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Research Report

Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods

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Abstract

The aims of the present study were to study the effect of different carriers and enrichments on the perceived healthiness and willingness to try functional foods; and to evaluate the effect of age, gender and motives underlying food choice. Participants had to evaluate different functional food concepts and had to answer a food choice questionnaire. Results showed that carrier products had the largest effect on consumers' perception of healthiness and willingness to try of the evaluated functional foods concepts. The highest positive relative utilities were achieved when the enrichment was a functional ingredient inherent in the product. Furthermore, gender, age and motives underlying food choice affected the preference patterns for the evaluated functional foods concepts, but it depended on the carrier and enrichment considered, suggesting that functional foods might not be accepted by all the consumers and that they could be tailored for certain groups.

Keywords: Functional foods; Conjoint analysis; Food choice; Carriers; Enrichments

Introduction

The functional foods market is growing worldwide, new products are being launched continuously and competition is becoming more intense (Menrad, 2003). To survive the competition, a functional food product has to be bought repeatedly, and therefore it has to be developed considering consumers wants and needs. Therefore, consumer research is crucial in the development of functional foods.

As consumers can only be expected to consider substituting conventional with functional foods if the latter are perceived as comparatively healthy, consumers' perceptions of the healthiness of the products, processes and enrichments involved in the production of functional foods are crucial in determining consumers' acceptance of this type of foods (Bech-Larsen, Grunert, & Poulsen, 2001). Some authors suggested that the acceptance of functional foods depends on the basic product that serves as carrier for the functional ingredient (Jonas & Beckmann, 1998; Poulsen, 1999; van Kleef, van Trijp, & Luning, 2005). Despite this, there is little research about which combinations of health claims and food carriers are most appealing to consumers (van Kleef et al., 2005). Previous research (Bech-Larsen & Grunert, 2003; Roe, Levy, & Derby, 1999) showed that the evaluation of health claims is partly determined by healthiness perceptions of the base product, which would suggest that some health claims combine better with some food products. However, while some authors suggest that consumers find enrichment of 'non-healthy' foods more justified than enrichment of foods which are perceived as healthy per se (Bech-Larsen & Grunert, 2003); other authors (Balasubramanian & Cole, 2002; van Kleef et al., 2005) have found that consumers see products that are intrinsically healthy as credible carriers of functional messages, and that they show a more positive attitude when the functional ingredient is inherent in the original product (Poulsen, 1999). Overall, the research

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evidence is limited and inconsistent and what is available is based on selective claim–product combinations only (van Kleef, van Trijp, Luning, & Jongen, 2002).

Some demographic background variables, such as gender, age and education could have some influence on food choice behaviour and functional foods acceptance. However, according to Dagevos (2005), their explanatory power has been decreasing in developed countries.

On the other hand, food choice is a complex process that influences food production systems and consumers' nutrient intake as it determines what foods consumers buy and eat (Furst, Connors, Bisogni, Sobal, & Winter Falk, 1996). Therefore, underlying food choices are important for food product development, marketing and impact of functional foods.

The aims of the present work were to study: (a) the effect of different food carriers and different enrichments on the perceived healthiness and willingness to try functional foods; (b) the effect of socio-demographic variables such as age and gender on the perception of healthiness and willingness to try; and (c) the influence of consumers' motives underlying food choice in their willingness to try the selected functional foods.

Materials and methods

Subjects

Data was collected through a survey of 200 consumers, who were randomly recruited at shopping areas, universities and public places. The sample included 103 females (51.5%) and 97 males (48.5%), ranging in age from 18 to 84 years (mean 37.7, standard deviation 15.2). Table 1 describes the characteristics of the participants by gender, age group, education, marital status, household dimension, and number of children in household.

Table 1
Demographic details of the achieved sample

	Total (*n*)	%
Gender		
Men	97	48.5
Women	103	51.5
Age		
18–29 years	68	34.0
30–44 years	63	31.5
45 years and more	69	34.5
Education		
Primary school only	21	10.5
High school	128	64
University	51	25.5
Marital status		
Single	112	56.0
Married	59	29.5
Divorced	22	11.0
Widowed	7	3.5
Household dimension		
1	28	14.0
2	64	32.0
3 or more	108	54.0
Number of children in household		
0	134	67.0
1 or more	66	33.0

Material

Conjoint analysis

Different functional foods were defined as concepts consisting of two dimensions: carriers and enrichments. The carriers corresponded to five different food products, popular in Uruguay: honey, yogurt, vegetable cream soup, dulce de leche (a type of sweetened condensed milk, produced by concentrating milk at atmospheric pressure in the presence of added sucrose) and marmalade. The considered enrichments were: soluble fibre, calcium, antioxidant extracts and iron. The concepts were formed following a full factorial experimental design (5×4), resulting in a set of 20 food concepts. In each questionnaire concepts were presented following a unique randomized order, which further eliminated the possibility of order effects.

Concepts were presented to participants, who were asked to score the perceived healthiness of the different concepts, using a 7-box scale labelled on the left with "not at all healthy" and on the right with "very healthy", and to score their willingness to try them using a 7-box scale labelled on the left with "I would definitely not try it", on the middle with "Maybe yes, maybe not" and on the right with "I would definitely try it". A sample of the scales used in the present study is shown in Fig. 1.

