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The influence of health claims and nutritional composition on consumers' yoghurt preferences

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ABSTRACT. The use of health claims on foods with a poor nutritional composition could pose a risk of misleading some groups of consumers in their food choices. This study aimed to explore the influence of the use of claims on consumers' preferences for yoghurts with a different nutritional composition and the influence of more and less familiar claims on food choices. The study was conducted on 371 consumers using conjoint methodology and further cluster analysis. Fruit yoghurt was used as a base product. We investigated the impact of the following product attributes on consumers' preferences: presence/absence of a probiotic and fat metabolism claim; sugar content; and fat content. The results suggest that, while consumers generally consider the nutritional composition of yoghurt to be more important than the tested claims, some groups of consumers are more sensitive to the use of health-related statements. We observed the consumers' generally positive preference for a familiar probiotic claim, and their negative preference for a non-familiar fat metabolism claim. Overall, these results indicate that some groups of consumers are more sensitive to the use of health-related communications and are therefore more exposed to the risk of being misled if the composition of the yoghurt they buy is in fact less favourable. It would be beneficial if nutrient profiles were introduced to limit the use of claims on foods.

KEYWORDS: health claims, biotin, probiotics, conjoint analysis, cluster analysis

1 Introduction

Changes in dietary and health patterns and physical activity are increasing the risk of non-communicable diseases, which are the leading cause of global mortality (Diepeveen, Ling, Suhrcke, Roland, & Marteau, 2013; WHO, 2010). While some consumers are more keen on the promotion of a healthy lifestyle and healthy food choices (Lalor, Madden, McKenzie, & Wall, 2011), changing the eating patterns of the general population is a very complex problem. One tool used in efforts to improve eating patterns involves informing consumers with detailed nutrition information and some countries have introduced this as part of their mandatory food labelling (Grunert & Wills, 2007). The mandatory labelling of a nutrition declaration was introduced in the European Union (EU) in 2007 for foods labelled with nutrition or health claims, while other prepacked foods will be affected at the end of 2016 (EC, 2011; Pravst, 2012).

Food labelling is regulated to both help consumers make informed choices regarding the food they consume and prevent any practices that may mislead them. In recent years, food labels have commonly included statements claiming beneficial nutritional or health effects – nutrition and health claims. While the occurrence of such claims is both category- and country-specific (Bonsmann et al., 2010), yoghurts and breakfast cereals are recognised as categories where the use of health claims is most frequent (Lalor, Kennedy, Flynn, & Wall, 2010; Pravst, Kušar, Pohar, & Klopčič, 2013).

It is well established that consumers' ability to understand food labelling information entails many different factors, such as socio-demographic characteristics, nutrition knowledge, familiarity with the food along with label format and articulation (Cowburn & Stockley, 2005; Grunert, Wills, & Fernandez-Celemin, 2010; Nocella & Kennedy, 2012). Poor understanding of such information can have a negative impact on healthy food choices and market efficiency (Nocella & Kennedy, 2012). It has been shown that consumers accept food labelling as beneficial (Zezelj, Milosevic, Stojanovic, & Ognjanov, 2012) and that they have a stronger preference for simple health statements (Bitzios, Fraser, & Haddock-Fraser, 2011), which are easier to understand, even though more familiarity with health claims may lead to a preference for more complete and informative – and hence longer – claims (Grunert et al., 2009). A lack of understanding of health claims can limit perceptions of the intended meaning and may cause suspicions regarding the product. Further, consumers have expressed doubts over the claimed effects of foods (Niva & Mäkelä, 2007; Svederberg & Wendin, 2011). In some cases, consumers do not read the claims carefully or transfer the meaning from a familiar food label to an unfamiliar one, potentially leading to overgeneralisation

and inaccurate conclusions (Draper et al., 2011; Fullmer, Geiger, & Parent, 1991). Some consumers search for additional information on a food package to help them relate the claim to their earlier knowledge and experiences (Svederberg & Wendin, 2011), while others find reading food labels time-consuming and strenuous (Signal et al., 2008; Zezelj et al., 2012). The response to food labels is also influenced by the way in which information is presented. Health claims are usually written in a technical language that consumers are unfamiliar with, limiting their ability to understand a claim's meaning; this can lead to: (a) a positivity bias, whereby a consumer gives better ratings for a product only because a claim is present; (b) a halo effect, which occurs when a consumer rates a product higher on attributes unrelated to the claim; and (c) a magic-bullet effect, when a consumer applies inappropriate health benefits to a product (Roe, Levy, and Derby 1999).

