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ARTICLE

Consumer attitudes in the election of functional foods

I. Küster-Boluda[a], I. Vidal-Capilla[b,c,*]

[a] *Prof. Dr., Marketing and Market Research Department, Faculty of Economy, University of Valencia, Spain*
[b] *PhD Student, Faculty of Economy, University of Valencia, Spain*
[c] *Business Analyst at Hudson Ethics Consulting, USA*

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KEYWORDS
Attitudes;
Consumption of functional foods;
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Abstract In recent years, the rise of functional foods has played a key role in healthy habits, due to growing consumer concern about health and the perception that diet directly affects healthiness. The objective of this work is to study how consumer attitudes influence the choice and consumption of functional foods in Spain. For this purpose, a proposed model is adapted to the field of study, integrating different models and theories. These theories have achieved broad support in the literature. With a sample of 333 consumers, we can conclude that consumer attitudes towards functional foods have a direct influence on the willingness to consume them. A healthy lifestyle has no effect on these attitudes, but lifestyle influences the willingness to use functional foods in a negative manner. We can also determine that certain motivators and barriers positively influence the healthy lifestyle. At the same time, the paper tries to analyze the moderating role of gender, and some differences between men and women are found.

PALABRAS CLAVE
Actitudes;
Consumo de alimentos funcionales;
Estilo de vida saludable;
Diferencias de género

La actitud del consumidor en la elección de alimentos funcionales

Resumen Recientemente, el auge de los alimentos funcionales ha tenido un papel fundamental en los hábitos saludables, debido a la creciente preocupación del consumidor por la salud y la percepción de que la alimentación influye directamente en ella. El objetivo de este trabajo es estudiar cómo influyen las actitudes del consumidor en la elección de compra y consumo de alimentos funcionales en España. Se plantea un modelo integrado por diversas teorías que han conseguido amplio respaldo en la literatura. Con una muestra de 333 consumidores, podemos concluir que las actitudes de los consumidores hacia los alimentos funcionales afectan, de manera directa, la voluntad de consumo. El estilo de vida saludable no influye en estas actitudes

* Corresponding author at: Edif. Departamental, 1P09 Av. dels Tarongers, s/n, 46022 Valencia, Spain.
E-mail addresses: ines.kuster@uv.es (I. Küster-Boluda), isabelvidalcapilla@gmail.com (I. Vidal-Capilla).

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hacia los alimentos funcionales, sin embargo, este estilo de vida saludable sí lo hace negativamente en la voluntad de consumo de estos alimentos. Asimismo, ciertos motivadores y barreras afectan al estilo de vida saludable. Al mismo tiempo, se intenta analizar el papel moderador del género y se encuentran algunas diferencias entre hombres y mujeres.

Introduction

The World Health Organization has defined obesity as the epidemic of the 21st Century. Dietary problems have a major impact on chronic diseases, health care costs, quality of life and public health (World Health Organization, 2000). In Spain, the rate of obesity in Spanish adults is higher than the OECD average and, in the case of children, this rate is among the highest in the OECD (Sassy, 2011).

For these reasons, the consumption of functional foods has proliferated in recent years. According to The International Life Sciences Institute (Ashwell, 2004), functional foods are those that include a variety of relevant components to improve health status or reduce the risk (non-prevention) of the disease. Those foods also must bring benefits beyond those of basic nutrition. For example, foods that are low in fats and sugars or incorporated fiber, among others, are functional foods. For a food to be classified as functional, its health properties must be supported by scientific evidence (Ashwell, 2004). According to Baboota et al. (2013), the functional ingredients are promising for the treatment of obesity and associated comorbidities, surpassing even the benefits of medication.

Consumers view food as a way to improve their health and wellbeing, and manufacturers are responding proactively by offering new products that meet these needs (Gray, Armstrong, & Farley, 2003). Many consumers fail to pay attention to nutritional values and calories when foods are shown as healthy, even if they are not (Chandon & Wansink, 2007); this confirms the importance that food needs to indicate in some way that is helping to maintain the consumer health.

Thus, according to Menrad (2003), functional foods came to the European market in the mid-1990s. The United States, in the early 2000s, represented the 50% of functional foods in the world (Menrad, 2003). According to this author, functional foods offer interesting growth opportunities for the food industry, but the specific efforts of different stakeholder groups (scientists, food ingredient suppliers, food industry companies, and food retailers) need to take advantage of these opportunities in the future. This market continues to grow steadily in Europe, with marked differences in the attitudes of consumers to functional food according to their country of origin (Özen, del Mar Bibiloni, Pons, & Tur, 2014). Ozen et al. (2014) indicate that, in recent years, the consumption of functional foods in Europe has been extended. Some consumers do not know how to categorize these products correctly, which may mark a decline in the interest of functional foods (Granqvist & Ritvala, 2016). In this context, it is interesting to be able to explain the consumer behavior that chooses these products in order to be successful in product development and marketing strategies (Urala & Lähteenmäki, 2003).

Bhaskaran and Hardley (2002) conclude that functional products, as a relatively new phenomenon, have yet to be studied in greater depth with regard to consumer behavior. In the same way, Özen, Pons, and Tur (2012) argue that it is not possible to reach generalized conclusions about the consumer in relation to functional foods and that we need further studies. Therefore, it is possible to affirm that the investigations carried out from the point of view of marketing in the study of the purchase and consumption of this type of food are still incipient.

Several studies indicate gender differences: these differences in dietary choices seem to be attributed to women's greater participation in weight control, and to the fact that they give more value than men do to healthy eating (Wardle et al., 2004).

Therefore, the objective of this work lies in the study of the attitude of the consumer towards the purchase and consumption of functional foods. Specifically, there are three specific objectives. First, analyze how the consumer's attitude towards functional foods influences the willingness of consumption. Second, discover how healthy lifestyle and health concern influences these attitudes toward functional foods and, therefore, the willingness to consume them. Finally, study which variables motivate or restrict this healthy lifestyle. In addition, the role of gender in the choice of functional foods is studied. The realization of this research adds value to previous studies as justified below.