Food choice

The Food Choice Questionnaire (FCQ) (Steptoe, Pollard, & Wardle, 1995) was developed in England, a developed European country. Thus, in order to evaluate if consumers in Uruguay, a developing Latin American country, considered all the items of the original FCQ while selecting their food a preliminary study was performed. A list of items was developed, containing 50 items, the 36 items from the original FCQ, translated into Spanish, plus 14 items that were not included in this questionnaire, generated through consideration of existing literature and discussion with nutritionists and food technologists. A group of 50 consumers, approximately 50% male and 50% female, ages ranging between 18 and 70 years were asked to read the items in the list and to indicate the items that they consider when selecting the food they eat everyday. For the design of the final questionnaire, only those items that were mentioned by at more than one consumer were considered. In the case of items having the same meaning, only one of them was considered (for example "*Takes no time to prepare*" and "*Is easy to prepare*").

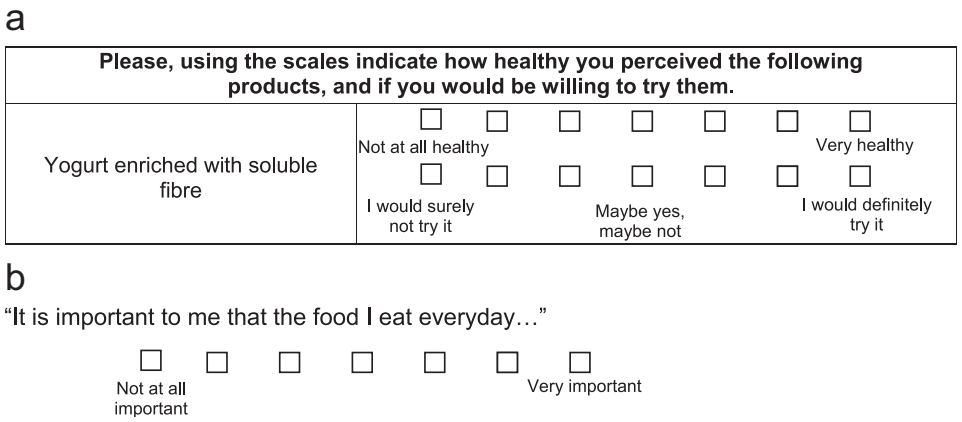

Fig. 1. Sample of the scale used by participants to: (a) rate the item importance in the "Food choice" questionnaire, and (b) to rate the perceived healthiness and willingness to try of different functional food concepts in the conjoint study.

Therefore, the FCQ developed by Steptoe et al. (1995), was modified by adding some items, deleting some of the original items; resulting in a questionnaire with a total of 22. Table 5 displays the wording of items used in the study. Participants were asked to rate the importance of each of the 22 items of the questionnaire by endorsing the statement "It is important to me that the food I eat everyday…" using a 7-box scale labelled on the left with "not at all important" and on the right with "very important", as shown in Fig. 1.

Socio-demographic data was also collected for participants' characterization.

Data analysis

Conjoint analysis

Analysis of variance (ANOVA) was performed on data from perceived healthiness and willingness to try of different concepts, using consumer, carrier, enrichment and the interaction carrier∗enrichment as variation factors. For evaluating differences by socio-demographic characteristics, analysis of variance for each factor was performed on scores using the categories of each socio-demographic characteristic as variation factor. When the effects were significant, honestly significant differences were calculated using Tukey's test. Differences were considered significant when $p \leqslant 0.05$.

Food choice questionnaire

An exploratory principal factor analysis with varimax rotation was performed on the scores for the 22 items of the food choice questionnaire, to reduce the original items into different factors. Factors with eigenvalues over 1 were considered significant (Rust & Golombok, 1989). Items with loadings above 0.40 were considered significant and those above 0.50 very significant (Hair, Anderson, & Tatham, 1987). Factor scores were calculated by averaging unweighted ratings for individual items in each factor. Analysis of variance was performed on factor scores using scores as variation factor. This same analysis was performed on the individual item ratings.

In order to identify different food choice patterns among consumers, a hierarchical cluster analysis was performed on the scores for the 22 evaluated items of the Food Choice Questionnaire using Euclidean distances and Ward's method of aggregation, performed on centred ratings (individual median subtracted).

All analyses were performed using Genstat for Windows Discovery Edition 2 (Lawes Agricultural Trust, Rothamsted, UK) statistical software package.

Results and discussion

Conjoint analysis

Highly significant differences ($p < 0.001$) were found in the perceived healthiness of the different functional food concepts. As shown in Fig. 2, yogurt enriched with calcium showed the highest perceived healthiness. ANOVA revealed that the main effects carrier and enrichment were highly significant ($p < 0.001$), showing the effect of both base product and functionality on perceived healthiness (Table 2). The carrier∗enrichment interaction was also significant (Table 2), which indicates that certain combinations of carriers and enrichments were evaluated with a different perceived healthiness than would be expected from the separate carrier and enrichment evaluations. Therefore, a certain enrichment might not have the same effect on the perceived healthiness when added to different carriers. While van Kleef et al. (2005) reported that Dutch consumers considered the contributions of health claims and carriers independently from each other, Uruguayan consumers seemed to evaluate the healthiness of enrichments differently according to the product in which they are incorporated. This suggests that in Uruguay functional food design must be studied separately for each type of carrier product, as reported by Bech-Larsen and Grunert (2003) for Danish, Finnish and American consumers.

