*	*.04*	*.06*	*.19*	*.00*	*.02*
Five-cluster solution										
Taste lovers										
- Heavy (n = 47)	95	17	14	22	13	32	29	8	16	14
- Soft (n = 38)	88	48	15	76	11	30	34	21	35	30
Nutrition fact seekers										
- Heavy (n = 23)	67	74	80	36	72	36	25	81	31	17
- Soft (n = 40)	36	24	81	39	73	11	13	20	22	17
Others										
- No strategy (n = 14)	48	52	28	29	39	19	27	23	25	17
F value	*38.99****	*21.45****	*74.88****	*21.82****	*58.30****	*5.77****	*3.70***	*48.68****	*3.36**	*3.08**
η^2 ($\Delta\eta^2$)	*.50 (.15)*	*.35 (.31)*	*.66 (.03)*	*.36 (.32)*	*.60 (.02)*	*.13 (.09)*	*.09 (.03)*	*.55 (.36)*	*.08 (.08)*	*.07 (.05)*

Note. Level of significance: * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$.

The five-cluster solution refines the two-cluster solution (lower part of Table 6). TL are divided into consumers whose judgments are solely driven by one attribute, which is taste (*heavy taste lovers*), and consumers who prefer taste for a reasonable price (*soft taste lovers*). *Post hoc* testing (LSD) confirmed that the price scores differ significantly between heavy and soft TL ($p \leq .001$), whereas the taste scores do not ($p > .05$). NFS also split into subclusters (Figure 3). One subcluster explicitly considers fat and sugar content (*soft nutrition fact seekers*). Another subcluster refers to several other attributes as well (*heavy nutrition fact seekers*), such as taste, best-before date, creaminess, and nutrition facts (all differences with $p \leq .001$). The fifth group captures consumers who are rather indecisive. Their preference scores are consistently below the threshold of .60. They do not show a clear preference for any of the top 10 criteria at all (*no strategy*).

Figure 3. Hierarchy of cluster solutions

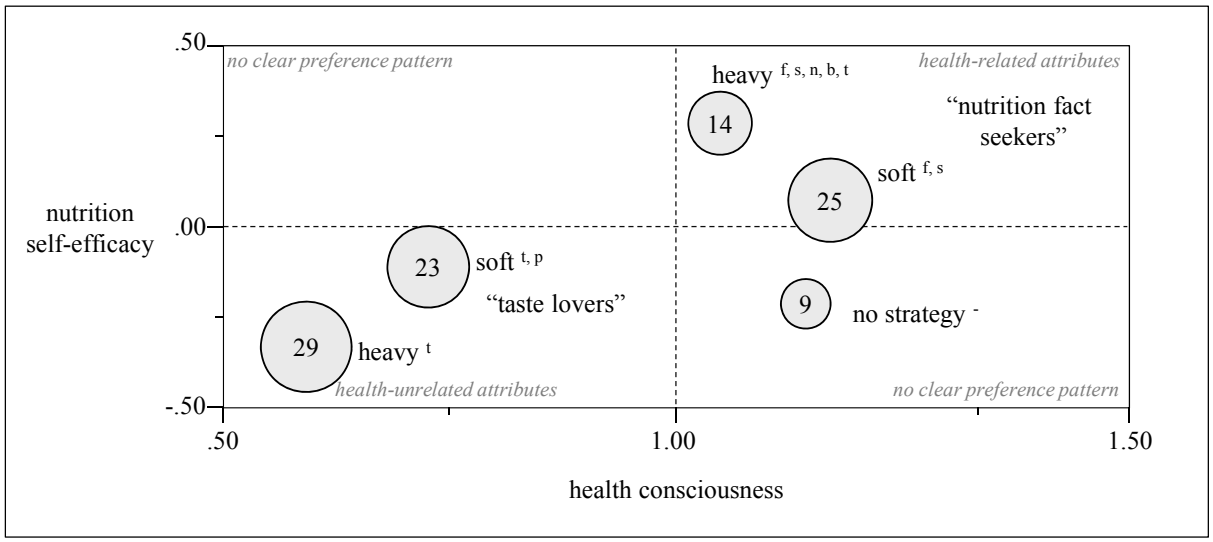


Note. Differences of the split clusters tested using *t*-test: n.s.= not significant; * $p<.05$; ** $p<.01$; *** $p<.001$.