Further, consumers' acceptance of foods labelled with claims depends on their familiarity and perceptions related to the perceived fit of the ingredients and carrier or base products (Krutulyte et al., 2011; Verbeke, 2010). It has been shown that consumers perceive some nutrients as either qualifying (i.e. vitamins) or disqualifying (i.e. fat, sugars) and that they consider the nutritional value of foods as important when selecting foods, particularly when it comes to qualifying nutrients (Hoefkens, Verbeke, & Van Camp, 2011). On the other hand, it is poorly understood how different health claims influence consumers' food preferences when disqualifying nutrients are involved. Studies investigating this area are also very important for informing policy-makers about the need to regulate the use of health claims on foods. Consumers can perceive products labelled with nutrition or health claims as healthier, which can influence their purchasing decisions (Verbeke, Scholderer, & Lähteenmäki, 2009). To avoid misleading consumers with the use of health claims on foods that are high in disqualifying nutrients, European regulation introduced the setting of nutrient profiles (EC, 2006), but this part of the legislation has not yet been implemented (Cappuccio & Pravst, 2011; Pravst, 2011). To enable efficient science-based decisions in this process, it is also vital to define different consumer segments and identify those most vulnerable to the nature of nutrition and health claims (Van Trijp and Van der Lans, 2007).

As consumers differ in terms of health consciousness, nutritional knowledge, familiarity with nutrients and functional ingredients, and previous experience with foods with health claims, we expect that consumers also differ in their reaction to health

claims in the context of different levels of disqualifying nutrients. Previous studies have taken such differences into account by distinguishing different consumer segments, but have either analysed only one type of claim (Cox et al., 2008) or have not placed the claims in the context of disqualifying nutrients (Annunziata & Vecchio, 2013; Hailu et al., 2009; Sorenson & Bogue, 2005; Sparke & Menrad, 2009).

Therefore, the objectives of our study were: (a) to study consumers' preferences for fruit yoghurt when different claims are present in combination with different levels of disqualifying nutrients; and (b) to determine different segments of consumers based on their preferences. In addition, we explored how familiarity with a claim influences consumers' food choices. The importance of various product attributes (presence or absence of a claim, different sugar and fat content) on consumers' yoghurt preference was measured using conjoint analysis. A base product (fruit yoghurt) was carefully selected to enable wide and realistic variations in the nutritional parameters and the use of different claims.

2 Material and methods

2.1 Data collection

The data were collected via a questionnaire administered to 390 consumers. The survey was carried out by six researchers in different regions of Slovenia to assure that both central and non-central parts of the country were covered. Researchers received instructions to select respondents on the basis of sex and age so as to ensure a suitable composition of the final sample. A filter question about the frequency of eating yoghurt was used to screen participants at the beginning of the interview. Participants who answered that they never consume yoghurt (N=18) were excluded from the study. The remaining participants were asked to complete a card-sorting task; 371 participants finished this task and represent the final sample. The study was performed in line with the Code of Ethics of the University of Ljubljana. Participants were interviewed in their homes.

The study had two parts. After the screening question, we performed a conjoint study and participants were asked to sort nine product cards according to their preferences. Second, they completed a questionnaire measuring their knowledge of the active ingredients, self-reported choice criteria, and demographics.