It should be noted that, according to Figueroa and Sánchez (2004), health is one of the main variables in the study of consumer behavior towards functional foods. Consumers show more positive products attitudes and increase the intention to buy them when these are presented as healthy and have favorable nutritional information (Kozup, Creyer, & Burton, 2003). Despite negative consumer perceptions of transgenic foods, functional foods, which maintain the health benefits of those who consume them, are generally perceived as positive. Therefore, it emphasizes the importance of the correct communication of these positive health effects (Van Kleef, van Trijp, & Luning, 2005). In this framework and in the study on functional foods in the Spanish market, Figueroa and Sánchez (2004) conclude that health and safety are the most relevant aspects for the consumer when choosing functional foods. Consumers of these foods say

they are more concerned about diet. Again, health is the most prominent component.

In this context, the present study sheds light on previous studies because it raises how the importance of health influences the choice of these foods and, specifically, how the consumer's healthy lifestyle influences the attitude and willingness of consumption of these foods. It also analyzes if there are differences between men and women.

Thus, most studies have focused on analyzing the consumption of a category of functional foods in a particular market. Ozen et al. (2012, 2014) carry out a wide bibliographic review that identifies differences between countries and more specifically between European countries. As stated by these authors, in recent years, the consumption of functional foods in Europe has been extended, but this consumption shows great differences among Europeans. While functional foods are very popular in most European countries like Finland, Sweden, The Netherlands, Poland, Spain and Cyprus, in some countries like Denmark, Italy and Belgium are not so accepted. For example, a high percentage of European Mediterranean adolescents (Spain and Cyprus, but not Italy) regularly consume functional foods (Ozen et al., 2014).

Ozen et al. (2012) indicate the importance of carrying out further studies aimed to gaining a better understanding of the factors that influence the consumption of functional foods. In this sense, we find qualitative studies that study the attitudes of consumers to certain categories of functional products, such as the work of Bhaskaran and Hardley (2002). Others focus on analyzing the packaging of a particular functional food category in a particular market (Sorenson & Bogue, 2005). Definitely, contributions in this field are diverse.

The study by Vassallo et al. (2009) concludes that it is necessary to develop better models to explain the options that promote the health of food. These should include food and health-related factors that are the starting point on which this research is based.

The present study focuses on the consumption of eight varied functional foods: low-fat spread butter or low-fat butter, enriched milk, probiotic yogurts, juice with added calcium, fortified cereals with fiber and minerals, bars with added fiber, Xylitol sweets and chewing gum, and energy drinks. Thus, unlike previous studies focused on one or a smaller number of foods, this research opens the spectrum to a greater number of products in order to have a holistic view of the consumption of this type of food. Second, the field of study of the Spanish market presents a challenge compared to other studies carried out in other countries. Finally, the possible moderating role of gender is considered.

In order to reach the objectives, the research is structured as follows: first, the variable attitude in the purchase and consumption of generic foods is analyzed, studying both the existing theories and the most used scales. The second part of the article dedicated to dealing with functional foods, following the same scheme: revision of the main theories and literature, presentation of the model, and exposure of the results. Finally, the conclusions, implications, limitations and future lines of research that are extracted from this study are shown.

Consumer attitudes towards the purchase and consumption of foods

According to the *Theory of Planned Action* (Ajzen, 1991), the attitude towards a behavior is the degree of acceptance or rejection of that behavior, so a positive attitude influences favorably the intention to perform that behavior. In this sense, and according to Urala and Lähteenmäki (2003) in their study on functional foods, attitudes modulate the way in which information is processed, adapted, used or refused.

Because attitudes influence the behavior in the choice of food, they can explain this food choice by consumers (Tuorila, 1997). It has been determined that attitudes and beliefs influence the choice of food along with other factors such as demographic, environmental or socioeconomic (Shepherd & Stockley, 1987). Both personal attitudes and environmental elements influence the food choice (Shepherd, 1990).

Since the beginning of the 1990s, there has been growing interest in the study of attitudes and beliefs related to healthy eating (Steptoe, Pollard, & Wardle, 1995). At this time, theoretical frameworks measuring consumer attitudes such as the *Health Belief Model* (Trenkner et al., 1990) are developed. After reviewing the literature, certain contributions are collected in terms of the measurement of attitudes towards health and food. In this context, the work of Steptoe et al. (1995) who developed *The Food Choice Questionnaire* (*FCQ*), consisting of nine factors: health, mood, convenience, sensory characteristics, natural content, price, weight control, familiarity, and ethical concern. On the other hand, Roininen, Lähteenmäki, and Tuorila (1999) developed a scale to measure the interest in general health (*General Health Interest – GHI*). Another way of measuring attitude is the *Health and Taste Attitudes Scale* (*HTAS*) (Roininen & Tuorila, 1999), which measures both health-related factors (interest in general health, low fat products and natural products) and factors related to taste (desire for sweet foods, food as reward and pleasure).

Therefore, models and scales have been developed to measure attitudes and willingness to consume food, and this work seeks to find a model that includes the main relationships. After reviewing the literature and after analyzing which are the most important points to study in the attitude and willingness to consume functional foods, Fig. 1 presents the conceptual model that collects the relationships proposed.

As can be seen, the proposed model is based on the contributions of Downes (2008) and Urala and Lähteenmäki (2007). In this sense, Urala and Lähteenmäki (2007) propose that individual attitudes towards functional foods are made up of four dimensions: (1) Perceived reward: how health, mood and general well-being can promote the consumption of these functional foods. The pleasure of the idea that consuming these products is a way of taking care of themselves. (2) Need for functional foods: Functional foods are perceived as necessary for health improvement (such as a medicine). (3) Trust and credibility that the benefits promised by the consumption of these foods exist. And (4) safety that the consumer perceives in functional