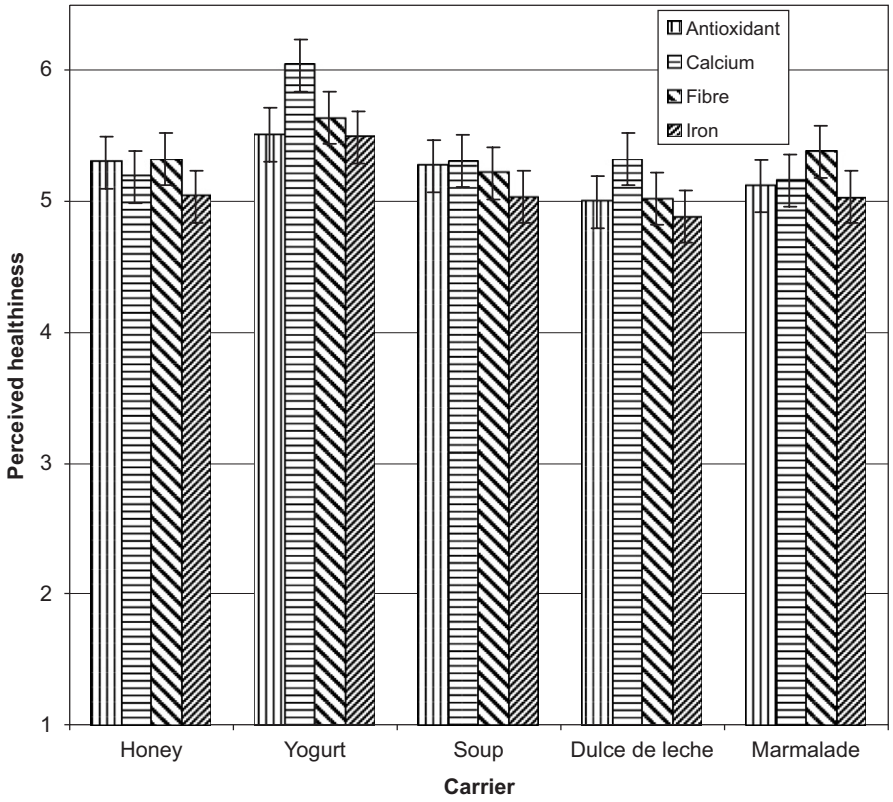

Fig. 2. Average scores for perceived healthiness of the evaluated functional food concepts. Vertical bars represent least significant differences according to Tukey's test ($p \leqslant 0.05$)

Table 2
ANOVA results for perceived healthiness and willingness to try

	Consumer	Carrier	Enrichment	Carrier*enrichment
Perceived healthiness	17.7***	29.1***	5.3**	2.2**
Willingness to try	26.7***	44.1***	17.4***	3.4***

***Highly significant differences ($p \leqslant 0.001$); **very significant differences ($p \leqslant 0.01$).

Thus, the perceived healthiness of functional food might depend on the characteristics of the consumers and the type of carrier and enrichment considered, and therefore no general trend can be established. As shown in Fig. 2, for all the considered enrichments, yogurt was perceived as the healthiest product, showing the impact of the image of the carrier product on how enrichments are perceived, which is consistent with the image of healthy product of yogurt. Table 3 shows the relative utility for the main effects and the interactions. Yogurt showed the highest relative utility for perceived healthiness, suggesting that enrichment of yogurt might be perceived as positive for consumers despite being perceived as inherently healthy, in contrast with results reported by Bech-Larsen and Grunert (2003), but in agreement with Poulsen (1999). This might also be attributed to the fact that in Uruguay there is marketing activity to increase the healthy image of yogurt. Moreover, these results suggest that Uruguayan consumers might perceive healthy products as credible carriers for functional messages. Furthermore, prior beliefs about the healthiness of the carrier product might override the effect of enrichments. This last statement is reaffirmed by the fact that the carrier's main effect on perceived healthiness was larger than those for enrichments or interactions, suggesting that products had the largest effect on consumers' perception of healthiness of the evaluated functional foods concepts.