2.2 Conjoint analysis design

Conjoint analysis is a method used to evaluate the importance individuals assign to various attributes of a product (Green & Srinivasan, 1978). Several studies have employed conjoint analysis to show the effect the trade-offs between health or nutrition claims and sensory or non-sensory factors have on consumers' preferences for choosing a product or determining its healthfulness (Annunziata & Vecchio, 2013; Ares, Gimenez, & Deliza, 2010; Ares, Gimenez, & Gambaro, 2009; Bech-Larsen & Grunert, 2003; Dean et al., 2012; Drewnowski, Moskowitz, Reisner, & Krieger, 2010; Johansen, Naes, Oyaas, & Hersleth, 2010).

The conjoint analysis design entailed four product attributes – two different claims (*probiotic* and *fat metabolism* claims), content of sugars and fat, as shown in Table 1. The full factorial design produced 36 (2x2x3x3) profiles. By using an orthogonal fractional factorial design allowing the estimation of main effects only, the number of product cards was reduced to nine. An example of such a product card with both claims is shown in Fig. 1. The participants had to rank the cards according to their preferences from 1 (most favourable) to 9 (least favourable).

The base product of this study was fruit yoghurt given that it is widely consumed around the world. As a good source of nutrients, yoghurt is recommended in many countries as part of a healthy diet (Smug, Salminen, Sanders, & Ebner, 2014; Eržen et al., 2014). Further, due to the common use of claims on yoghurts (Lalor et al., 2010; Pravst et al., 2013) consumers are already familiar with such functional products. Two different claims were tested in our study. The claim "*probiotics*" (hereinafter the *probiotic claim*) is most often used on yoghurts in Slovenia (Pravst et al., 2013) and consumers frequently encounter such claims. Such a claim was visually exposed in the stimuli, and accompanied by a statement in a smaller font noting that the product *contains 10^9 live probiotic bacteria Bifidobacterium animalis*. The second claim made in the stimuli was "*support in metabolism of fats*" (hereinafter the *fat metabolism claim*), accompanied by the words "*added biotin, which contributes to normal metabolism of fats and other macronutrients*", again in a smaller font. This claim is uncommon in the marketplace and was therefore new to most participants. This second claim is also interesting because the health relationship targets fat, a disqualifying nutrient, which was also one of the product attributes we studied.

Sugars and fat are two food constituents consumers pay most attention to when grocery shopping; some consumers stated that low-fat claims have a negative impact on their purchase decision because they expect such products to be less tasteful, while on the contrary many consumers had a positive reaction to products carrying a reduced sugar content claim (Patterson, Sadler, & Cooper, 2012). Nevertheless, both sugars and fat are usually recognised as disqualifying nutrients (Hoefkens et al., 2011) and commonly labelled on nutritional declarations.

Table 1

Attributes of yoghurts and their levels used in the conjoint analysis

Attribute	Attribute levels
Claim *"support in metabolism of fats"* (hereinafter the *fat metabolism claim*)	Yes No
Claim *"probiotics"* (hereinafter the *probiotic claim*)	Yes No
Sugar content per 100 g of product	4 g 10 g 16 g
Fat content per 100 g of product	0.1 g 1.5 g 3.5 g

2.3 Other measures

After the participants completed the conjoint study, they were presented with a questionnaire concerning their knowledge about probiotics and biotin, statements related to food purchasing decisions and yoghurt choices, and demographics. These measures enable a further insight into our sample of consumers, and are valuable when interpreting their yoghurt preferences.

The respondents' knowledge of biotin and probiotics was measured using a multiple-choice question in which they had to categorise the ingredient as either a mineral, vitamin, microorganism, antioxidant or fibre. Their opinions on statements related to food choices and yoghurts were measured using a 5-point Likert scale (1 - strongly agree; 2 - agree; 3 - neutral; 4 - disagree; 5 - strongly disagree), in most cases with an additional "Don't know" option (Table 2).

Finally, socio-demographic characteristics (age, education, number of household members, and gender) were collected.

2.4 Analysis

Conjoint analysis was conducted with CVA System V2.0 (Sawtooth). Since we used card rankings in our research, relative importance and part-worth utilities were estimated using Monotone regression analysis, which is appropriate for our set of data because it does not assume that the data represent anything more than rank orders.