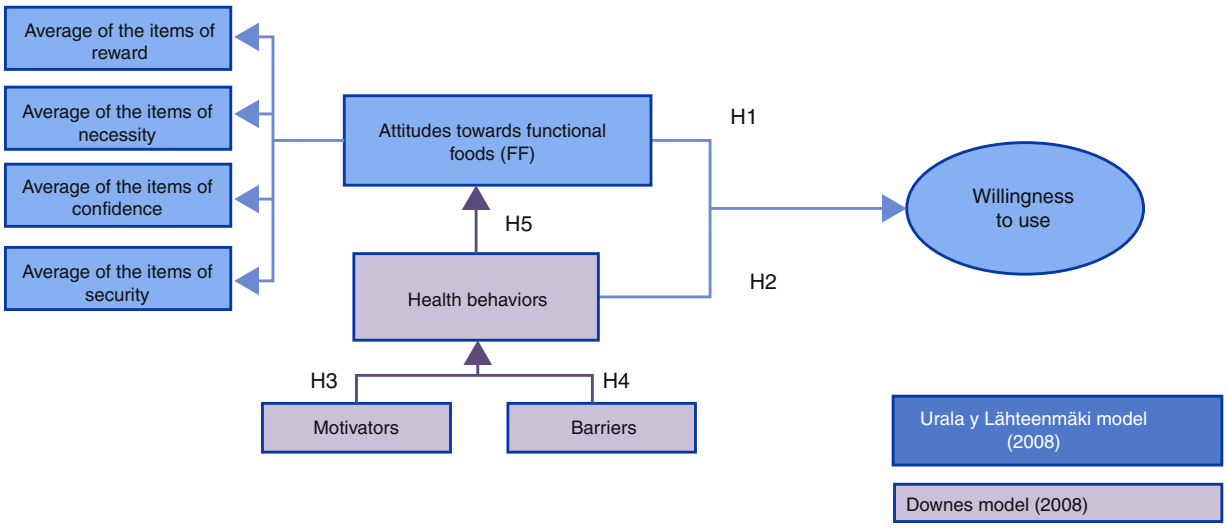

Figure 1 Proposed model.

foods. In addition, those consumer attitudes influence the behavior. Verbeke (2005) affirms that beliefs, knowledge and control over health are the determining factors in the acceptance of functional foods. In this study by Verbeke, the idea of a rational/cognitive decision-making process for functional foods is reinforced. Qin and Brown (2008) analyze the differences in attitude towards genetically modified food according to the gender of the consumer and conclude that the most important attitudes to the purchase intention are trust in organizations, perceived risk and increase of the ethical/moral concern of these applications. Honkanen, Verplanken, and Olsen (2006) also highlight how attitudes towards certain foods (ex. organic) increase the likelihood of consuming them.

Therefore, it is possible to propose a first hypothesis that establishes a positive relation between the attitude towards functional foods and the will to consume them. Unlike previous studies, the present hypothesis covers the attitude and willingness to consume a wide variety of functional foods. Likewise, this relationship is considered in a larger model where the influence of other variables could influence the strength of the relationship. Finally, the relationship is focused on the Spanish market.

H1. Attitudes towards functional foods influence the willingness to consume them.

As pointed out, according to Figueroa and Sánchez (2004), health is one of the main variables in the study of consumer behavior towards functional foods. Consumers prefer products that claim health benefits (Aschemann-Witzel & Hamm, 2010). Some authors highlight how health knowledge increases the likelihood of functional food selection (Naylor, Droms, & Haws, 2009), and poor health knowledge implies little interest in these functional foods, even if there is a relationship between the concepts of healthiness and good taste (Raghunathan, Naylor, & Hoyer, 2006). This is why the proposal model of Downes (2008) is defended: a healthy lifestyle can have an effect on the attitude or consumption of functional foods. This study poses the existence of motivators and barriers to a healthy lifestyle. Thus, Downes (2008) states that a healthy lifestyle involves the performance of physical activity and certain dietary habits. In summary, a positive relationship between the healthy lifestyle and the attitude toward functional foods is presented.

H2. The consumer healthy lifestyle influences positively the attitudes towards functional foods.

Following Downes (2008), there are barriers and motivators of a healthy lifestyle. This author mentions personal motivators (increased energy, spiritual beliefs, weight management and desired outcome) and environmental motivators (roles models, social support, provider counseling, health information) as motivators of this lifestyle. Similarly, Downes (2008) points to two types of barriers: personal (lack of motivation, lack of time) and environmental barriers (lack of social support, safety concerns, lack of resources). In Annex 1, these motivators and barriers are detailed.

Thus, in relation to motivators, wellbeing and disease prevention promote the choice of functional foods, according to Urala and Lähteenmäki (2003). In the same way, Verbeke (2005) argues that the affirmation of the health benefits of functional food and the presence of a sick relative influence more than sociodemographic/cognitive and attitudinal variables in the acceptance of functional foods.

On the other hand, in relation to the barriers, Miles, Ueland, and Frewer (2005) affirm that the lack of information and confidence in transgenic foods is one of the main barriers to its consumption and, therefore, the need for a good labeling and transparency is a necessary condition to curb this barrier to the consumption of these foods. Similarly, Abood, Black, and Feral (2003) postulate that the lack of nutritional knowledge influences inversely when choosing healthy foods.

In sum, two additional hypotheses that argue that motivators and barriers influence the healthy lifestyle of consumers are postulated.

H3. Motivators positively influence the healthy lifestyle of consumers.

H4. Barriers negatively influence the healthy lifestyle of consumers.

Thus, the literature argues that the lifestyle of consumers affects the attitude and consumption of healthy elements. For example, Zandstra, De Graaf, and Van Staveren (2001) measure the relationship between health and overall dietary behavior and conclude that health and lifestyle are good predictors of eating behavior and the will to eat healthy foods.

On the other hand, regarding to the willingness to buy healthy food, the level of consumer health awareness influences attitudes toward functional foods: consumers who are more concerned about health and more aware of healthy lifestyles are more willing to use functional foods than those who are less concerned about health (Chen, 2011). Roininen et al. (1999) also state in their generic food study that all health subscales proposed for health food choices are good predictors of food attitudes.

Therefore, we argue that the healthy lifestyle of consumers influences the attitude and consumption of functional foods.

H5. Consumers healthy lifestyle positively influences the willingness to consume functional foods.

However, the hypotheses raised may differ between men and women. Gender-based differences in attitudes, beliefs, practices, aspirations and life choices have become the focus of an enormous amount of research in most branches of the social sciences, including studies related to food consumption (Beardsworth et al., 2002).

