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# Willingness to purchase functional foods according to their benefits

## Consumer profiles in Southern Chile

Willingness to purchase functional foods

1453

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### Abstract

**Purpose** – The purpose of this paper is to explore differences in consumers' willingness to purchase functional foods (FFs) in southern Chile in terms of socio-demographic characteristics, consumer knowledge, and subjective well-being.

**Design/methodology/approach** – A survey was carried out among 400 people in southern Chile. The questionnaire measured willingness to buy FFs with 18 different benefits, knowledge about FFs, socio-demographic characteristics and satisfaction with life and with food-related life.

**Findings** – Two dimensions were found for benefits sought in FFs: disease prevention and improvement of bodily functions. Cluster analysis was used to distinguish three types of consumers. The majority (59.8 per cent) showed a significant disposition to buy FFs that prevent diseases or improve bodily functions. Others (25.8 per cent) were less inclined to buy either type of FF. A minority (14.5 per cent) showed greater disposition to buy FFs which improve bodily functions. The types differ according to the size of family, presence and age of children at home, ethnic origin, education, socio-economic status, knowledge about FFs and satisfaction with life and food-related life.

**Research limitations/implications** – This study was conducted in the context of only one country in South America. The results reveal a high interest to buy FFs in order to improve bodily functions, and this preference may be associated to lifestyle changes in the population in Latin American countries.

**Originality/value** – This study provides information on the willingness to buy FFs and relates it to ethnic origin and satisfaction with food-related life. People from ethnic minorities are less inclined to buy FFs. People who are more inclined to buy FFs are more satisfied with their life and their food-related life.

**Keywords** Consumer purchasing decisions, Cluster analysis, Functional foods, Satisfaction with food-related life

**Paper type** Research paper



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## Introduction

Although functional foods (FFs) lack a standard definition (Hasnah and Ameira, 2010), they are typically characterised as including components believed to improve overall health and well-being, reduce the risk of specific diseases, or minimise the effects of health concerns. Bilgiç and Yüksel (2012) and Reinhardt *et al.* (2011) pointed out that, among other reasons, there is currently a strong demand for these products due to the needs of the aging population and the rising costs of health care. Reinhardt *et al.* (2011) reported that by 2009 the market for FFs and beverages had outpaced the growth of the total US food and beverage market, representing 6 per cent of it. These authors stated that stressed economies, such as the US during the recession, seem to increase consumers' commitment to health and wellness, achieved through the purchase of FFs.

However, it should be noted that FFs can only solve health problems if consumers are willing to buy them, which is the motivation for this study in the Chilean context. Malnutrition remains a problem for developing nations, while at the same time obesity is reaching epidemic proportions (Frisancho, 2003). The food situation in Latin American countries is related to socio-demographic, economic, dietary and lifestyle changes in the population. In Chile, these changes have happened quickly in recent decades, resulting in increasing consumption of foods rich in cholesterol, saturated fats, sugar and sodium, with the ensuing consequences of a high prevalence of obesity and non-communicable chronic diseases (Araneda *et al.*, 2010). On this basis, the Chilean government has financed several research and development (R&D) projects aimed at improving the population's health and quality of life by developing FFs. This programme is expected to have an impact on Chileans' health by identifying and improving foods that contain bioactive compounds with a direct relation to the prevention or treatment of highly prevalent diseases in Chilean society, like diabetes, obesity, cardiovascular diseases or mental illnesses (CONICYT, 2011).

We expected that Chilean consumers will differ in their willingness to buy FFs, depending on the benefits that such foods provide, and that these differences will be linked to characteristics of the consumer's life situation. Against this background, the objectives of this study were: to find the underlying dimensions of respondents' willingness to buy FFs based on the health benefits they associate with the food; to develop a consumer typology based on the benefits sought in FFs; and to characterise the types found according to their demographic characteristics, their knowledge of FFs, and their satisfaction with life (SWLS) and food-related life.

The study was conducted in Temuco, capital of the Araucanía Region in southern Chile. This city was chosen for the research due to its intercultural backdrop and the diversity of its population. In Chile, 5.4 per cent of the population claim to belong to one of the eight indigenous populations recognised by the Indigenous Peoples Act (Law 19.253). The Mapuche people are the largest group, with nearly 90 per cent of the total indigenous population. Although they are spread throughout the country, the highest population concentration is in the Araucanía Region (33.6 per cent) (MIDEPLAN, 2005). Between the last decades of the nineteenth century and the first of the twentieth century, the main communities of European immigrants in the Araucanía (mainly Germans, Swiss, Italian, French and English) settled there (Zavala, 2008). Therefore, in this region, the Spanish descendants, the *mestizos*, derived from the conquest of the country, the Mapuche and the descendants of the European colonists that arrived more recently to the country currently co-exist, and this has given rise to new types of mixing of ethnic backgrounds.

Various authors have pointed out the existence of a gradual process of collective acculturation of the Mapuche people towards Chilean culture. The influence of acculturation is clearly observed in various aspects, including food (Pérez-Bravo *et al.*, 2001; Carrasco *et al.*, 2004; Schnettler *et al.*, 2013c) and its health-related aspects, such as the increase in the prevalence of diabetes and other chronic diseases among the Mapuche people (Pérez-Bravo *et al.*, 2001). Carrasco *et al.* (2004) concluded that the prevalence of type 2 diabetes, dyslipidemia and other non-communicable chronic diseases in urban Mapuche populations is higher than that of their rural counterparts and the non-Mapuche population.

Considering that eating practices constitute a fundamental part of the cultural identity of social groups, and that culture influences the development and maintenance of behaviours and attitudes towards food, studying FF acceptance in this multicultural setting allows for an exploration of the influence of ethnic origin on the acceptance of these types of foods. The paper is organised as follows: the next section reviews the literature on consumer acceptance of FF. Then, the data collection process, the sample and the statistical analyses are described in detail, along with the main findings. The paper closes with a discussion of the research findings in relation to the aims of the study and the conclusions.