Following the conjoint analysis, a cluster analysis based on the individual utilities was undertaken to identify groups (clusters) of individuals with similar preferences, but different from individuals in other groups (Müller & Hamm, 2014). To verify the differences amongst clusters in socio-demographic characteristics and consumers' responses in the questionnaire, the chi-square test and analysis of variance were used. Cluster analysis was carried out with the SPSS software (version 13.0).

3 Results

The final sample included 371 participants (47% male and 53% female) with different demographic characteristics: 60% had finished secondary school and 36% had a college degree or higher education. The age of the participants ranged between 14 and 82 years (average age 40.4 years) and the majority (65%) declared that they were solely or jointly responsible for grocery shopping in the household.

The majority of the consumers stated they consumed yoghurt at least a few times a week (68%). Probiotics, a common component of yoghurts in the marketplace, were recognised as microorganisms by 70% of consumers; 63% (strongly) agreed with the statement that probiotic yoghurts are healthier than regular ones (12% disagreed or strongly disagreed) (Table 2). On the contrary, only 37% of the participants were able to recognise biotin as a vitamin and 36% (strongly) agreed with the statement that yoghurts enriched with biotin are healthier than regular ones (14% disagreed or strongly disagreed, while 50% were unable to decide).

Table 2

Consumers' opinions on statements related to food choices, yoghurts and their constituents

Statement	N	Mean score[c]	Share (%) of response levels			
			1-2	3	4-5	Don't know

Taste is important when I make food-purchasing decisions.[a]	371	1.7	92%	6%	2%	N/A
Probiotic yoghurts are healthier than regular ones.[b]	371	2.4	63%	21%	12%	4%
Yoghurts enriched with biotin are healthier than regular ones.[b]	369	2.7	36%	30%	14%	20%
Yoghurts with a higher fat content taste better.[b]	369	2.4	61%	11%	24%	4%
Yoghurts with a higher sugar content taste better.[b]	370	3.1	37%	13%	49%	1%

[a] Measured using a Likert scale 1 (strongly agree) to 5 (strongly disagree) without “Don’t know” option
[b] Measured using a Likert scale 1 (strongly agree) to 5 (strongly disagree) with “Don’t know” option
[c] Mean score excluding consumers which selected “Don’t know” option.

The majority of consumers (92%) declared that taste is an important parameter when making food purchasing decisions. While 61% of the consumers (strongly) agreed that yoghurts with a higher fat content taste better (24% disagreed or strongly disagreed), only 37% (strongly) agreed that higher sugar levels contribute to a better taste (49% disagreed or strongly disagreed).

3.1 Importance of attributes and their levels

We investigated the importance of nutritional composition and the use of probiotic and fat metabolism claims on consumers' yoghurt preferences. Results of the part-worth utilities of attribute levels and the relative importance of individual attributes are shown in Table 3. Sugar and fat content have the strongest relative importance for the consumers (mean relative importance of 30% and 31%, respectively). The relative importance of the probiotic and the fat metabolism claims was lower, namely 20% for the probiotic claim and 19% for the fat metabolism claim.

Considering the mean part-worth utilities, the consumers generally preferred yoghurts with a low or medium sugar content as opposed to yoghurts with high sugar levels. Surprisingly, a high fat content was a more desirable product attribute than a medium or low fat content. Among the claims, a positive mean part-worth utility was observed for the probiotic claim (+5.2), while a negative one (-11.7) was found for the fat metabolism claim.

Table 3

The part-worth utilities of attribute levels and the relative importance of individual attributes

Attribute	Attribute level	Total
Fat metabolism claim	Yes	-11.7
	No	+11.7
	Relative importance (%)[a]	19.0
Probiotic claim	Yes	+5.2
	No	-5.2
	Relative importance (%)[a]	19.9
Sugar content per 100 g of yoghurt	4 g	+9.2
	10 g	+10.6
	16 g	-19.9
	Relative importance (%)[a]	30.4
Fat content per 100 g of yoghurt	0.1 g	-0.2
	1.5 g	-11.4
	3.5 g	+11.6
	Relative importance (%)[a]	30.7

[a] Mean relative importance for each attribute

3.2 Cluster analysis

Three clusters were derived using Ward's hierarchical cluster analysis with Euclidean distance. Analysis of variance (Kruskal-Wallis test, alpha level: $p = .05$) revealed statistically significant differences between the clusters in the attribute part-worth utilities (Table 4). Such utilities of each attribute of an individual cluster estimated in aggregate at the cluster level are presented in Table 4. The size and socio-demographic characteristics of each cluster are shown in Table 5.