According to attitudes towards food, Baker and Wardle (2003) found no significant attenuating effects of gender preferences or attitudes. Urala and Lähteenmäki (2003) also claim that men and women do not differ in their attitudes towards functional foods.

Other authors, however, do find differences in attitudes towards food according to gender. According to Beardsworth et al. (2002), women are more inclined to make food choices based on ecological or animal protection issues, having higher levels of vegetarianism. These results coincide with those achieved by Ridler and Ridler (2011), who emphasize that women are more willing to pay a high price for food if it fulfills the desired characteristics (organic, for example). Men are more confident and more oriented toward traditional cooking as a foundation for healthy eating. Women, on the other hand, are more inclined to accept new foods (Beardsworth et al., 2002).

Schafer, Schafer, Bultena, and Hoiberg (1993), for example, concluded that women are more concerned about food security than men. In this line, Wardle et al. (2004) argue that men exhibit riskier and healthier behaviors than women and give lower priority to health in food choices (Fagerli & Wandel, 1999).

On the other hand, Stanton, Lang, and Laszlo (2013) state that, in general, women are more emotional than men in decision making at the time of purchase.

Based in previous lines, two hypotheses highlight the possible moderating role of gender.

H1bis. The gender of the consumer moderates the relationship between the attitude towards functional foods and the willingness to consume them.

H2bis. Consumer gender moderates the relationship between healthy lifestyle and attitudes towards functional foods.

Regarding the healthy lifestyle, we found several studies in the literature regarding gender differences. Roos, Lahelma, Virtanen, Prättälä, and Pietinen (1998), for example, claim that, in relation to food, women's behavior is more in consistent with dietary guidelines than men are. This study agrees with Baker and Wardle (2003), which study confirms that women know the current recommendations for fruit and vegetable intake better than men know and are more aware of the links between fruit and vegetable consumption and diseases prevention. Women's increased concern about diet may be related to the fact that in most countries women have a disproportionate responsibility to select and prepare food for their families (Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999).

In addition, according to Baker and Wardle (2003), men are less likely to diet to lose weight. Rozin et al. (1999) highlight the greatest concern among Western women about weight, body shape and appearance. According to the authors, female concerns about weight might explain the consumption of foods low in fat, dieting and concern for foods high in calories.

Silliman, Rodas-Fortier, and Neyman (2004) confirm that the gender difference influences the barriers of following a healthy diet: men consume more sodas, alcohol, and higher fat dairy products eat more meat and less vegetables and fruits than women do. These subjects claim that lack of time is the most common barrier to following a healthy diet. On the other hand, these authors affirm that men exercise more frequently and intensely than women. The most common barrier to exercise is still the lack of time.

The study by Mosca, McGILLEN, and Rubenfire (1998) suggests that gender differences exist in barriers that influence lifestyle. In this research, women rated self-esteem as the most important barrier and classified it significantly higher than men. Women also rated money, knowledge, skills and stress significantly higher than men did.

This exposes the following hypotheses where gender moderates the relationship between motivators/barriers and healthy lifestyle:

H3bis. Consumer gender moderates the relationship between motivators and consumers healthy lifestyle.

H4bis. Consumer gender moderates the relationship between barriers and consumers healthy lifestyle.

Verbeke (2005) indicates that there is a consensus on the gender issue regarding acceptance of functional foods: all studies consistently report to women as the most likely consumers. According to this author, women are more reflective about problems of food and health than men, who usually

Table 1 Study guide.

Data sheet	Sample
Sample description	Spanish men and women over 20 years old who buy or consume food
Area of study	Spain
Method of collecting information	Structured Questionnaire
Sampling procedure	Convenience Non-Probabilistic Sampling
Sample size	333
Field work date	May 2015

demonstrate a rather uncritical and traditional view of food. Other authors, such as Ares and Gámbaro (2007), confirm how gender influences the relationship between lifestyle and willingness to eat functional foods.

However, Verbeke (2005) further states that sociodemographic differences have vanished: the assertion that women, who in previous studies are more willing to consume functional foods, based on health and lifestyle beliefs, are not confirmed in the 2005 study. This statement is in line with previous analysis (Urala & Lähteenmäki, 2007).

The above exposes the following hypotheses where gender moderates the relationship between healthy lifestyle and willingness to eat functional foods.

H5bis. Consumer gender moderates the relationship between the healthy lifestyle of consumers and the willingness to consume functional foods.

Methodology

In order to examine the proposed model and contrasting the hypotheses, a field study is carried out during 2015 with food consumers. The target population is Spanish men and women over 20 years old who buy or consume food products in the geographical context of the region of Valencia.

The method of collecting information was the personal interview with a structured questionnaire (mostly via e-mail), during the months of April to June 2015.

Once a non-probabilistic convenience sampling procedure was carried out, a sample of $n = 333$ participants was obtained. Table 1 shows the technical file of the study.

Sample profile

Of the sample (Table 2), 40% were men and 60% were women. More than 60% of the respondents are in the age range from 30 to 39 years. 89.9% have university studies. As for the number of people in the household, the majority has one to two or three to four members (47.4% and 47.8% respectively). In addition, 37.6% have children under 6 years of age in the home and 13.3% of households are over 65 years of age.

Regarding food purchase and consumption (Table 3), the majority of respondents are the main homebuyers (45.5%). Likewise, most households do not have dietary restrictions (81.1% on their own and 80.1% on that of a family member), with cholesterol being the main problem in food (57.7% of respondents indicate some restrictions).

Measurement of variables and evaluation of psychometric characteristics

For the measurement of the variables of study, it has been used those scales most used in the literature, thus guaranteeing the validity of content. The redaction of items has been adapted to the characteristics of functional foods using all seven Likert-type questions. Annex 1 provides detailed information about the measuring instruments.

Regarding to the measurement of attitude towards functional foods, the literature uses measurement scales developed in the field of generic foods. Alongside this, there are certain specific contributions, such as the Functional Food Scale proposed by Urala and Lähteenmäki (2007), which is also originally based on three other scales that are the most used when studying the attitudes of consumers towards food in general: General Health Interest (GHI) Scale (Roininen et al., 1999), Natural Product Interest (NPI) Scale (Roininen et al., 1999) and Food Neophobia Scale (FNS) (Pliner & Hobden, 1992).