Furthermore, calcium and fibre seemed to be the most appealing enrichments for consumers. In the case of calcium this could be attributed to general knowledge of the functions that it plays in organism due to the effect of public health campaigns, while in the case of fibre to a perceived need and a growing concern about this component. On the other hand, iron showed the highest negative relative utility, suggesting that the addition of iron caused a decrease in perceived healthiness when compared to the

Table 3
Conjoint analysis results (relative utility scores) for perceived healthiness and willingness to try

Attributes and levels	Perceived healthiness	Willingness to try
Carrier		
Money	−0.051	−0.220
Yogurt	0.404	0.456
Cream soup	−0.057	−0.099
Dulce de leche	−0.208	−0.017
Marmalade	−0.088	−0.121
Enrichment		
Fibre	0.054	0.042
Calcium	0.140	0.080
Antioxidants	−0.025	0.026
Iron	−0.170	−0.149
Interaction effects		
Honey∗fibre	0.056	0.178
Honey∗calcium	−0.160	−0.215
Honey∗antioxidants	0.110	0.079
Honey∗iron	−0.005	−0.041
Yogurt∗fibre	−0.084	−0.093
Yogurt∗calcium	0.230	0.164
Yogurt∗antioxidants	−0.135	−0.077
Yogurt∗iron	−0.010	0.008
Cream soup∗fibre	−0.038	−0.033
Cream soup∗calcium	−0.039	−0.067
Cream soup∗antioxidants	0.086	0.078
Cream soup∗iron	−0.009	0.023
Dulce de leche∗fibre	−0.087	−0.200
Dulce de leche∗calcium	0.122	0.212
Dulce de leche∗antioxidants	−0.033	−0.029
Dulce de leche∗iron	−0.003	0.016
Marmalade∗fibre	0.153	0.149
Marmalade∗calcium	−0.153	−0.094
Marmalade∗antioxidants	−0.028	−0.050
Marmalade∗iron	0.027	−0.005

other alternatives. These results might suggest that consumers did not perceive a need to increase their iron intake, probably due to high average intake of red meat (30 kg/person year) (Ilundain, Lema, & Peyrou, 2004). Despite this, medium class Uruguayan consumer might not be interested in functional foods enriched with iron.

As shown in Table 3, the effect of the considered enrichments on perceived healthiness depended on the product considered. None of the enrichments had a significant influence on the perceived healthiness of cream soup, suggesting that this product might not benefit from the addition of functional ingredients. For yogurt and dulce de leche, the highest positive relative utilities in perceived healthiness were found when calcium was considered as enrichment. The relative utility for calcium in dulce de leche was higher than that for calcium in yogurt, probably due to the fact that dulce de leche is perceived as less healthy than yogurt, and the addition of calcium improves its healthy image. On the other hand, a high positive relative utility was found when fibre was added to marmalade and when antioxidants were added to honey; whereas a negative relative utility was found by adding calcium. Therefore, for each carrier product, the highest positive relative utilities in healthiness were achieved when the functional ingredient was inherent in the original product (calcium in milk, fibre in marmalades, antioxidants in honey). These results are in agreement with those reported by Poulsen (1999) and Roe et al. (1999).

Regarding willingness to try, similar results from those of perceived healthiness were obtained. As shown in Table 2, ANOVA showed that the main effects carrier and enrichment had a highly significant effect ($p<0.001$), showing the effect of both carrier and enrichment on the willingness to try. As shown in Fig. 3, yogurt enriched with calcium showed the highest perceived healthiness. Table 3 shows the relative utility for the main effects and the interactions for willingness to try, showing similar results from those found by analysing data from perceived healthiness. For each product, the highest relative utilities on willingness to try were found when the enrichments were inherent in the original product. These results show the relationship between the perception of healthiness and willingness to try functional foods. Perceived healthiness scores were linearly correlated with willingness to try scores ($R^2 = 0.767$, $p<0.001$), confirming that the consumption of functional foods might be related to how healthy consumers perceive them. However, willingness to try did not only depended on perceived healthiness. The relative utility for willingness to try of honey was negative and much lower than the relative utility for perceived healthiness (−0.220 vs. −0.051), while the opposite trend was found for dulce de leche, having a relative utility for willingness to try of −0.017 and a relative utility for perceived healthiness of −0.208. These results suggest that although consumers might have perceived honey as healthier than dulce de leche (probably due to its relatively high fat content), they might be more willing to try dulce de leche with different enrichments than enriched honey, maybe because honey is perceived as a natural food, without any added ingredients.

According to van Kleef et al. (2005), willingness to try functional food is driven by its attractiveness, credibility and uniqueness, which suggests that not only the healthy image of a functional food determines its consumer acceptance.

Influence of socio-demographic variables

As shown in Table 4, different gender and age groups showed different preference patterns for the functional foods concepts with different carriers and enrichments, showing the influence of socio-demographic variables such as gender and age in determining the acceptance of functional foods.

Women gave significantly ($p<0.05$) higher perceived healthiness scores to functional foods concepts with yogurt, dulce de leche and marmalade than men (Table 4). Therefore, women had a more positive attitude towards functional foods with yogurt and marmalade as carrier products than men, as these products showed a higher