### Acceptance of FFs

There is a growing number of studies addressing the cognitive, motivational and attitudinal determinants of consumer acceptance of FFs and their willingness to use them in different developed countries (Bech-Larsen and Grunert, 2003; Urala and Lähteenmäki, 2007; Verbeke, 2005; Chen, 2011; Reinhardt *et al.*, 2011; Crofton *et al.*, 2013; Carrillo *et al.*, 2013; Goetzke *et al.*, 2014). Likewise, although there are still few studies carried out in the developing countries of South America, there is a growing interest in learning about consumer acceptance and preferences for FFs in this part of the world (Soto *et al.*, 2006; Ares *et al.*, 2008, 2009, 2010; Schnettler *et al.*, 2010; Harrar *et al.*, 2011; Cruz *et al.*, 2013).

Studies show a general tendency among consumers to evaluate FFs positively (Asselin, 2005; Teratanavat and Hooker, 2006; Barreiro-Hurlé *et al.*, 2008; Ares *et al.*, 2009, 2010; Reinhardt *et al.*, 2011; Carrillo *et al.*, 2013). While some authors have found no socio-demographic differences in the acceptance of FFs (Verbeke, 2005; Urala and Lähteenmäki, 2007), others have concluded that preferences for the benefits of FFs are related to consumer demographics (Barreiro-Hurlé *et al.*, 2008) and psychographics (Goetzke and Spiller, 2014). Some studies have shown that acceptance depends on the functional ingredient (Asselin, 2005; Ares *et al.*, 2009, 2010; Grunert *et al.*, 2009; Lähteenmäki *et al.*, 2010; Schnettler *et al.*, 2010). In this regard, a recent study conducted in Germany concluded that consumers' awareness of ingredients seems to increase with the duration of scientific evidence; i.e., the longer the scientific history of a certain FF ingredient, the more familiar this ingredient becomes to a wide range of consumers (Bornkessel *et al.*, 2014). However, Wansink *et al.* (2005) showed that a person's likelihood of purchasing a FF depends on his ability to link the functional characteristics of the product to the results of consuming it. Thus, consequence-related knowledge about the FF (e.g. the product contributes to the preservation of bone health) increases more to the likelihood of consumption than knowledge only related to the functional ingredient (e.g. contains extra calcium). If people can perceive more benefits from using FFs, they will be more willing to buy them. Benefits related to serious diseases were rated as more attractive, and increased the intention to try

FFs more than psychological or appearance benefits in studies carried out in developed countries (Williams *et al.*, 2008; Hailu *et al.*, 2009; Lähteenmäki *et al.*, 2010). Van Trijp and van der Lans (2007) found that products with the added benefits of reducing the negative impact of stress or improving concentration had a lower consumer appeal than products strengthening the body's natural defence system. Siegrist *et al.* (2008) suggested that consumers are more inclined to buy FFs with physiological rather than psychological health claims. In summary, consumer acceptance of FFs seems to depend on the benefits of those FFs.

Benefits of FFs that have been studied in recent years regarding consumer acceptance include improving cardiovascular health (Krystallis *et al.*, 2008; Siegrist *et al.*, 2008; Williams *et al.*, 2008; Grunert *et al.*, 2009; Lähteenmäki *et al.*, 2010; Crofton *et al.*, 2013; Goetzke *et al.*, 2014; Chrysochou and Grunert, 2014), managing weight (Siegrist *et al.*, 2008; Grunert *et al.*, 2009; Lähteenmäki *et al.*, 2010; Crofton *et al.*, 2013), reducing the risk of cancer (Siegrist *et al.*, 2008; Williams *et al.*, 2008; Hailu *et al.*, 2009), maintaining healthy cholesterol levels (Niva, 2007; Urala and Lähteenmäki, 2007; Williams *et al.*, 2008; Chen, 2011; Goetzke *et al.*, 2014), reducing the risk of osteoporosis or strengthening bones (Krystallis *et al.*, 2008; Siegrist *et al.*, 2008; Williams *et al.*, 2008; Chrysochou and Grunert, 2014), contributing to vision improvement (Krystallis *et al.*, 2008; Williams *et al.*, 2008), reducing blood pressure (Urala and Lähteenmäki, 2007; Chen, 2011), strengthening the natural defences of the body (Sorenson and Bogue, 2005; Krystallis *et al.*, 2008; Williams *et al.*, 2008; Grunert *et al.*, 2011), reducing risk of diabetes (Crofton *et al.*, 2013), preventing dementia or improving memory functions (Grunert *et al.*, 2009; Lähteenmäki *et al.*, 2010; Chrysochou and Grunert, 2014), reducing stress or tiredness (Siegrist *et al.*, 2008; Williams *et al.*, 2008), extra energy (Krystallis *et al.*, 2008; Williams *et al.*, 2008; Chen, 2011), keeping a youthful appearance (Siegrist *et al.*, 2008; Williams *et al.*, 2008), contributing to personal well-being (Krystallis *et al.*, 2008; Hailu *et al.*, 2009) and increasing concentration and extending longevity (Siegrist *et al.*, 2008). These studies, most of which have been carried out in developed countries in North America and Europe, show that the interest in different benefits differs among consumers.

Moreover, there is evidence of differences between consumers in different countries and continents (Verbeke, 2005; van Trijp and van der Lans, 2007). It is expected that the results from a study on willingness to buy FFs in a developing country like Chile will differ from those in North America and Europe. Although the prevalence of chronic non-communicable diseases in South America in general and Chile in particular is approaching the situation found in developed countries, the socio-economic conditions are completely different. In developing countries there are still problems of undernourishment associated with social inequality, with high poverty rates among native minorities, and with general ignorance about the nutritional content of foods.