Due to the specificity of its application, the present investigation will follow this scale which, in addition, is the review of several scales previously published by the same authors (Urala & Lähteenmäki, 2003, 2004). After the last two revisions, these are the items to be measured that influence attitudes towards functional foods: reward, need, confidence and safety.

Urala and Lähteenmäki (2007) conclude that there is a need for regular measurement on the development of attitudes towards functional foods as products become more familiar and approach conventional foods. In the Finnish market, these products are reaching maturity and the content of the scales becomes increasingly stable. Cross-cultural validation is required as it focuses on Finnish consumers and the content of the dimensions can be loaded differently depending on the culture studied. Therefore, we will use this measurement scale of attitudes toward functional foods in Spain.

Prior to the comparison of the model, the scales for the five constructs were evaluated from a Confirmatory Factorial Analysis, in order to determine the reliability and validity of the scales by EQS 6.1. (Anderson & Gerbing, 1988). It should be noted that the attitude scale towards functional foods is a multidimensional scale composed of four dimensions. Therefore, in order to move from a second order model to a first order model, a Confirmatory Factorial Analysis with all dimensions and the rest of the model variables was carried out. Once the psychometric characteristics were checked, each dimension of the attitude scale was estimated by the calculation of averages. Once the first-order model is drawn, we again analyze whether the items on each scale measure the latent reference variables, so the scores should be closely related to each other, being internally consistent. Therefore, items whose factor loadings are below 0.6 should be eliminated. Only two cases, PROBAF7 (0.586) and PROBAF8 (0.541), show values close to 0.6, although somewhat lower. Therefore, we decided to keep them and not to re-check the validity of content.

Table 2 Socio-demographics characteristics of the sample.

Characteristics	%		%
Gender		**Monthly household income (including of all individual income)**	
Men	40.0%	*Less than 500 €*	0.4%
Women	60.0%	*From 501 to 1000 €*	0.4%
Age		*From 1001 to 2000 €*	17.3%
29 and younger	7.5%	*From 2001 to 4000 €*	44.7%
From 30 to 34	31.4%	*Over 4000 €*	37.3%
From 35 to 39	31.8%	**Household structure**	
From 40 to 44	9.4%	*Children under 6 years old*	37.6%
From 45 to 54	8.2%	*Seniors +65 years old*	13.3%
From 55 to 64	6.3%	*Total number of people living at home*	
65 and older	5.5%	From 1 to 2	47.4%
Education level		From 3 to 4	47.8%
No studies	0.0%	From 5 to 6	4.4%
Mandatory studies	2.0%	6 and over	0.4%
High School	8.2%		
University degree	55.7%		
PhD or Master degree	34.1%		

Regarding reliability, all Cronbach's Alpha as Composite Reliability (CR) were required to be above the recommended value of 0.7 (Nunnally & Bernstein, 1994). All meet both measures, except the Cronbach Alpha ''F3 Healthy Lifestyle'' (0.656) which is very close to 0.7. Additionally, the Average Variance Extracted (AVE) index, which is an indicator of the variance captured by a factor against the variance due to the measurement error, was used and recommended to be higher than 0.5 (Fornell & Larcker, 1981a). All factors are met (including ''F1 Functional Food Consumption Willingness'' (0.405) and ''F2 Attitude towards Functional Foods'' (0.495), which are considered equal to 0.5 and therefore meets the requirements).

Likewise, the significance of the standardized coefficients was considered, with absolute minimum *t* values of 5.970, being all *t* values given by the EQS program significant (Table 4).

Finally, the discriminant validity of the model was verified. To achieve this, first the corresponding confidence intervals were calculated (Anderson & Gerbing, 1988), that is to say, calculating a confidence interval of ± 2 standard errors between correlation factors, determining the validity if the interval does not include the value 1. As can be seen in Table 5, these conditions were met for each of the factors.

Second, the accomplishment was verified with the extracted variance test (Fornell & Larcker, 1981b), verifying that the square of the covariance of each pair of factors is less than the variance extracted from each of these factors. As can be seen from Table 5, this criterion is checked in all cases. Therefore, it can be affirmed that there is discriminant validity.

Results

Having carried out the relevant tests regarding the reliability and validity of the scales that determine the proposed model, the estimations of the model have been made through structural equation models (EQS 6.1). The results are summarized in Table 6.

Table 3 Characteristics of the sample: consumption and anthropometric data.

Main home food buyer		Main healthy concerns/characteristics	%
Mother or father	29.4%	Cholesterol	57.7%
Partner	24.7%	Lactose	9.6%
Oneself	45.5%	Vegetarian	7.7%
Other person	0.4%	Allergies	5.8%
Restrictions on the diet on a family member		Celiac disease	5.8%
No	80.1%	Uric acid	3.8%
Yes	19.9%	Triglycerides	1.9%
Restrictions on own diet		Hypertension	1.9%
No	81.1%	Vegan	1.9%
Yes	18.9%		

Table 4 Psychometric properties of the measuring instrument.

Variable	Indicator	Factorial loads	*t* value	Alpha Cronbach	CR (IFC)	Ave
F1 Willingness of consumption of functional food	PROBAF1	0.624	10.797	0.850	0.843	0.405
	PROBAF2	0.745	9.939			
	PROBAF3	0.603	10.908			
	PROBAF4	0.761	9.664			
	PROBAF5	0.75	9.987			
	PROBAF6	0.698	10.233			
	PROBAF7	0.586	10.963			
	PROBAF8	0.541	11.131			
F2 Attitude towards functional foods	RECMED	0.883	8.720	0.903	0.797	0.495
	NECMED	0.906	7.348			
	CONFMED	0.925	8.108			
	SEGMED	0.911	11.059			
F3 Healthy life style	HLB1	0.748	11.311	0.656	0.821	0.535
	HLB2	0.837	7.937			
	HLB3	0.868	5.970			
	HLB4	0.818	9.976			
F4 Motivators to healthy lifestyle	MOT1	0.893	9.507	0.754	0.901	0.567
	MOT2	0.958	9.577			
	MOT3	0.725	11.267			
	MOT4	0.906	8.943			
	MOT5	0.884	10.094			
	MOT6	0.76	11.007			
	MOT7	0.788	11.204			
F5 Barriers to healthy lifestyle	BAR1	0.865	9.601	0.816	0.896	0.552
	BAR2	0.845	9.737			
	BAR3	0.897	11.144			
	BAR4	0.851	9.905			
	BAR5	0.876	10.694			
	BAR6	0.906	9.129			
	BAR7	0.89	10.454			