Differences in health consciousness and nutrition self-efficacy

First, we consider differences between the two major decision strategies taste loving and nutrition fact seeking. ANOVA demonstrated that TL scored markedly lower on health consciousness than NFS ($F_{[1,160]}$=15.616, η^2=.083, $p\leq.001$). This finding gives additional evidence for Hypothesis 1 and corroborates the results of Study 1 that was based on a rather small sample. Second, we analysed differences between the five clusters. In line with Hypothesis 2, the differentiation into five subclusters depends on consumers' nutrition self-efficacy ($F_{[4, 157]}$=2.618, η^2=.063, $p\leq.05$; Figure 4). The nutrition self-efficacy scores were exceptionally low for heavy TL and exceptionally high for heavy NFS. This result supports Hypothesis 2. Moreover, the no-strategy segment encompasses health-conscious consumers who doubt their healthy eating abilities. These incompatible beliefs are reflected in the lack of a clear food choice strategy.

Figure 4. Positioning of the five clusters in the health consciousness/nutrition self-efficacy-matrix



Note. Preference scores ≥ .60 for ^{t} … taste; ^{p} … price; ^{f} … fat content; ^{s} … sugar content; ^{n} … nutrition facts; ^{b} … best-before date ; $^{-}$ … none of the 25 product attributes with preference scores higher than .60. Bubble size indicates cluster size (*in %*).

Robustness check

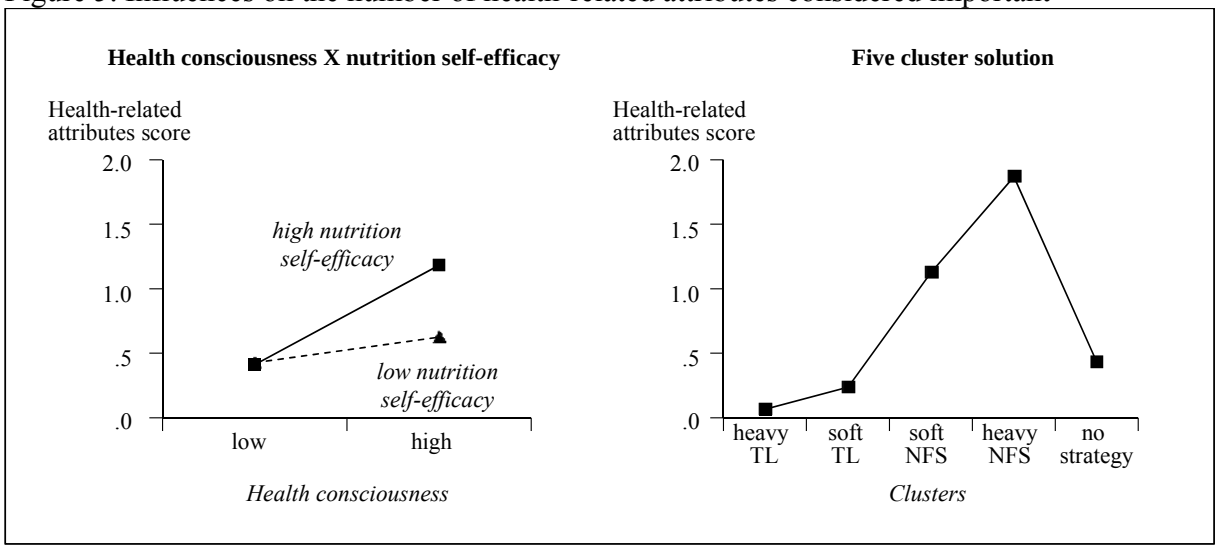
We checked whether sociodemographic (age, gender, education, size of households, marital status, number of children) and socioeconomic (income, yoghurt consumption), as well as psychographic variables (need for cognition, pleasure, convenience, willingness to pay) differ between the segments by means of cross-tabulation and ANOVA. No meaningful differences were found. Hence, the different preference patterns are to be observed in different sociodemographic groups (e.g., age, gender). As one would expect, some of our control variables and our predictor variables are interrelated. In our study, for example, female in contrast to male subjects (F=5.558, $p < .05$) and older in comparison to younger respondents ($\beta = .234$, $t = 4.229$, $p < .001$) scored markedly higher on health consciousness. Health consciousness and self-efficacy, however, have greater predictive power for food decision making than sociodemographics. Nonetheless, to further ensure the stability of our findings, we reran the analyses reported above, including the control variables as covariates. All effects remained stable (health

consciousness: $F_{[1, 148]}$=7.942, η^2=.051, $p\leq$.01); nutrition self-efficacy: $F_{[4, 145]}$=2.866, η^2=.073, $p\leq$.05).