The traditional "medicinal" approach to food is evolving into a more comprehensive (Reinhardt *et al.*, 2011), positive and holistic (Block *et al.*, 2011) wellness-focused one. Goetzke and Spiller (2014) suggested an obvious connection between food choice and well-being improvement strategies. In this respect, there is increasing interest in the literature in measuring food-related well-being. Some examples are the studies by Boelsma *et al.* (2010), King *et al.* (2012) and Ares *et al.* (2014). While the first two used questionnaires with different scales, the last used a qualitative methodology. Ares *et al.* (2014) found that food-related well-being is linked to physical health, body functioning, intellectual capacity, positive emotions and social contact and relationships, and concluded that understanding the impact of specific food products on consumers'

well-being is highly relevant to better understanding consumers' choices and eating patterns. Many authors have stressed the capacity of FFs to contribute to a more complex state of consumer well-being, which also implies psychological and mental aspects (Menrad, 2003; Niva, 2007; Siró *et al.*, 2008), resulting in improvements in physical and mental well-being (Menrad, 2003). Subjective well-being (SWB) is an assessment people make of their own lives, including happiness, pleasurable emotions, SWLS and the relative absence of unpleasant emotional states. This evaluation includes cognitive and emotional aspects of experience. The cognitive component of SWB is SWLS, whether overall or by specific domains. The concept of SWLS has been defined as a positive evaluation a person makes of their life in general, or of particular aspects (Diener *et al.*, 1999). A recent study in Spain reported that SWLS influenced the attitude towards FFs (Carrillo *et al.*, 2013). Similarly, Goetzke *et al.* (2014) found that the cognitive-emotional level of well-being and health did affect FF consumption in a study carried out in Germany. Also in that country, Goetzke and Spiller (2014) using AIO-based items (activities, interests and opinions) concluded FF consumers try to improve their well-being by using more passive strategies and cultivating a more passive lifestyle.

Numerous studies have addressed overall SWLS and in certain domains, including food. Grunert *et al.* (2007) developed and tested the satisfaction with food-related life (SWFL) scale in three studies in eight European countries. SWFL is defined as a person's overall assessment regarding their food and eating habits (Grunert *et al.*, 2007). Recent studies with samples of adults in Europe, America and Asia reported a positive relationship between life satisfaction and food as a life domain, so that those who are satisfied with their food and eating habits are satisfied with their lives (Grunert *et al.*, 2007; Schnettler *et al.*, 2012, 2013b; Seo *et al.*, 2013). However, it is noteworthy that this relationship is associated not only with the pleasure of eating a tasty food, but also with healthful eating habits and a better health status. Dean *et al.* (2008) found older people in eight European countries who are in good physical and mental condition are more satisfied with their food-related life. With an adult sample in Chile, Schnettler *et al.* (2013b) concluded that unhealthful eating behaviours such as eating frequently in restaurants or eating prepared food are associated with a lower level of SWFL. Additionally, Schnettler *et al.* (2013a) determined that university students with healthier eating habits exhibit fewer emotional health issues, lower rates of overweight and obesity and greater satisfaction with their food-related life. Therefore, if the degree of SWFL is associated with the selection of more or less healthful foods and with health, it is to be expected that the preferences for FFs are related to the SWB in the domain of food, measured with the SWFL. Because this relation has not been studied before, the present study will use both general SWLS and SWFL to profile consumers who differ in their acceptance of FFs.

## Methods

### *Sample and procedure*

Personal interviews were conducted with a sample of 400 people from Temuco (Araucanía Region, 38°45' S, 73°03' W), Chile. The number of people surveyed was obtained using the simple random sample formula for non-finite populations ( $N > 100,000$ ; Temuco: 245,347 inhabitants, Census 2002), considering 95 per cent confidence and 5 per cent estimated error with  $p$  and  $q$  0.5 (Fernández, 2002).

The survey was conducted personally by two trained interviewers at the exits of two supermarkets in Temuco during January and March 2010. The surveyor intercepted people in the street, explained to them the objectives of the survey and the strictly confidential treatment of the information obtained, and then asked if they would agree to answer the questionnaire. Prior to data collection, the questionnaire was pretested with a smaller sample, using the same method of addressing the participants as in the final survey. As no problems were detected, no changes were required in either the questionnaire or the interview procedure. The participants signed informed consent statements before responding. The execution of the study was approved by the Ethics Committee of the Universidad de La Frontera, Temuco, Chile.

### *Questionnaire*

The questionnaire contained only closed-ended questions. The first question consisted of 18 benefits possibly associated with consuming FFs, chosen based on interviews with qualified informants belonging to the Scientific and Technological Bioresource Nucleus of the Universidad de La Frontera (Bioren-UFRO). The selection criteria used were that the benefits had to be associated with the main non-communicable chronic diseases and physiological functions that were meant to be prevented or improved upon in the population in South America. The respondents were asked to indicate their willingness to buy FFs enriched with ingredients that offer health benefits using a four-point Likert scale (1: not willing to buy at all, 4: very willing to buy). Before participants answered this question, the interviewer read the definition of FFs provided by Diplock *et al.* (1999) aloud to them.

The questionnaire also included the SWLS and SWFL scales. The SWLS, developed by Diener *et al.* (1985), is a scale consisting of five items grouped into a single factor for a person to evaluate overall cognitive judgments about their life. The SWFL was proposed and tested by Grunert *et al.* (2007) and also consists of five items grouped in a single dimension. Spanish versions of the SWLS and SWFL were used in this study. Both scales showed good levels of internal reliability and the existence of a single factor for all the items in a previous study in Chile (Schnettler *et al.*, 2012). On each scale the respondents were asked to indicate their degree of agreement with these statements using a six-point Likert scale (1 is disagree completely, 6 is agree completely). In the present study the SWLS and SWFL scales showed adequate levels of internal consistency (Cronbach's  $\alpha$  coefficient of 0.835 and 0.833, respectively) and the existence of just one factor for all the items.