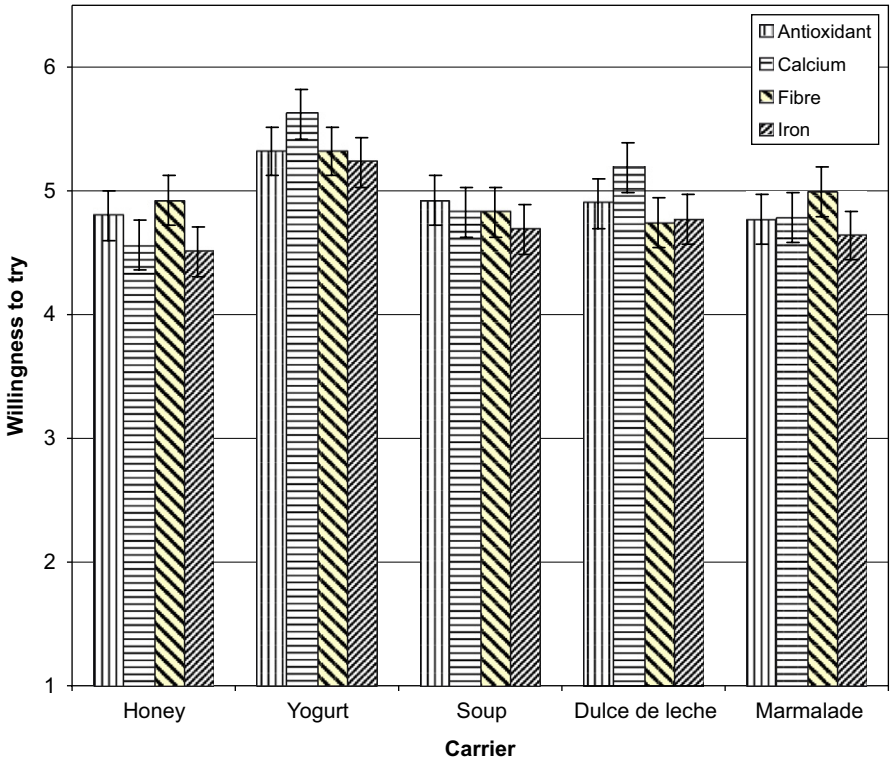

Fig. 3. Average scores for willingness to try the evaluated functional food concepts. Vertical bars represent least significant differences according to Tukey's test ($p \leqslant 0.05$).

score for women than for men both for perceived healthiness. Besides, men had a more positive attitude towards functional foods with honey and cream soup as carriers than women, as they gave higher scores for willingness to try. These results suggest that differences in the perception of healthiness and willingness to try functional foods exist between males and females, and that different products might be attractive for one or the other gender. Regarding enrichments, although both males and females showed the same preference pattern, women showed a more positive attitude towards concepts enriched with fibre and iron, which could be attributed to a higher perceived need for these nutrients (Table 4). Although significant differences ($p < 0.001$) were found between the scores given by women to the perceived healthiness of the concepts with different enrichments, no significant differences were found in their willingness to try scores, suggesting that willingness to try functional foods might not be only affected by perceived healthiness.

Scores for perceived healthiness and willigness to try also varied with age (Table 4). Younger consumers seemed to have a more positive attitude towards dulce de leche and marmalade as carriers, as perceived healthiness scores for concepts with dulce de leche and willingness to try scores for concepts with marmalade were significantly higher for consumers between 18 and 29 years than those with more than 45 years. Thus, sugary functional foods, such as dulce de leche and marmalade, with functional ingredients might be targeted to young people, and the type of enrichment might be selected considering only this population. This segment of consumers gave high scores for yogurt functional products, showing that they might accept functional dairy products. No significant differences were found between the perceived healthiness of the different enrichments with age, showing that the three age groups evaluated the healthiness of the enrichments in the same way. Regarding intention to try, older people (people with more than 45 years) were less positive to enrichment with iron than the other two age groups, showing that this segment was less interested in increasing their iron intake.

According to some authors (Bogue & Ryan, 2000; Poulsen, 1999), the most positive group towards functional foods are women and middle-aged or elderly consumers. However, in the present study the attitude towards the evaluated functional foods concepts depended on the carrier and type of enrichment considered, suggesting that functional foods might not be accepted for all the consumers and that they could be tailored for certain groups. This suggests the need for further study using similar methodology on targeted population groups, in order to identify the most appropriate carriers and enrichments for particular groups. Furthermore, results related to different perception of functional foods concepts with gender and age suggest the importance of segmentation and studying the perception of particular groups when designing functional foods.

Table 4
Average scores for perceived healthiness and willingness to try by gender and age