Finally, as additional robustness test of Hypothesis 1 and 2, we analysed the influence of health consciousness and self-efficacy on the number of health related attributes considered important. Therefore, we combined the scores of health-related product attributes to an index. We divided the sample into groups of low and high health consciousness as well as low and high nutrition self-efficacy by a median split. A two-factorial ANOVA confirms that health consciousness ($F_{[1, 158]}$=10.076, η^2=.060, $p\leq$.01) and nutrition self-efficacy ($F_{[1, 158]}$=3.913, η^2=.024, $p\leq$.05) influence the number of health-related attributes considered important. In addition, there is a statistically significant interaction effect of both variables ($F_{[1, 158]}$=3.924, η^2=.025 $p\leq$.05, left side of Figure 5).[1] Consequently, consumers engage in deeply elaborated processing of health-related food properties only if both health consciousness and nutrition self-efficacy are high. Another ANOVA with the cluster solution as the independent variable reveals that the five clusters explain the number of health-related food attributes considered important in a similar manner ($F_{[4, 157]}$=37.270, η^2=.487, $p\leq$.001, right side of Figure 5). The heavy NFS, which are characterised by high health consciousness and high nutrition self-efficacy, consider the highest number of health-related attributes as important. Hence, this analysis additionally confirms the robustness of our findings.

[1] To ensure that the interaction effect is not only due to median split, we additionally used the full information of the continuous scale in regression analysis. Similar to the ANOVA, we found main effects of health consciousness (β = .162, t = 1.973, p < .05) and nutrition self-efficacy (β = .223, t = 2.351, p < .01). Most importantly, the interaction effect remains stable (β = .315, t = 3.013, p < .01).

Figure 5. Influences on the number of health-related attributes considered important



Note. TL… Taste lovers, NFS… Nutrition fact seekers.

GENERAL DISCUSSION

Consumers differ in the way which and how many product attributes they consider important when making food decisions. The present article contributes to our knowledge of why some consumers prefer healthy food, while others prefer rather unhealthy food. We reveal parts of the psychological process that determines the quality and quantity of food attributes different consumer segments take into account when choosing food products.

Study 1 identified two major decision strategies. The distinction between taste lovers and nutrition fact seekers, albeit simple, gives new insights on individual preferences for certain food properties. *Taste lovers* primarily consider health-unrelated product attributes, whereas *nutrition fact seekers* put a high emphasis on health-related attributes. Study 2, which expanded the number of attributes, further differentiated these segments. As postulated, there is a heavy and a soft subsegment of the nutrition fact seekers. Remarkably, there is also a heavy and a soft segment of the taste lovers. We additionally identified a fifth segment, not expected from theoretical consideration, with no specific preference pattern.

This article strives to explain the diverging decision strategies across different consumer segments. As expected, *health consciousness* determines the quality of the attributes considered important. Taste lovers care less about their health. They make food choices, mostly with regard to health-unrelated attributes, such as taste and price. Nutrition fact seekers are more aware of their health. They scrutinize attributes known to trigger obesity and other diet-related diseases. *Nutrition self-efficacy* explains the distinction between the soft and heavy segments. Health-conscious individuals who strongly believe in their capability to eat healthy (heavy nutrition fact seekers) exert more cognitive effort. Accordingly, they consider more health-related food attributes than do consumers with lower nutrition self-efficacy scores. On the contrary, less health-conscious consumers with lower nutrition self-efficacy (heavy taste lovers) (over)simplify food decisions by referring to one health-unrelated food attribute only. In our study, this attribute is taste. Soft taste lovers generally seem to have a somewhat higher level of nutrition self-efficacy. This may be due to a halo-effect: a higher level of general self-efficacy (Bandura, 1977) pervades other domain-specific types of self-efficacy (including the ability to eat healthy; Schwarzer, 2004). This may help explain why less health-conscious consumers with higher nutrition self-efficacy consider more health-unrelated attributes (taste and price) when making food decisions than heavy taste lovers. Further research should explore such halo-effects of general traits of nutrition-specific constructs (Lastovicka and Joachimsthaler, 1988) and their consequences for food decision making. The fifth segment encompasses consumers who are health-conscious but doubt their healthy eating abilities. These incompatible beliefs are reflected in the lack of a clear food choice strategy.

Implications for marketers

This study has strong implications for business and society. The findings provide producers, marketers, and policy-makers with guidelines on how to distinguish the key food decision

strategies. They provide insights on how and why consumers base their food decisions on different health-related and health-unrelated attributes. We pinpoint that practitioners should take into account the underlying drivers of food choice, namely, health consciousness and nutrition self-efficacy.