To measure knowledge of FFs, respondents needed to rate eight statements as true or false (Table I). These statements were selected by the Bioren-UFRO researchers.

Demographic questions were included to establish gender, age, family size, presence and age of children, area of residence, occupation and level of education of the head of the household, and ownership of ten domestic goods. The two latter variables were used to characterise the socio-economic status (SES) of the respondent, classified as ABC1 (high and upper middle), C2 (middle-middle), C3 (lower middle), D (low) and E (very low) according to Adimark (2004). The final question was: "Considering your parents and grandparents, do you consider your ethnic origin to be: Chilean, Mapuche, Spanish, German, Italian, other origin?"

### *Statistical analysis*

The scale factors were extracted using a principal component analysis (PCA), considering eigenvalues greater than 1 and a varimax factor rotation (Hair *et al.*, 1999).

Sample	(%)	Willingness to purchase functional foods
<i>Gender</i>		
Female	55.2	<b>1459</b>
Male	44.8	
<i>Age</i>		
< 35 years	34.5	
35-54 years	42.0	
55 years or more	23.5	
<i>Family size</i>		
1-2 members	26.5	
3-4 members	50.0	
5 members or more	23.5	
<i>Presence and age of the children</i>		
Without children	36.5	
Children < 5 years	21.8	
Children 5-12 years	20.0	
Children 13-17 years	10.8	
Children ≥18 years	11.0	
<i>Occupation</i>		
Independent worker	30.5	
Businessperson	11.0	
Private-sector worker	29.8	
Public-sector worker	16.2	
Retired	8.5	
Unemployed	2.8	
Other	1.2	
<i>Socioeconomics</i>		
ABC1 (high and upper middle)	49.5	
C2 (middle-middle)	28.8	
C3 (lower middle)	14.8	
D and E (low and very low)	7.0	
<i>Residence</i>		
Urban	89.5	
Rural	10.5	
<i>Ethnic origin</i>		
Chilean	56.1	
Spanish	11.5	
German	8.3	
Italian	3.3	
Mapuche	16.0	
Other	4.8	
<i>SWFL</i>		
<i>Cronbach'α = 0.833</i>		
<i>One factor; variance by factor: 60.5%</i>		
Dissatisfied	1.5	
Somewhat satisfied	9.0	
Satisfied	53.0	
Extremely satisfied	36.5	

(continued)

**Table I.**  
Characteristics (%)  
of the sample

BFJ 117,5	Sample	(%)
<b>1460</b>	SWLS	
	<i>Cronbach's <math>\alpha = 0.835</math></i>	
	<i>One factor; variance by factor: 62.1%</i>	
	Dissatisfied	1.0
	Somewhat satisfied	15.5
	Satisfied	56.0
	Extremely satisfied	27.5
	Antioxidants eliminate free radicals from the body, which are responsible for cellular oxidation (% correct answer)	68.8
	Fibre contributes to intestinal health (% correct answer)	87.0
	Fruit contains a small quantity of antioxidants (% correct answer)	71.5
	There is no difference between probiotics and prebiotics (% correct answer)	51.5
The consumption of fibre and antioxidants is to be recommended for people with high cholesterol (% correct answer)	77.5	
Omega 3 fatty acids contribute to brain development in children (% correct answer)	59.0	
All oils contain omega 3 (% correct answer)	73.0	
Functional foods reduce the risk of getting cancer (% correct answer)	36.0	

**Table I.**

To determine the adequacy of the factor analysis, the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity were used. The internal consistency of the scales was calculated using Cronbach's  $\alpha$  coefficient (Hair *et al.*, 1999).

A cluster analysis (hierarchical conglomerates) was used to determine consumer segments according to the benefits sought from FFs, with linkage by Ward's method and the squared Euclidian distance as the measure of similarity between objects (Hair *et al.*, 1999). This analysis was applied to the Z-scores resulting from the factor analysis. The number of groups was determined based on the percentage change of the recomposed conglomeration coefficients. To describe the segments, Pearson's  $\chi^2$ -test was applied to the discrete variables, and analyses of variance to the Z-scores resulting from the factor analysis of the benefits. Because the Levene's statistic indicated non-homogeneous variances in all the continuous variables analysed, the variables for which the analysis of variance resulted in significant differences ( $p < 0.001$ ) were subjected to Dunnett's T3 multiple comparisons test. The programme used was SPSS vs 16.0 (SPSS, 2007) for Windows.

## Results

Table I shows characteristics of the sample of consumers surveyed. There was a good spread in the sample in terms of gender, family size, occupation and SES. As for ethnicity, most participants were of "Chilean" and "Mapuche" origin.

The average of the SWLS was 24.88 (SD = 3.28). The average of the SWFL was 24.18 (SD = 3.48). Based on the sum of the scores of the two scales, it can be seen that the majority were satisfied and extremely satisfied with life, and satisfied and extremely satisfied with their food-related life.

Most participants responded correctly to the statements regarding the function of fibre and that the consumption of fibre and antioxidants is beneficial to people with high cholesterol. Considering all the correct responses of each participant, a knowledge index of 65.5 per cent was obtained as the average of the total sample.

*Benefits sought in FFs*

Using a PCA, two components were obtained with eigenvalues greater than one. In total, 16 of the 18 items had high loadings on the two components (Table II). The benefits “reducing the risk of anaemia” and “reducing hyperactivity in children” were eliminated because they did not load on a single factor. The value of the KMO sample adequacy test is considered excellent, and Bartlett’s test of sphericity was significant ( $p \leq 0.001$ ) (Hair *et al.*, 1999). All items loaded positively on their respective components. The components obtained were:

- Disease prevention: this is composed of ten items related to the disposition to buy foods which help prevent different diseases. The Cronbach’s  $\alpha$  coefficient obtained in Component 1 was 0.952.
- Bodily functions: this consists of six items which characterise the disposition of people to improve the physiological functions of their body. The Cronbach’s  $\alpha$  coefficient obtained in Component 2 was 0.950.