As reported in Table 5, cluster 1 was composed of 117 consumers (32%). Those in this cluster preferred yoghurt with a low or medium sugar content, a high fat content and without probiotic and fat metabolism claims; they may be described as *traditional consumers*. Cluster 1 had the biggest share of females (58%).

Considering the preferences, cluster 3 (120 consumers, 32%) is more similar to cluster 1 than cluster 2. Consumers in both cluster 1 and 3 preferred yoghurts without a fat metabolism claim and with a lower sugar content. The main difference between clusters 1 and 3 is the consumers' preference for yoghurts with a probiotic claim, and fat content. Further, consumers in cluster 3 preferred the presence of a probiotic claim

and yoghurts with the lowest fat content. The latter is the most important attribute for them, with a mean relative importance of 35%. These consumers may be seen as *health-oriented consumers*.

Consumers in cluster 2 (134 consumers, 36%) also preferred yoghurts with the lowest fat content. Compared to cluster 3, the biggest difference was their preference for yoghurts with a fat metabolism claim, and a high sugar content. Consumers in cluster 2 were the only ones to show a strong preference for yoghurts with the highest sugar content. Only consumers in this cluster preferred both of the tested claims on yoghurts. Hence, they may be described as *claim seekers.* Consumers in clusters 1 and 2 differed in every level of each attribute. The only thing similar between these clusters was the highest relative importance of fat content.

We should note that selecting the number of clusters in cluster analysis is to some extent a question of judgement. If the number of clusters were increased in this study, cluster 1 (traditional consumers) would stay the same due to the participants' homogeneous yoghurt preferences, while the other two clusters could be further classified because of their dispersion and diversity in preferences for yoghurt traits.

Table 4

Part-worth utilities of each attribute per individual cluster

Attribute	Attribute level	Total	Cluster 1 (traditional consumers)	Cluster 2 (claim seekers)	Cluster 3 (health-oriented consumers)	***p*-value[a]**
Fat metabolism	Yes	-11.8	-45.0	14.2	-8.3	<.001
claim	No	11.8	45.0	-14.2	8.3	<.001
	Relative importance[b]	19.0	23.0	17.4	17.0	
Probiotic claim	Yes	5.2	-6.8	9.8	11.9	.001
	No	-5.2	6.8	-9.8	-11.9	.001
	Relative importance[b]	19.9	17.9	19.9	21.6	
Sugar content	4 g	9.2	23.2	-28.2	37.4	<.001
per 100 g of	10 g	10.8	25.3	-13.7	23.8	<.001
yoghurt	16 g	-19.9	-48.5	41.9	-61.1	<.001
	Relative importance[b]	30.4	26.1	30.1	35.0	
Fat content	0.1%	-0.2	-68.7	26.9	36.4	<.001
per 100 g of	1.5%	-11.4	21.3	-38.3	-13.2	<.001
yoghurt	3.5%	11.6	47.4	11.5	-23.3	<.001
	Relative importance[b]	30.7	33.0	32.6	26.3	

[a] Highly significant differences (p < .001)

[b] Mean relative importance for each attribute

Table 5

Size and characteristics of the clusters

	TOTAL	Cluster 1	Cluster 2	Cluster 3	*p*-value[a]
Cluster size	371	117 (32%)	134 (36%)	120 (32%)	
Gender					
Female	196	68	70	58	.316
Male	175	49	64	62	
Female/male ratio	1.12	1.39	1.09	0.94	
Average age	39.4	38.3	40.4	39.4	.592
Education					
Primary school	4%	6%	1%	4%	.236
High school	60%	55%	69%	56%	
Undergraduate	16%	17%	15%	17%	
Postgraduate	20%	22%	14%	23%	
Average number of household members	3.36	3.44	3.19	3.48	.405
Biotin correctly identified as a vitamin	37%	40%	37%	35%	.629
Probiotics correctly identified as microorganisms	70%	72%	72%	64%	.264