General contrast model

The structural model was tested using the robust maximum likelihood method using the EQS 6.1 program. In the lower part of Table 6 the adjustment indicators of the measurement model are shown, differentiating between global, incremental and parsimony adjustment measures. The values obtained are, in general, positive. According to Martínez and Pina (2004), the Chi-square test depends highly on the sample size, recommending samples of 100–200 observations for correct interpretation. Like the authors, since the sample exceeds this interval, no greater importance should be given to their non-compliance (Martínez & Pina, 2004).

Goodness-of-fit statistics suggest that the structural model offers an acceptable fit (Table 7). As for the overall adjustment: Chi-square (p, 0.001) = 3534.307 (435); Chi-square (sb) (p = 0.00000) = 819.014 (399); Chi-square (sb)/gl = 2.05; RMSEA = 0.062; GFI = 0.839. In

Table 5 Discriminant validity.

Variable	F1	F2	F3	F4	F5
F1 Willingness of consumption of functional food	0.405	0.425	0.018	0.104	0.003
F2 Attitude towards functional foods	(0.568–0.736)	0.495	0.001	0.145	0.0002
F3 Healthy life style	(−0.284 to 0.012)	(−0.112 to 0.176)	0.535	0.138	0.050
F4 Motivators to healthy Lifestyle	(0.189–0.457)	(0.257–0.505)	(0.229–0.513)	0.567	0.019
F5 Barriers to healthy lifestyle	(−0.082 to 0.198)	(−0.123 to 0.149)	(−0.371 to −0.075)	(−0.284 to 0.008)	0.552

Table 6 Model of structural equations. Hypothesis contrast.

	Contrast of hypothesis	Standardized load	*t* value	Confirmation
H1	Attitude FF → Willingness consumption FF	0.662**	8.499	Hypothesis accepted
H2	Healthy life style → Attitude FF	0.073 (n.s.)	1.000	Hypothesis rejected
H3	Motivators → Healthy life style	0.356**	3.277	Hypothesis accepted
H4	Barriers → Healthy life style	−0.174*	−2.129	Hypothesis accepted
H5	Healthy life style → Willingness of consumption	−0.144*	−2.15	Hypothesis rejected

* $p < 0.05$.
** $p < 0.01$.

Table 7 Goodness-of-fit statistics.

Goodness-of-fit indicators		
Global adjustment	Incremental adjustment	Parsimony adjustment
Chi-square = 3534.307 (435) (*p* 0.001)	NFI = 0.768	Chi-square (normal) = 797.679
Chi-square (sb) = 819.014 (399) *p* = 0.00000	NNF I = 0.852	AIC independence = 2664.307
Chi-square (sb)/gl = 2.05	CFI = 0.852	AIC model = 21.014
RMSEA = 0.062	AGFI = 0.813	
GFI = 0.839		

the incremental adjustment: NFI = 0.768; NNF I = 0.852; CFI = 0.852; AGFI = 0.813. As indicated in previous lines, in relation to the measures of adjustment of parsimony, its use is more appropriate comparing alternative models since the parsimony of a model is the extent to which it reaches adjustment for each coefficient or estimated parameter and no associated statistical test of this index is available. In addition, they could also be used to evaluate if the proposed model presents an adequate number, or not, of relation parameters.

Once the goodness of the adjustment was analyzed, we proceeded to analyze the contrast of the hypotheses. As can be seen in Table 6, in the proposed model three of the five hypotheses are accepted. Therefore, the analysis has allowed to estimate the model almost totality, noting the existence of an effective and direct interrelation between the selected constructs of each one of the theories and integrated models and their variables.

The main body of this paper focuses on the relationship between attitudes and the willingness to consume functional foods. From the analysis of results, firstly, it is clear that the attitude towards functional foods positively influences the will to consume them (H1 accepted, $B1 = 0.632$). This relationship is tested in previous studies by various authors in other countries (Chen, 2011; Urala & Lähteenmäki, 2007).

As for the relationship between lifestyle and functional food consumption, we have not been able to conclude that the healthy lifestyle influences the willingness to consume functional foods (H5 rejected, $B1 = -0.144$). This relation has obtained an opposite sign to the expected one. Likewise, it has not been possible to demonstrate a significant influence of the healthy lifestyle on the attitude towards functional foods (rejected H2). In the following section, we try to justify these results.

In addition, it has been shown that motivators (H3 accepted; $B = 0.356$) have a direct and positive influence on the healthy lifestyle. Likewise, the barriers of the model (H4 accepted; $B4 = -0.174$) directly and negatively influence the healthy lifestyle.

Fig. 2 graphically shows the final accepted model. As can be seen, the more robust relationships occur between the attitude towards functional foods and the will to consume them (H1), and how the motivators influence the healthy lifestyle (H3). The barriers that negatively influence the healthy lifestyle (H4) and healthy lifestyle that also negatively influence the willingness to consume functional foods (H5).

The moderator of gender

To analyze the moderating role of gender in the general model, we made two independent estimates: one for 153 women and one for 102 men. The idea was to compare our hypotheses in these two scenarios.

The moderation hypotheses (H1bis, H2bis, H3bis, H4bis and H5bis) were tested by multi-group analysis with the EQS software (version 6.1). Two steps were followed. The first does not imply any formal analysis of the moderating effect, since for each group of interviewees the parameters and significance of each of the proposed causal hypotheses are estimated. For both sub-samples (men and women), the same hypotheses are accepted and both subgroups reject the same hypotheses (Table 8).