*Consumer types*

Cluster analysis resulted in three consumer types with significant differences in the Z-scores of the two components obtained in the PCA ( $p \leq 0.001$ ) (Table III). The types differed significantly by family size, presence and age of children, education, SES, ethnic origin and knowledge about the different aspects of FFs ( $p \leq 0.001$  or  $p \leq 0.05$ ) (Table IV). The types also differed significantly in levels of SWLS and food-related life ( $p \leq 0.05$ ) (Table V). Each type is characterised below.

	Mean	Component 1 loadings	Component 2 loadings
Reducing the risk of diabetes	3.65	0.843	0.339
Reducing triglycerides	3.62	0.801	0.429
Reducing the risk of cancer	3.69	0.795	0.431
Reducing the risk of obesity	3.62	0.763	0.335
Reducing the risk of heart disease.	3.71	0.754	0.445
Reducing the risk of hypertension	3.65	0.746	0.457
Reducing the risk of degenerative diseases (such as Parkinson’s and Alzheimer’s)	3.56	0.739	0.421
Reducing cholesterol	3.70	0.709	0.501
Reducing the risk of osteoporosis	3.58	0.690	0.492
Reducing the effects of ageing	3.47	0.679	0.240
Improving performance at work or in studies	3.68	0.385	0.866
Improving concentration	3.67	0.354	0.851
Improving digestion	3.67	0.426	0.814
Reducing stress/relaxing	3.66	0.394	0.813
Improving the body’s defences	3.69	0.439	0.787
Improving sexual performance	3.59	0.410	0.701
Variance by factor (%)		41.552	35.242
Accumulated variance (%)		41.552	76.794

**Notes:** Kaiser-Meyer-Olkin measure of sampling adequacy = 0.947. Bartlett’s test of sphericity: approximate  $\chi^2 = 7,133.384$ ; gl = 120; sig. = 0.000. Method of extraction: principal axes. Method of rotation: varimax normalisation with Kaiser. The rotation has converged in three iterations

**Table II.**  
Principal  
components analysis  
of functional food  
benefits’

*Interested in products that improve bodily functions.* Group 1, which represented 14.4 per cent of the sample surveyed, had significantly lower scores than the other groups in the “disease prevention” component. Within the “bodily functions” component, it was similar to Group 2 and significantly higher than Group 3 (Table III). Group 1 had a higher proportion of people who identified themselves as “other ethnic origin”, who responded incorrectly about the level of antioxidants in fruit and about the benefits of consuming fibre and antioxidants for people with high cholesterol (Table IV).

*Interested in products that improve bodily functions and prevent disease.* Group 2 (59.8 per cent of the sample) had significantly higher scores than the other groups in the “disease prevention” component. Regarding the “bodily functions” component, it was similar to Group 1 and significantly higher than Group 3 (Table III). Group 2 had a greater proportion of people with families of five or more members, with children aged under five, who were educated to degree level or above, who identified themselves as being of German descent, belonged to SES ABC1, and a larger proportion of them responded correctly about the function of antioxidants in the body, the difference between prebiotics and probiotics, the consumption of fibre and antioxidants in people with high cholesterol, the effect of omega 3 fatty acids and the content of omega 3 in oils (Table IV). Group 2 showed a higher level of people who were extremely satisfied with their food-related life and with life (Table V). Table VI shows that this group had average values in the SWLS ( $p \leq 0.05$ ) and SWFL ( $p \leq 0.001$ ) that were significantly higher than Group 3, but similar to Group 1. Likewise, the average knowledge index of Group 2 was significantly higher than the rest of the groups ( $p \leq 0.001$ ).

*Less interested in FFs.* Group 3 (25.8 per cent of the sample), was significantly different from Groups 1 and 2 with regard to the “disease prevention” component. In the “bodily functions” component, it had significantly lower scores than Groups 1 and 2 (Table III). Group 3 had a larger proportion of people from families of one or two members, without children, who had graduated from secondary school, belonged to SES C2, who identified themselves as being of Mapuche origin, and a larger proportion of them responded incorrectly to the questions about the difference between prebiotics and probiotics and the content of omega 3 in oils (Table IV). Group 3 had a greater proportion of people who were somewhat satisfied with life (Table V).

**Discussion**

Health has been acquiring an important role in food consumption because nowadays consumers are interested in feeling well (Carrillo *et al.*, 2013). One of the aims of this research was to ascertain people’s inclination to buy FFs based on their health benefits. The high average values for inclination to buy the 16 items on the scale in the total sample confirmed the general acceptance of FFs (Asselin, 2005;

**Table III.**  
Mean z-scores of functional food benefit components for groups obtained in cluster analysis

	Group 1 (n = 58)	Group 2 (n = 239)	Group 3 (n = 103)	F	p-value
Component 1. Disease prevention	-1.511 c	0.466 a	-0.227 b	180.466	0.000
Component 2. Bodily functions	0.440 a	0.703 a	-1.414 b	475.115	0.000

**Note:** Different letters in the line indicate significant differences according to Dunnett’s T3 multiple comparison test ( $p \leq 0.05$ )