[a] No significant differences (p > .05)

4 Discussion

To determine how consumers perceive the presence of claims on products with a different nutritional composition, fruit yoghurt was selected as a base product to enable realistic variations of product attributes. Yoghurt is recommended as part of a healthy diet in many countries, including Slovenia (Smug, Salminen, Sanders, & Ebner, 2014; Eržen et al., 2014) and is as such considered as a healthy food.

It has previously been shown that consumers have a stronger preference for simple (Bitzios et al., 2011) and more familiar claims (Lahteenmaki et al., 2010). We therefore tested the effect of a familiar (*probiotic*) and an unfamiliar claim (*support in metabolism of fats*), which were visually exposed in the stimuli. We found that, when making a decision on which yoghurt to select, for the majority of the consumers the

content of fat and sugar in yoghurt is more important than the two tested claims. This indicates that the potential of disqualifying nutrients to influence consumers' food preferences is stronger than both unfamiliar and familiar tested claims, also when used on a relatively healthy base product such as yoghurt. The reason behind this might lie in consumers' independent interpretation of claims and nutritional composition information when making nutrition-related decisions (Garretson & Burton, 2000). However, we should mention that due to the conjoint design that was used (the number of nutrient attributes' levels was higher than the number of claims' levels) the results might be biased toward the nutrient composition.

We found that the consumers generally avoided yoghurts with the biotin-related fat metabolism claim. One main reason for such behaviour might be unfamiliarity with the tested claim and biotin itself. Namely, only 37% of the respondents were able to identify biotin as a vitamin and only 36% (strongly) agreed with the statement that yoghurts enriched with biotin are healthier than regular ones. Results from other studies also indicate consumers' unwillingness to accept a claim when they are unfamiliar with it (Lahteenmaki et al., 2010; Lin, 2008). Further, incomprehensible expressions and concepts can be confusing to consumers, which can negatively affect their food choice (Brunsø, Fjord, & Grunert, 2002; Svederberg, 2002). However, by using cluster analysis, we determined that there are consumers who are willing to accept unfamiliar claims. Respondents in cluster 2 (comprising 36% of the participants) favoured the fat metabolism claim, although 63% of them were unable to identify biotin as a vitamin, underlining that consumers differ in their preferences for health claims, even when these are unfamiliar.

On the contrary, the majority (70%) of our participants recognised probiotics as microorganisms. We should note that, to minimise the influence on the participants, this was measured after the sorting task (which included a card where the probiotic claim was accompanied by a note stating that yoghurt contains live probiotic bacteria; Fig. 1). Nevertheless, consumers are frequently exposed to probiotic claims, either on the labels of yoghurts and other functional foods, or by strong commercial advertising and even media reports (Annunziata & Vecchio, 2013; Pravst et al., 2013). Therefore, their familiarity with probiotics was expected. In addition, our survey showed that 63% of the respondents (strongly) agreed with the statement that probiotic yoghurts are healthier than those without probiotics. Consumers' prior knowledge of probiotics can be expected to affect their preferences for the probiotic claim. Interestingly, familiarity

with probiotics does not necessarily result in a higher positive part-worth utility for the probiotic claim. While consumers in cluster 2 showed a preference for the probiotic claim, those in cluster 1 had a negative preference for it, even though consumers in both clusters had a high familiarity with probiotics. Similarly, Bruhn et al. (2002) observed that some consumers believe that the consumption of probiotic yoghurts can be beneficial while others believed this to be unnecessary since a balanced diet is sufficient for the human body to function normally. These observations confirm conclusions that consumers' reactions to claims are strongly connected not only to their familiarity and knowledge of the constituent with a claimed effect, but also to their general interest in healthy eating generally, in specific food products (Brunsø et al., 2002; Lahteenmaki, 2013), and to their own subjective theories of health.