The second step, testing the significant differences between the parameters in both subgroups, the Lagrange multiplier (Lmtest) was used, after including the constraints in our model. Therefore, we can verify if the removal of the

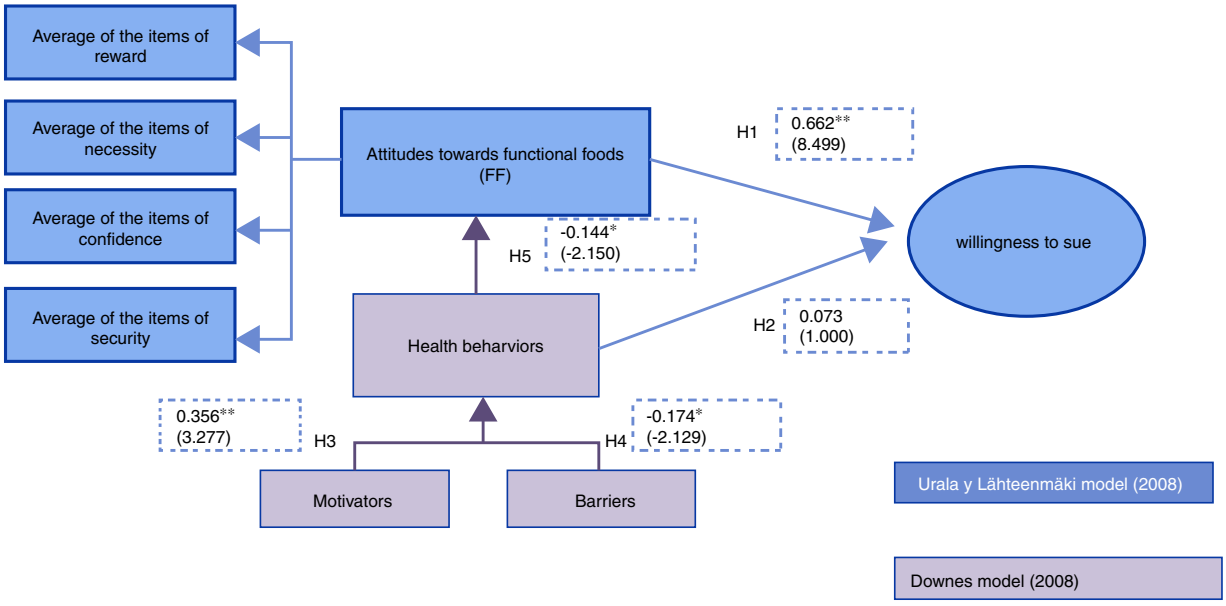

Figure 2 Accepted final model.

Table 8 Moderator variable: women vs. men.

Contrast of hypothesis		Women		Men		Confirmation
	Generic model	Beta coef	*T* rob	Beta coef	*T* rob	
H1bis	Attitude FF (F2) → Willingness consumption FF (F1)	0.657**	8.512	0.643**	8.512	Hypothesis accepted
H2bis	Healthy life style (F3) → Attitude FF (F2)	0.059 (n.s.)	0.982	0.086 (n.s.)	0.982	Hypothesis rejected
H3bis	Motivators (F4) → Healthy life style (F3)	0.272*	2.204	0.226*	2.204	Hypothesis accepted
H4bis	Barriers (F5) → Healthy life style (F3)	0.241*	−2.337	0.228*	−2.337	Hypothesis accepted
H5bis	Healthy life style (F3) → Willingness of consumption FF (F1)	0.275*	−2.354	−0.275*	−2.354	Hypothesis rejected

* $p < 0.05$.
** $p < 0.01$.

constraints produces a significant change in the statistic X^2. This leads to the rejection of the equality constraint on the parameters, whose elimination significantly improves the fit of the model. The statistic associated with differences in X^2 for each separate restriction indicates that gender only moderates a relationship [motivators (*F4*) influences healthy lifestyle (*F3*)].

Thus, in our study, one hypothesis (H3bis) of five differs significantly between women and men. Women and men differ significantly in the relationship between motivators and the healthy lifestyle (H3bis). Motivators influence healthy lifestyles more significantly in women than men.

All this allows us to present several conclusions and implications as shown below.

Conclusions, limitations and future lines of research

The present research tries to contribute to current studies on functional foods. Thus, a first contribution of this study is that it combines previous proposals made by literature through an explanatory model of attitudes toward functional foods. Therefore, based on the Urala and Lähteenmäki (2007) proposal, the model also integrates the antecedents of the healthy lifestyle into the attitude and consumption of these foods (Downes, 2008).

The results show the influence of attitudes on the willingness to consume functional foods and confirm the line of

previous studies by Urala and Lähteenmäki (2007) and Chen (2011).

Likewise, lifestyle is both positively influenced by motivators and negatively influenced by barriers, corroborating the results of the MABS model (Downes, 2010), which had already been accepted in previous literature.

However, a healthy lifestyle negatively influences the willingness to consume functional foods and does not influence significantly to attitudes toward functional foods. This differs from previous studies in Finland (Urala & Lähteenmäki, 2007) and Taiwan (Chen, 2011). The reason may be that in Spain, consumers most interested in health do not consider it necessary to use this type of food, since they focus on a consumption of natural foods and the search for a balance in food, beyond of products that stand out for the benefits they may have on specific aspects of health.

More and more work is emphasizing this negative relationship between a healthy lifestyle and a willingness to consume functional foods. According to Siro, Kapolna, Kapolna, and Lugasi (2008), Europeans are much more critical with new food products and technologies compared to American consumers. In addition to misgivings about the safety of these foods, they are more critical with processes away from traditional methods (Poppe & Kjærnes, 2003). Therefore, Europeans have an acceptance of functional foods less unconditional and with a greater number of reservations compared to Americans. Bech-Larsen and Grunert (2000) claim in their study of the Nordic market, how health-related benefits are a necessary but not sufficient condition for increased consumption of functional foods.

These results are in line with those of Urala and Lähteenmäki (2007), where the interest in certain functional products fell with respect to previous studies by the same authors (Urala & Lähteenmäki, 2003, 2004), as consumers increasingly preferred natural products. Rozin et al. (2004) also point out that the preference for natural products is highly related to perceived health and, therefore, to healthy lifestyle. However, Chen (2011) points out that the results can change, depending on how the sample is classified (consumers who are more concerned with health and less concerned with health).