	Group 1 (n = 58)	Group 2 (n = 239)	Group 3 (n = 103)	p-value	Willingness to purchase functional foods
1-2 family members	24.1	23.1	35.9	0.037	<b>1463</b>
3-4 family members	60.3	49.6	44.7		
5 or more family members	15.5	27.3	19.4	0.010	
No children in the home	37.9	30.7	49.5		
Children under 5	13.8	26.5	15.5		
Children between 5 and 13	29.3	18.9	16.5		
Children between 14 and 17	13.8	11.3	7.8		
Adult children	5.2	12.6	10.7		
Without estudies	1.7	0.8	0	0.017	
Incomplete elementary	1.7	2.5	1.9		
Complete elementary	1.7	0.8	3.9		
Incomplete high school	5.2	7.1	7.8		
Complete high school	24.1	16.8	29.1		
Incomplete technical college	8.6	8.4	14.6		
Complete technical college or incomplete university	36.2	25.6	24.3		
Complete university or more	20.8	38.0	18.4		
ABC1	44.8	56.7	35.0	0.006	
C2	31.0	23.9	38.8		
C3	20.7	11.8	18.4		
D and E	3.4	7.5	7.8		
Chilean	55.2	56.3	53.3	0.033	
Spanish	13.8	13.4	5.8		
German	5.2	11.2	8.7		
Italian	3.4	3.4	2.9		
Mapuche	12.1	13.1	21.4		
Other	10.3	2.5	4.8		
<i>Antioxidants eliminate free radicals from the body, which are responsible for cellular oxidation</i>					
Incorrect	46.6	25.6	35.9	0.004	
Correct	43.4	74.4	64.1		
<i>Fruit contains a small quantity of antioxidants</i>					
Incorrect	41.4	24.8	29.1	0.041	
Correct	58.6	75.2	70.9		
<i>There is no difference between probiotics and prebiotics</i>					
Incorrect	55.2	41.6	61.2	0.002	
Correct	44.8	58.4	38.8		
<i>The consumption of fibre and antioxidants is to be recommended for people with high cholesterol</i>					
Incorrect	36.2	18.5	24.3	0.013	
Correct	63.8	81.5	75.7		
<i>Omega 3 fatty acids contribute to brain development in children</i>					
Incorrect	48.3	35.3	49.5	0.023	
Correct	51.7	64.7	50.5		
<i>All oils contain omega 3</i>					
Incorrect	34.5	19.7	38.8	0.000	
Correct	65.5	80.3	61.2		

**Table IV.**  
Characteristics with  
statistical differences  
between groups  
obtained with cluster  
analysis

**Note:** p-value correspond to the (bilateral) asymptotic significance obtained in Pearson'  $\chi^2$ -test

Teratanavat and Hooker, 2006; Barreiro-Hurlé *et al.*, 2008; Ares *et al.*, 2009, 2010; Reinhardt *et al.*, 2011; Carrillo *et al.*, 2013). This high level of acceptance is thought to be related to the fact that the items used in the scale clearly indicate the expected benefit of the FF, in agreement with the suggestion by Wansink *et al.* (2005) and Chen (2011). Similar findings were reported by Cox and Bastiaans (2007) in Australia and Annunziata and Vecchio (2011) in Italy.

The two components found in the analysis of the FF benefits, namely “disease prevention” and “bodily functions”, correspond to the conceptualisation that Verschuren (2002) makes of FFs, namely that they have two primary effects on health: the enhancement of physiological functioning and the reduction of disease risk. One aspect worth highlighting is that the items in both components had high average values in terms of likelihood of purchase, which differs from the results reported by van Trijp and van der Lans (2007), Williams *et al.* (2008), Siegrist *et al.* (2008), Hailu *et al.* (2009) and Lähteenmäki *et al.* (2010), and can be related to the individual differences that these means mask, and which we have uncovered by the cluster analysis. This signifies, in general terms, that the participants placed similar value on the prevention of serious diseases and the improvement of bodily functions, including those related to more psychological aspects such as reducing stress or increasing concentration.

The cluster analysis identified three groups of participants: those “Interested in products that improve bodily functions” (Group 1, 14.4 per cent), those “Interested in products that improve bodily functions and prevent disease” (Group 2, 59.8 per cent) and those who were “Less inclined towards functional foods” (Group 3, 25.8 per cent). It is notable that 74.2 per cent of the sample was highly inclined to buy FFs to improve bodily functions. This is in line with the findings of Brečić *et al.* (2014), who pointed out that FFs appeal most to those concerned about their health, who tend to seek convenient, “quick fixes”. Our finding could be associated with the fact

**Table V.**  
Degree of satisfaction with life and food-related life (%) of groups obtained with cluster analysis

	Group 1 (n = 58)	Group 2 (n = 239)	Group 3 (n = 103)	p-value
<i>SWLS</i>				
Dissatisfied	1.7	0.4	1.9	0.009
Somewhat satisfied	15.5	12.6	22.3	
Satisfied	58.6	53.4	61.2	
Extremely satisfied	24.1	33.6	14.6	
<i>SWFL</i>				
Dissatisfied	0	3.4	3.9	0.005
Somewhat satisfied	6.3	12.1	13.6	
Satisfied	56.7	39.7	52.4	
Extremely satisfied	37.0	44.8	30.1	

**Table VI.**  
Average values of SWLS, SWFL and knowledge index in the groups obtained using cluster analysis

	Group 1 (n = 58)	Group 2 (n = 239)	Group 3 (n = 103)	F	p-value
SWLS	23.66 ab	24.73 a	23.19 b	4.471	0.012
SWFL	24.40 ab	25.28 a	24.23 b	8.041	0.000
Knowledge index	57.33 b	70.12 a	59.59 b	10.130	0.000

**Note:** Different letters in the line indicate significant differences according to Dunnett’s T3 multiple comparison test ( $p \leq 0.05$ )

that in recent years stress has come to affect a high proportion of Chile's population. The results of the Chilean National Health Survey 2009-2010 indicated that 8.8 per cent had a self-perception of permanent stress, 18.1 per cent experienced high levels of financial stress, and 62.5 per cent had tackled stressful life events in the last year (Chilean Ministry of Health, 2010). This may be associated with lifestyle changes in the population in Latin American countries (Araneda *et al.*, 2010) linked to greater demands at work and school, due to increased competition for better jobs and higher incomes. In this vein, in Germany Goetzke and Spiller (2014) found people who are stressed in their daily life buy FFs rather than other foods linked to health, like organic food.