Attributes and levels	Gender			Age			
	Men	Women	*F*	18–29 years	30–44 years	45 years and more	*F*
Perceived healthiness							
Carrier							
Honey	5.13^{b,c}	5.28^{b}	1.9 (NS)	5.33^{a,b}	5.17^{b}	5.25^{b,c}	0.5 (NS)
Yogurt	5.46^{a}	5.86^{a}	14.9***	5.67^{a}	5.61^{a}	5.79^{a}	1.0 (NS)
Cream soup	5.25 ^{a,b}	5.25^{b}	0.6 (NS)	5.00^{c}	5.18^{b}	5.35^{b,c}	1.7 (NS)
Dulce de leche	4.91^{d}	5.19^{b}	6.1*	5.46^{a,b}	5.01^{b}	5.00^{c}	3.6*
Marmalade	5.03^{c,d}	5.31^{b}	6.5*	5.25^{b}	5.13^{b}	5.21^{b,c}	0.5 (NS)
Enrichment							
Fibre	5.18^{a}	5.44^{a}	6.8**	5.30^{a}	5.24^{a,b}	5.50^{a}	2.5 (NS)
Calcium	5.32^{a}	5.48^{a}	2.8 (NS)	5.50^{a}	5.38^{a}	5.40^{a}	0.3 (NS)
Antioxidants	5.14^{a,b}	5.32^{a,b}	3.2 (NS)	5.14^{a}	5.21^{b}	5.34^{a}	1.9 (NS)
Iron	4.98^{b}	5.20^{b}	5.0*	5.30^{a}	5.11^{b}	5.05^{b}	1.2 (NS)
Willingness to try							
Carrier							
Honey	4.87^{b}	4.53^{c}	6.2*	4.73^{b,c}	4.80^{b}	4.40^{c}	2.8 (NS)
Yogurt	5.29^{a}	5.44^{a}	1.3 (NS)	5.35^{a}	5.38^{a}	5.36^{a}	0.1 (NS)
Cream soup	4.97^{b}	4.86^{b}	5.2*	4.45^{c}	4.87^{b}	4.84^{b}	1.8 (NS)
Dulce de leche	4.87^{b}	4.67^{b,c}	0.4 (NS)	5.1^{a,b}	4.92^{b}	4.70^{b,c}	2.9*
Marmalade	4.80^{b}	4.79^{b,c}	0.1 (NS)	4.92^{b}	4.87^{b}	4.32^{c}	4.7**
Enrichment							
Fibre	5.07^{a}	5.44^{a}	1.1 (NS)	4.71^{a}	5.01^{a}	4.92^{a}	1.1 (NS)
Calcium	5.02^{a,b}	5.48^{a}	1.6 (NS)	4.99^{a}	5.04^{a}	4.89^{a}	0.6 (NS)
Antioxidants	4.97^{a,b}	5.32^{a,b}	0.3 (NS)	4.56^{a}	4.99^{a}	4.97^{a}	2.5 (NS)
Iron	4.84^{b}	5.20^{b}	1.4 (NS)	4.86^{a}	4.87^{a}	4.47^{b}	4.3*

Values within one column with different superscripts are significantly different according to Tukey's test ($p \leqslant 0.05$).
F: ratio in Analysis of Variance between groups of demographic variable. ***Highly significant differences ($p \leqslant 0.001$); **very significant differences ($p \leqslant 0.01$); *significant differences ($p \leqslant 0.05$); NS, not significant ($p > 0.05$).

Food choice

An exploratory factor analysis was performed on the 22 items of the modified "Food Choice" questionnaire to reduce the original items into different factors. This analysis resulted in 7 factors which accounted for 54.48% of the variance, with eigenvalues ranging from 7.3 to 1.4. Table 5 summarizes the factor analysis after varimax rotation. The resulting factors were: *Health and nutritional value*, S*ensory appeal*, *Weight control*, *Familiarity*, *Price and convenience*, *Feeling good and safety*, and *Natural content*.

In order to quantify the importance of the resulting factors, scores for each factor were calculated as previously described, yielding values from 1 to 7. Factor average ratings are shown in Table 6. *Feeling good and safety* was the most important factor for Uruguayan consumers, followed by *sensory appeal* and *health and nutrient content*. This might show the importance of non-sensory factors in determining the decisions people make with respect to what they eat. Furthermore, the high importance of health in determining food choice for Uruguayan consumers might suggest that functional foods could reach an important market segment in Uruguay.

Cluster analysis

An agglomerative hierarchical cluster analysis based on scores given to the different FCQ items was carried out to identify segments of consumers with different choice patterns. Three clusters were identified: cluster 1, composed of 75 consumers, cluster 2 with 50 consumers and cluster 3 with 75 consumers.

Highly significant differences ($p < 0.001$) were found in the scores of the seven choice factors between the clusters (Table 6), suggesting that the three identified clusters might give different importance to the evaluated factors and had different choice patterns.

As shown in Table 7, clusters significantly ($p < 0.001$) differed in their gender and age distribution. Cluster 1 was mainly composed of men (65%) and young people, showing the lowest average age (32.9 years). 58% of women in this cluster were between 18 and 29 years, while 47% of men in this cluster had ages in this range. Therefore, Cluster 1 was basically composed of young people and men, who probably lived with other people responsible for food selection and food preparation. People in this cluster consider mainly *health and nutrient content*, as well as *sensory appeal* for selecting the food they consume everyday. This group of people did not seem to be

concerned about the use of natural ingredients, the control of their weight, familiarity or the convenience of the food they eat. The lack of concern about convenience might be attributed to the familiar structure of Uruguayan society, in which women are responsible for selecting what to eat and preparing meals at home. On the other hand, men and young people do not care much for this factor, as they usually eat what women prepare.

Cluster 2 showed a significantly higher ($p<0.001$) average age than Cluster 1 (38.1 years), and was composed both by men and women living mainly in households composed of more than three people (Table 7). For these consumers *Health and nutrient content*, *Natural content* and *Sensory appeal* were the basic determinants of their food choices. This segment of consumers seemed to be particularly concerned about the use of additives and natural ingredients, scoring this factor as high as sensory appeal and health. *Familiarity* and *Price and convenience* were the least important factors in determining food choice.