Producers of healthy food, for example, should identify whether their target customers belong to taste lovers or nutrition fact seekers. Both segments require tailored product development, and they should be addressed by specific communication strategies. When designing healthy food products for less health-conscious consumers, taste should be the top priority, whereas for health-conscious consumers, the healthy nature of a product may compensate for a certain loss in taste. Advertisements may attract nutrition fact seekers by health-related messages stressing positive nutrition facts (e.g., "less fat and sugar"). This strategy, on the contrary, seems less promising for consumers who are primarily attracted by taste. For taste lovers, claims that highlight the food's taste (e.g., "real Coca-Cola taste and zero calories") or front cooking may be a good way to advertise healthy food products. Spotlighting nutrition facts in advertising or by the packaging may even be counterproductive because consumers often associate less fat and sugar with a decrease in taste (Raghunathan *et al.*, 2006).

This study demonstrates that marketers can differentiate taste lovers and nutrition fact seekers more precisely into five subsegments. Consumers belonging to the heavy nutrition fact seekers segment, for example, extensively decide about food. Advertisers should provide them with detailed information on which aspects of a food product is healthy. Consumers in the soft segment put less effort into decision making. Marketers should thus carefully choose only a few health-related key attributes to signal the healthy nature of a product. Companies could differentiate products and promotion with regard to taste lovers as well. Heavy taste lovers are more

likely to pay a price premium for food products than soft taste lovers who demand taste for a reasonable price (similar to smart shoppers who demand high quality at a low price).

By giving new insights into food decision making, this study is also beneficial to (non)governmental organizations and policy-makers. The findings help to develop target-specific social marketing campaigns that effectively foster healthy nutrition. Taste lovers in general and heavy taste-loving consumers in particular are the most important targets of interventions because they are less health-conscious and show low beliefs in their ability to achieve healthy eating. Thus, these groups have the highest risk of developing health-related diseases in the future. Many prevention approaches prompt the healthy nature of certain food categories as the central message. Our findings indicate, however, that these campaigns are not very well suited for persuading taste lovers. Alternatively, campaigns should praise the taste of healthy food products. Subsequent campaigns should additionally aim to increase awareness of health-related product attributes.

Limitations and implications for further research

This investigation contributes new aspects to our understanding of food decision strategies. From a conceptual perspective, we expanded previous partial-profile studies by examining a comprehensive set of product attributes. Moreover, to overcome the shortcomings connected with traditional questionnaire studies (e.g., inflation of expectation, socially desirable responses), the two studies applied a multi-method decompositional design.

This article pinpoints two fundamental consumer segments and five subsegments that are relevant for any food-related investigation. Most importantly, this is the first study to explain consumers' preference patterns for these attributes by taking into account the underlying variables in health behaviour. Although we linked these segments with the core variables of health behaviour models, researchers should examine additional variables to explain preference patterns

(e.g., risk perception, outcome expectancies). Qualitative and/or quantitative studies in other settings would help to identify neglected predictors. In addition, we measured health consciousness as a trait. However, intrapersonally varying states of health consciousness may greatly influence the food decision. Hence, we call for future studies that experimentally manipulate the respondents' state of health consciousness. Scholars might induce different levels by means of priming studies. In this way, it could be evaluated, for instance, whether communication campaigns that foster health consciousness may potentially increase the relevance of health-related attributes in food choices. Finally, further research should establish the external validity of the present findings. On this account, additional studies are needed in product categories other than dairy products.

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Appendix

Appendix. Measurement of latent constructs

Wording	Factor loadings
Health consciousness (EV = 55%, α = .72, M = .89, SD = .82)	
I reflect about my health a lot.	.80
I'm very self-conscious about my health.	.75
I'm generally attentive to my inner feelings about my health.	.61
I am constantly examining my health.	.79
Nutrition self-efficacy (EV = 59%, α = .82, M = -.10, SD = .98)	
I can manage to stick to a healthy diet…	
… even if I have to learn much about nutrition.	.69
… even if I have to watch out in many situations.	.84
… even if I have to try several times until it works.	.83
… even if I have to rethink my entire way of nutrition.	.69
… even if I initially do not receive much support.	.76
Need for cognition (EV = 52%, α = .68, M = -.81, SD = 1.00)	
I try to anticipate and avoid situations where there is likely chance I will have to think in depth about something.*	.74
I only think as hard as I have to.*	.72
It's enough for me that something gets the job done; I don't care how or why it works.*	.74
I usually end up deliberating about issues even when they do not affect me personally.	.67
Convenience (EV = 80%, α = .92, M = .30, SD = 1.03)	
How important is convenience to you when shopping food?	.92
How important is convenience to you when cooking food?	.92
Willingness to pay (M = .43, SD = .09)	
How much do you pay for a yogurt (200g) on average?	
Pleasure (M = 1.25, SD = .59)	
How important is pleasure to you when eating?	

Notes. Explortive factor analysis (PCA. Varimax-rotation). EV = explained variance, α = coefficient alpha, *M* = Mean (scale ranging from -3 to 3), *SD* = Standard deviation. * = reversely coded.