The demographic composition of the three groups showed differences in the presence and age of children, which agrees partially with the results of Chen (2011), who showed that consumers with children are more inclined to consume FFs. In this study, it was notable that the group "Interested in products that improve bodily functions and prevent disease" differs from the other types inasmuch as it includes a greater number of people with children aged under five, while those "Less inclined to functional foods" contains the largest proportion of childless people. This finding is consistent with the results from previous studies in developed countries (Krystallis *et al.*, 2008, 2010), which have shown that consumers' preference for FFs is strongly related to their stage of life. The fact that the type "Interested in products that improve bodily functions and prevent disease" shows the greatest disposition to buy FFs to prevent disease suggests that parents are concerned about preventing diseases in their children from a very early age through FF consumption. However, another hypothesis could be that these parents want to prevent diseases in themselves so as to have a longer life with their currently small children. New research should be carried out to investigate this aspect further. However, this finding could be related to the importance of social interaction (Ares *et al.*, 2014) and in particular the family with regard to food, which can promote healthier eating habits in children and youth (Neumark-Sztainer *et al.*, 2004; Hammons and Fiese, 2011; Schnettler *et al.*, 2013c, 2015) and increases the level of overall life satisfaction and in the domain of food (Schnettler *et al.*, 2013c, 2015). This is of particular relevance in Latin American culture, because the family is central for the individual more than for groups in some other cultural contexts (Negy and Snyder, 2006).

The type "Interested in products that improve bodily functions and prevent disease" had a greater presence of people educated to degree level or above and belonging to the SES with highest income. The Group "Less inclined toward functional foods" had a greater proportion of people with secondary school studies and belonging to the SES C2. These findings agree with the results of previous studies in developed countries (Annunziata and Vecchio, 2011; Yu and Bogue, 2013) and in Chile (Soto *et al.*, 2006), which show that FFs consumers are people with higher levels of education and income. However, these two results contradict the results reported by Herath *et al.* (2008) in Canada, who concluded that the consumers least receptive to FFs have higher levels of education and income.

Most of the studies on food consumption among ethnic minorities have been conducted on immigrant ethnic minorities, and not on native ethnic groups, which represent an important proportion of the population in some countries, particularly in South America (Schnettler *et al.*, 2013c). Therefore, one result of particular interest is the different composition of the three groups with respect to their ethnic origin. "Interested in products that improve bodily functions and prevent disease" had a greater presence of people who identified themselves as being of German descent and

“Less inclined toward functional foods” a greater proportion of people who identified themselves as being of Mapuche origin. This suggests that ethnic origin has an influence on interest in different benefits of the FFs. A study by Hasnah and Ameira (2010) in multi-ethnic groups (Malay, Chinese, Indian and indigenous groups) found that the knowledge of each ethnic group about FFs is not equal. This might be because each ethnic group consumes specific FFs according to their culture’s eating habits or they are not familiar with the specific benefits of the FF they are consuming. The greatest presence of people of Mapuche origin in the group “Less inclined toward functional foods” is worrisome due to the greater prevalence of non-communicable chronic diseases among this ethnic minority (Pérez-Bravo *et al.*, 2001; Carrasco *et al.*, 2004), which could be prevented through the consumption of FFs. However, new research is needed to delve more deeply into the effect of ethnic origin on the preferences for the health benefits offered by FFs.

The differences between the consumer types in their knowledge about the characteristics of some functional ingredients confirm the suggestion by Grunert *et al.* (2011) that respondents with higher motivation also have more knowledge of FFs. The type “Interested in products that improve bodily functions and prevent disease” had a significantly higher proportion of participants who responded correctly to five of the eight aspects about functional ingredients, and a correspondingly higher knowledge index. This is consistent with the higher level of studies of this type. In this regard, Bornkessel *et al.* (2014) found the educational level showed a significant influence on ingredient awareness in Germany. Thus it may be said that education and knowledge about the characteristics of functional ingredients contributed positively to the disposition toward buying this type of food in the sample studied. Therefore, based on the knowledge of which health claims are most valuable for consumer segments, health practitioners and decision makers may design information campaigns tailored for these groups. According to Tarabella and Burchi (2012), compliance to legislation on food labelling and health claims cannot guarantee consumers will correctly understand said labelling and claims, e.g., people looking for “quick fixes” through FFs may employ these at the expense of more fundamental adjustments to diet and fitness, which may provide the basis for superior overall disease prevention and health promotion (Brečić *et al.*, 2014). They must receive training on nutrition and a healthful diet, and in that regard, personal (family, relative, experience and friends) and impersonal (mass media, salesperson, packaging, and the internet) communication channels can be used by food practitioners, government agencies and food marketers to communicate the accurate health benefits of FFs to different consumer segments (Hasnah and Ameira, 2010).