Finally, Cluster 3 was composed mainly by women (67%), and showed the largest average age (42.3 years). This cluster was also composed of people living alone, as 68% of them were part of this cluster. Cluster 3 gave the highest scores to all factors ($p<0.05$), showing that food choice was governed by multidimensional reasons . Apart from health and sensory appeal, these consumers seemed to

Table 5
Item and factor loadings for the factor analysis of the "Food Choice" questionnaire

Factor and items	Loading	Explained variance (%)
Factor 1—Health and nutritional value		28.49
3. Contains a lot of vitamins and minerals	0.93	
2. Contains a high nutritional value	0.76	
8. Keeps me healthy	0.62	
14. Is high in protein	0.59	
Factor 2—Sensory appeal		9.63
5. Tastes good	0.78	
22. Has a pleasant texture	0.76	
15. Looks nice	0.50	
Factor 3—Weight control		4.80
11. Helps me control my weight	0.75	
18. Is low in calories	0.71	
13. Is low in fat	0.58	
Factor 4—Familiarity		4.48
16. Is familiar	0.69	
19. Is from a well known brand	0.54	
17. Is made in Uruguay	0.53	
Factor 5—Price and convenience		2.59
9. Is not expensive	0.62	
1. Is easy to prepare	0.56	
12. Has a long shelf life	0.54	
21. Is easily available in shops and supermarkets	0.52	
Factor 6—Feeling good and safety		2.66
7. Makes me feel good	0.61	
6. Makes me feel safe and trusty	0.55	
Factor 7—Natural content		1.83
10. Contains no artificial ingredients	0.64	
4. Contains no additives	0.53	
20. Contains natural ingredients	0.53	

Item numbers refer to the order in which statements were presented in the questionnaire.

Table 7
Demographic details of the identified clusters

	Cluster 1 ($n=75$) (%)	Cluster 2 ($n=50$) (%)	Cluster 3 ($n=75$) (%)	χ^2
Gender				15.393***
Men	65	56	33	
Women	35	54	67	
Age				22.721***
18–29 years	60	34	23	
30–44 years	17	28	33	
45 years and more	23	38	44	
Household dimension				14.553*
1	7	8	25	
2	40	30	25	
3 or more	53	62	50	

***Highly significant differences ($p\leqslant0.001$); *significant differences ($p\leqslant0.05$).

Table 6
Average scores for the importance of the factors of the Food Choice questionnaire, for the whole sample and for each of the identified clusters

Factor	Whole sample	Cluster 1	Cluster 2	Cluster 3
Factor 6—Feeling good and safety	6.2[a]	5.7[a]	6.2[a]	6.7[a]
Factor 2—Sensory appeal	5.8[b]	5.2[b]	5.8[b]	6.3[b,c]
Factor 1—Health and nutritional value	5.7[b]	4.8[c]	5.9[b]	6.4[b]
Factor 7—Natural content	5.4[c]	4.1[d]	6.1[a,b]	6.1[c,d]
Factor 5—Price and convenience	5.1[d]	4.3[d]	4.8[d]	5.9[d]
Factor 3—Weight control	4.9[d]	3.5[e]	5.4[c]	5.9[d]
Factor 4—Familiarity	4.4[e]	4.0[d]	4.7[d]	5.1[e]

Values within one column with different superscripts are significantly different according to Tukey's test ($p\leqslant0.05$).

give a great importance to *Price and convenience*, scoring this factor approximately 1.3 points higher than the rest of the clusters, probably due to the fact that they are in charge of food preparation and selection at their homes. Furthermore, this segment of consumers seemed to be particularly concerned about the use of additives and natural ingredients, scoring this factor as high as sensory appeal and health. This group gave significantly higher ratings to *weight control* than the other clusters, being concerned about their image.

This variation in the relative importance of different factors for different segments of the population may make it possible to create food with different profiles for each of these distinct groups. Besides, the relative importance given to different factors could be used to promote functional foods in different ways to different population sectors.

Relationship between motives for food choice and willingness to try functional foods

Clusters identified in the FCQ showed different preference patterns for the evaluated functional food concepts. Main effects' relative utilities for willingness to try are shown in Fig. 4. Cluster 1 showed positive relative utilities for yogurt and dulce de leche as carriers, and for calcium and antioxidants as enrichments. This group gave the lowest importance to *health and nutritional value* and *feeling good and safety* in their food choices. However, they seemed to have a positive attitude towards functional