In many countries, including Slovenia, lowering the dietary intake of sugars and fat has become a major public health priority and is usually included in national dietary guidelines (Baghurst, 2007). The health risks of high sugar and fat intake are also commonly communicated in the mass media, and in public health campaigns. In addition, particularly the fat content of yoghurts was shown to have a major effect on consumers' healthfulness perception of yoghurt labels (Ares et al., 2013). Based on this, we expected the consumers would generally prefer yoghurts with a lower sugar and fat content. Considering the part-worth utilities for the entire sample (n = 371), the consumers' preference for yoghurts with a low/medium sugar content is consistent with previous reports (Chollet, Gille, Schmid, Walther, & Piccinali, 2013). Even though the consumers generally preferred yoghurts with a lower sugar content, consumers in cluster 2 favoured yoghurts with the highest sugar content. Further, sugar content was second most important attribute for them when choosing a yoghurt (mean relative importance of 30.1%).

Surprisingly, the consumers generally preferred yoghurts with high fat content. Several reasons might explain this preference, including their taste-related expectations; 92% of the consumers in our study stated that taste is an important criterion when choosing a food product and 61% (strongly) agreed that yoghurts with a higher fat content taste better. It was previously reported that consumers are generally not prepared to trade taste for health (Verbeke, 2006). In addition, they believe that removing something from a food product results in counterbalancing by adding something else to preserve the taste. Moreover, many consumers tend to choose products with a higher fat content out of habit (Chan, Patch, & Williams, 2005).

Hence, consumers are probably aware that 3.5% is the normal amount of fat in yoghurts and anything less could compromise the sensory traits. We should also note that the variation in the tested fat levels (0.1 – 3.5 g) was lower than in the tested sugar levels (1.5 – 16 g).

The cluster analysis provided us with further insight into this issue; we showed that the *traditional consumers* in cluster 1 preferred high fat yoghurts, while consumers in the other two clusters preferred low fat yoghurts. In addition, the *traditional consumers* (cluster 1) disregarded any claims on yoghurt. The most important attribute for them was fat at a level of 3.5%. These consumers might be sceptical about adding different active ingredients to the yoghurt; therefore, the most suitable yoghurt for them is one without any claims, with a high fat and low to medium sugar content. Even though the content of sugar and fat were the most important attributes for the *claim seekers* (cluster 2), they were also willing to accept both of the tested claims. This segment of consumers stands out the most based on their health claim preference. *Health oriented consumers* (cluster 3) preferred a lower fat and sugar content and they might thus be more susceptible to nutrition claims.

Claim seekers are the most willing to accept yoghurts enriched with active ingredients and, most importantly, they could be influenced by health claims. If healthier yoghurt carries a claim, this segment of consumers would likely make healthier choices. On the contrary, if less healthy yoghurt is labelled with a claim, these consumers could be misled to select a less healthy product. Such risks can be avoided if the use of health claims is only allowed on foods with an overall good nutritional composition. Nutrient profiling is already used to assure this in some countries, for example in Australia and New Zealand (Devi et al., 2014), and our results show that it would also be useful to implement nutrient profiles in the European Union.

The present study was conducted using an experimental design involving a manipulated composition of yoghurts and the use of cards in a sorting task. However, the product attributes (including fat and sugar levels) were carefully selected to reflect the composition of yoghurts in the marketplace. Presenting yoghurts on cards does not reflect a real-life situation for consumers and limits their ability to interact with a product. The visual field on the actual yoghurts differs from the yoghurts presented on the cards where all the information could be seen by the consumers without the need to further handle the product. Reflecting the objective of the study to determine how consumers perceive the presence of claims on products with a different nutritional composition,