One of the main contributions of this study is finding a greater proportion of people who were extremely satisfied with life and with food-related life in the type “Interested in products that improve bodily functions and prevent disease”, which suggests that the inclination to buy FFs is related to the SWLS and food-related life. This finding confirms that SWLS influenced the attitude towards FFs in Spain (Carrillo *et al.*, 2013). It is also in line with research conducted in Germany relating FF consumption to well-being (Goetzke *et al.*, 2014; Goetzke and Spiller, 2014). Nevertheless, the connection obtained in this study between the willingness to purchase FFs and the level of SWFL seems to indicate the intention to purchase FFs will contribute to a better overall assessment regarding the food and eating habits, according to the SWFL definition (Grunert *et al.*, 2007). This confirms the results of previous studies in Chile that link a higher level of SWFL to healthful eating habits (Schnettler *et al.*, 2013a), although these studies did not consider the willingness to purchase FFs. Nevertheless, it is worth

noting that our results indicate that the people most satisfied with their food-related life have a greater willingness to buy FFs associated with preventing diseases as well as improving bodily functions. This finding is in line with those obtained by Ares *et al.* (2014) in Uruguay, where food-related well-being in general was related to body functioning and intellectual capacity. Although that study did not focus on FFs and used a qualitative methodology, it is possible to suggest that the relation foods and improving bodily functions may be associated with the geographical area studied: developing countries in South America. Future research should examine this relationship in greater depth and confirm whether this is an issue linked to certain markets specifically.

It is worth noting the significantly higher scores on the SWLS and SWFL in the group “Interested in products that improve bodily functions and prevent disease” compared to the group “Less inclined towards functional foods”; the latter with a greater presence of people of Mapuche origin. This result is consistent with the results of an exploratory study conducted by Schnettler *et al.* (2011), in which a greater proportion of students of Mapuche origin were found to be dissatisfied with their life and their food-related life compared to non-Mapuche students.

One of the limitations of this study is that it was conducted in the context of only one country, Chile, although the sample mirrors the cultural diversity of South America. In addition, it can be considered a starting point in the study of the relation between the willingness to buy FFs and the degree of SWFL. On the other hand, this study only addressed consumers’ preferences based on specific health benefit claims. While it provides insight into the effects the Chilean consumer expects from FFs, this study did not include other variables related to consumers’ perception of FFs, such as type of product, functional ingredients, brand and price, among others, and future research must take this into consideration.

Another limitation of the study is that the sample is not representative of the country’s population distribution. However, the consumer distribution in this survey was similar to the sample obtained by Schnettler *et al.* (2010) in a supermarket consumer study. Therefore, although the results and conclusions in this study may not be applicable to the whole population, they might be valid for those consumers that normally purchase foods in supermarkets. Considering that some studies have shown that consumer perceptions of FFs depend on the carrier food and its interaction with the health claim (Bech-Larsen and Grunert, 2003; Williams *et al.*, 2008; Annunziata and Vecchio, 2013), another limitation of this research is the fact that the health benefits shown are not associated with any food in particular, so new studies will be necessary in this respect.

## Conclusions

In a context of growing interest in understanding the determinants of consumer acceptance of FFs, and a more recent concern to connect food choice and well-being, both in developed countries and developing countries in South America, the use of the SWLS and SWFL scales in this study provide evidence that those people most inclined to care for their health through consuming FFs will not only succeed in preventing diseases and improving bodily functions, but will also achieve higher levels of SWLS and with food-related life, and therefore will not only improve their physical but also their SWB. This means that the SWFL scale may be a useful instrument to measure food-related well-being, including FFs in different countries and on different continents. It should be noted that the high sample proportion strongly inclined to buy FFs to improve bodily functions differs from findings in developing countries. This may

be associated with lifestyle changes in the population in Latin American countries (Araneda *et al.*, 2010) linked to greater demands at work and school, due to increased competition for better jobs and higher incomes, that generate high stress levels in the population (Chilean Ministry of Health, 2010). This result must be confirmed and examined further through cross-cultural studies involving other developing countries in South America as well as developed countries.

The consumption of FFs must be promoted particularly in developing countries in South America, like Chile, where malnutrition problems and a high prevalence of obesity and non-communicable chronic diseases co-exist. This would improve people's physical health, and according to the results of this study, would also improve consumers' well-being and ultimately their quality of life. Considering the characteristics of the types distinguished according to the willingness to purchase FFs with different benefits, the types "Interested in products that improve bodily functions" and "Less interested in functional foods" merit particular attention. In the former group, interest in FFs with benefits associated with preventing diseases must be promoted, whereas in the latter consumption of FFs with benefits associated with preventing diseases and improving bodily functions must be promoted. This must be approached initially through campaigns to raise awareness of the benefits of consuming FFs and their benefits for improving health, overall well-being and in the domain of food. This should be undertaken by Ministry of Health authorities in developing countries. However, this should also be addressed by Ministries of Education, in terms of incorporating different topics that present functional ingredients and their benefits for health into elementary and secondary curricula. Special emphasis should be given to indigenous populations, whose presence is important in developing countries in South America. According to our results Mapuche people are not really interested in FFs. Despite reports of a gradual process of collective acculturation of the Mapuche people towards Chilean culture, including food, this has apparently not manifested itself in the consumption of FFs. This will require a greater effort in terms of communicating and educating such consumers about taking their cultural identity into account, which differs among the various indigenous peoples in South America.

The results of this study can also help domestic and foreign food companies identify the target market segment where it is feasible to successfully introduce new FFs or increase the already existing sales of FFs in the market. The type "Interested in products that improve bodily functions and prevent disease" comprising consumers with large families, with children under five, university studies, from the socio-economic groups with the highest income, satisfied with their life and their food-related life, who identified themselves as being of German descent, would constitute the most attractive market segment from the commercial point of view. Since these consumers have a greater knowledge of the benefits associated with consuming FFs, clear information on the packaging or labelling (health claims) and promotional activities (Carrillo *et al.*, 2013) should be implemented in the marketing mix. However, according to Chrysochou and Grunert (2014), effective advertising and public policy campaigns that aim at communicating the healthfulness of food products can benefit by the use of visual elements, since this can affect consumers' product evaluations and stimulate purchase. Visual elements related to well-being could be successful in this market segment. By contrast, Chrysochou and Grunert (2014) indicated that to stimulate purchase in those who are less health motivated, like the types "Interested in products that improve bodily functions" and "Less interested in functional foods", the visual element to enhance product-related attitudes should be associated with health.

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