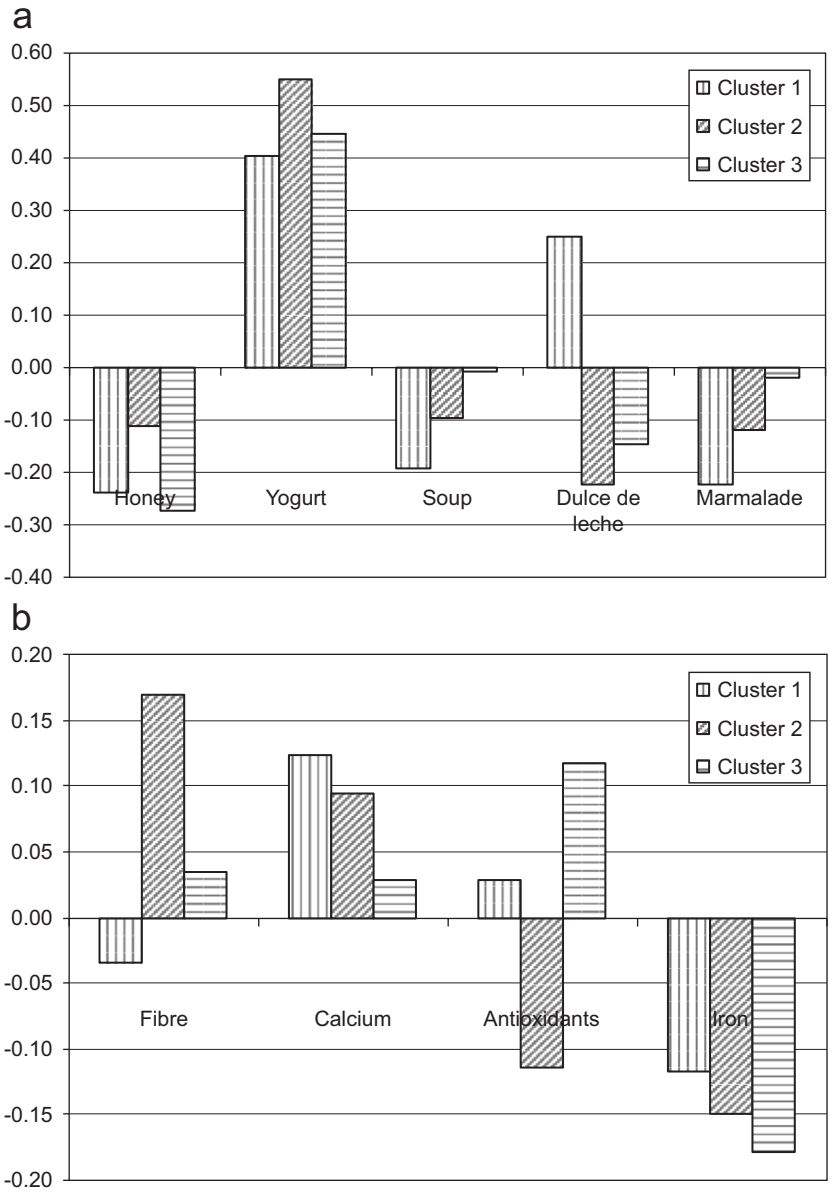

Fig. 4. Conjoint analysis results (relative utilities) for each of the identified clusters of the Food Choice Questionnaire: (a) carriers' main effects, and (b) enrichments' main effects.

foods. The fact that *sensory appeal* was one of the factors governing their food choices might explain the high relative utility given by this group to dulce de leche.

Besides, cluster 3 gave positive relative utilities to yogurt as carrier and to antioxidants as enrichments. This segment of consumers is particularly concerned about *health* and weight control. This might explain the fact that they gave negative relative utilities to sugary products as honey, marmalade and dulce de leche.

Cluster 2 showed an intermediate behaviour, giving high relative utilities to yogurt as carrier, and fibre and calcium as enrichments. This group of consumers gave the highest relative utility to fibre.

The different choice patterns of the identified clusters might have lead to different preferences for the evaluated functional food concepts, but might have not determined a higher acceptance for functional foods. Furthermore, an increase in the importance given to *health and nutritional value* in food choice might have not caused an increase in the willingness to try functional foods, suggesting that the acceptance of this type of food is not exclusively related to how important health is in determining food choice.

None of the groups showed a higher willingness to try for all the evaluated functional food concepts, and might not be catalogued as "functional food acceptors or rejectors". On the contrary, the attitude towards functional foods concepts depended on the carrier and type of enrichment considered, suggesting that the acceptance of functional foods might not be unconditional, varying with the type of product considered. Besides, the distinct preferences of different segments of consumers suggest that different kinds of functional foods could be developed in order to attend the needs and preferences of each of these groups.

Conclusions

ANOVA showed that carrier*enrichment interaction was significant, showing that a certain enrichment might not have the same effect on the perceived healthiness or willingness to try when added to different carriers. These suggests that food producers considering launching a certain functional food should conduct consumer research in order to understand consumers attitude towards the particular carrier product and enrichment involved.

Carrier main effects on perceived healthiness and willingness to try were larger than those for enrichments or interactions, suggesting that products had the largest effect on consumers' perception of healthiness of the evaluated functional foods concepts. For this reason, functional foods based on carrier products that are perceived healthy per se might be more easily accepted by consumers. Besides, for each carrier product, the highest positive relative utilities in healthiness were achieved when the enrichment was a functional ingredient inherent in the original product.

Differences in preference patterns for the evaluated functional food concepts were found with gender, age and between the clusters identified in the Food Choice questionnaire. However, the attitude towards functional foods concepts depended on the carrier and type of enrichment considered, suggesting that the acceptance of functional foods might not be unconditional. These results suggests that functional foods might be designed for specific groups, rather than being aimed for the whole marketplace.

Further research should be conducted in order to get more information about Uruguayan consumers' perception of functional foods, and to address some of the limitations of the present study, such as the small number of carriers and products and the small consumers sample. Furthermore, future studies are needed to understand the effect of health claims on Uruguayan consumers acceptance of functional foods.

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