we deliberately excluded the brand name, price and other product attributes, but we should note that in practice these attributes would critically affect purchasing decisions. The lack of the brand name in particular could result in increased use of the label since consumers are unable to rely on their familiarity with the product (Graham & Jeffery, 2011). In addition, while we tested two different claims (a familiar and a non-familiar one) with yoghurt as a base product, the results cannot be simply extrapolated to the use of other claims and other base products. Further, while use of the orthogonal design enabled us to minimise the number of yoghurt profiles, the limitation of such an approach lies in its inability to estimate interactions between yoghurts with different claims and same nutrient content levels. In addition, the interviews took place at individual respondents' homes, where they were given unlimited time to process the information and rearrange the cards. Due to the shortage of time when shopping, consumers' attention to food labels may decrease (Van Herpen & Van Trijp, 2011) which can influence their buying decisions. However, using product cards without a time limitation can give a clearer image of consumers' preferences for specific information used on food labels. Moreover, consumers tend to look longer at a food label when novel food products are introduced to them (Van Herpen & Van Trijp, 2011).

5 Conclusions

The results suggest that while consumers generally consider the nutrition composition of yoghurt to be more important than the tested claims, some groups of consumers are more sensitive to the use of health-related statements. We also observed that different claims hold very different potential to influence consumers' purchasing decisions. We detected the consumers' general positive preference for (a familiar) probiotic claim, and a negative preference for (a non-familiar) fat metabolism claim. Significant differences in the preferences were observed in specific groups of the consumers. While the *traditional consumers* in cluster 1 preferred yoghurt without the probiotic and the fat metabolism claims, consumers in the other clusters were more susceptible to the use of claims. This should be further researched since these consumers are at a higher risk of being misled to select foods with a poor nutritional composition when they are labelled with health claims. The introduction of nutrient profiles would particularly benefit those groups of more vulnerable consumers.

We believe these results are not only relevant to the field of research of the perception of functional foods, but also support further regulatory decisions related to the use of nutrition and health claims on foods.

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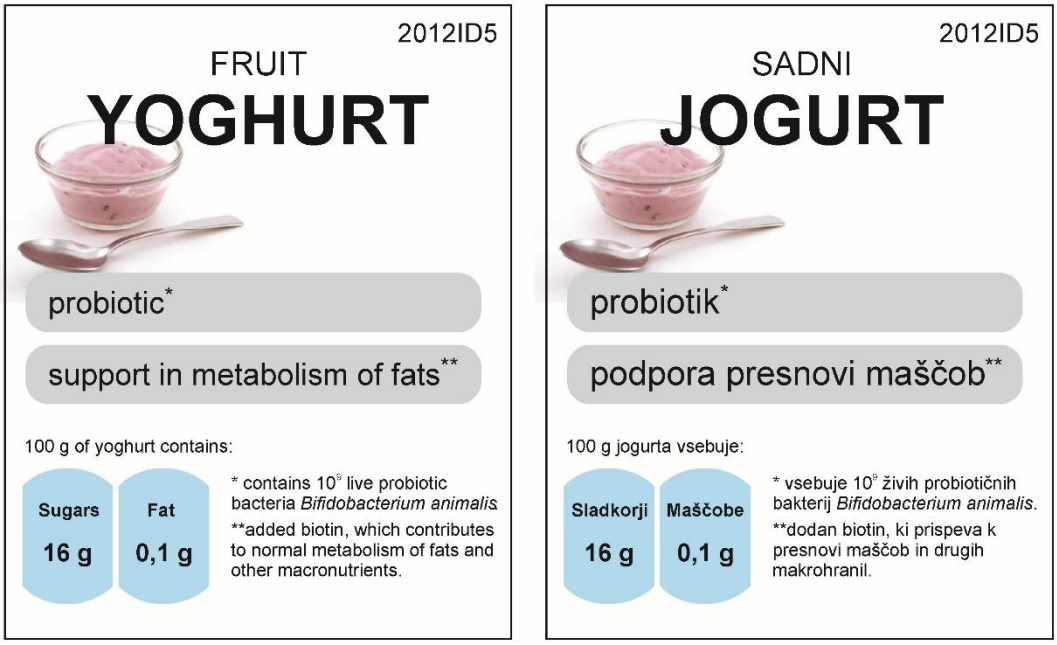
Fig. 1: An example of the stimuli (English translation and original in Slovenian)



English translation | Original (Slovenian)