The *second contribution* has been the study of the Spanish market. The Functional Food Scale was carried out in Finland in 2007. Despite the proliferation of studies on functional foods in Spain, this scale had not been applied even though it was recognized as one of the most relevant applications in the analysis of attitudes towards Functional foods (Urala & Lähteenmäki, 2007), allowing to cover a research gap in the academic literature. Alongside this, the present research uses the model proposed by Downes (2008) and its validated scale, MABS, in Spain. This model had been used in The U.S.A. (Downes, 2008, 2010) in a study of black population, but never in a European country.

The third contribution would be the study of the moderating role of gender. These findings contribute to a better understanding of how healthy lifestyles may differ between men and women in influencing attitudes toward functional foods.

Because of the results and conclusions reached, there are five management implications in companies dedicated to the production and distribution of functional foods, the first of a generic nature and four more ones that are specific. Firstly, marketing departments should consider these results when marketing campaigns if they want to influence the consumer's attitude towards functional foods and, therefore, the will to consume them (as noted Hypothesis 1). To do this, they must focus on the reward, need, confidence and safety of these foods, which are the main variables that shape attitudes towards them.

Second, include the technical specifications to be able to meet the quality and labeling requirements that cover the safety variable, reducing the risks of added or extracted ingredients.

Third, marketing campaigns exalt the arguments of health and disease prevention to encompass the variables of need and reward of consumption of these functional foods. The consumer must differentiate effortlessly and evaluate some beneficial characteristics that the conventional product does not provide.

Fourth, improve transparency so that the consumer relies on the arguments, with clear information and product benefits well explained in the packaging.

And fifth, take into account gender differences, being the motivators a more influential variable in the healthy lifestyle in women than in men. This should be taken into account when presenting arguments in favor of functional foods, especially in those products that may be directed to the female audience (weight control, increased energy, lengthen life expectancy, etc.).

It should be noted that both the results and the conclusions/contributions and implications must be understood under the umbrella of the limitations of the research. Thus, given the characteristics of the sample, these results cannot be generalized and it would be convenient, therefore, a sample with more similar characteristics to the population.

However, despite the bias of the sample, we can justify its validity. For this, we take as reference previous works that indicate that the samples with these characteristics of gender, studies, level of income and age, are those with more knowledge and more intention of consumption of functional foods (Hilliam, 1996; IFT Institute of Food Technologist, 2014; Sääksjärvi, Holmlund, & Tanskanen, 2009; Siro et al., 2008, among others). After an exhaustive analysis, we find literature in which this sample of younger age, with greater feminine representativeness and high level of studies or income is justified.

Gender: most studies (Sääksjärvi et al., 2009) reveal that women (60% of our sample) have a greater knowledge of functional foods than men and, therefore, greater intention to use them. Siro et al. (2008) carried out a meta-study where they emphasize that women are the main consumer of functional foods in both Europe and The USA.

Studies and income level: this sample reflects a majority with university level of education (55.7%) and with a monthly income in the household – totaling all individual income – from 2000 to 4000 euros.

Siro et al. (2008) indicate in their literature analysis that consumers with higher education and higher income levels are the main consumers of functional foods in The U.S.A. and Europe. In addition, according to Hilliam (1996) the higher socioeconomic group has a greater willingness or ability to pay a high price, as well as a better knowledge

and awareness of the health and benefits of functional foods.

Also, Sääksjärvi et al. (2009) argue that the level of income has a positive impact on consumer knowledge about functional foods. A post hoc test showed that the relationship between income and knowledge is linear: people earning less than 10,000 euros a year have little knowledge about functional foods, while knowledge of consumers earning more than 60,000 euros are higher. This same author argues that respondents with university education obtain better results in the index of knowledge of functional foods than those of a lower level of education.

Age: According to IFT – the Institute of Food Technologists – (2014), millennials (born between 1982 and 2005) are most likely to believe that functional foods or beverages can be used instead of some medicines to relieve tiredness or lack of energy, maintain mental acuity with aging, reduce stress and improve eye health. Millennials and X generation (born between 1961 and 1981) read nutrition labels to be informed of the health benefits that functional foods can provide for calories, vitamins, minerals, etc.

The Nielsen Company (2015) states in its most recent functional food survey in 2015 that the generational gap is particularly pronounced for functional foods that reduce the risk of disease or promote good health: the willingness to pay a premium for health attributes decreases with age. Homeland generation (born between 2005 and 2025) and millennials (born between 1982 and 2005) are more willing to pay a premium than baby boomers (born between 1943 and 1960).

Another limitation of the study is the analysis of eight types of functional foods and the willingness to consume each of them according to their specific health benefits. As indicated above, functional foods are not perceived as a homogeneous group (Urala & Lähteenmäki, 2003), as each product causes attitudes in the consumer. We observed that, of the eight product categories, the least known in Spain is the juice with added calcium and, accordingly, this is the one that the consumer would be less willing to try. It would be interesting to go deeper into other well-known functional foods or with other reported benefits.

As for the future lines of research, we highlight three main recommendations.

Firstly, a greater number of variables should be considered to assess the positive influence of attitudes towards functional foods, as we have found that lifestyle does not influence these attitudes towards functional foods (it would be interesting to study the perceived risk, the influence of the container, etc.).

The second possible future line of research is to verify the proposed model by dividing the sample between those who follow a healthier lifestyle and those who do not. It would be interesting to evaluate the results and to check if there is any difference in the influence towards the willingness to consume functional foods, since in previous literature we find a conflict between those who do confirm this positive influence and those who do not, as we have analyzed previously. Since our model has not been able to prove a significant influence between the healthy lifestyle and the attitude towards functional foods, we should take into account the demographic and anthropometric characteristics of the sample, analyzing the results according to age, sex, income level and, above all, according to the food restrictions and the desired weight.

Thirdly, it would be relevant to compare this study carried out in Spain with other countries, specifically with The U.S.A., the number one country regarding functional food consumption (Menrad, 2003). The Functional Food Scale, which had not been applied in Spain as we mentioned earlier, has not been applied in The U.S.A. neither.

Conflict of interest

The authors do not have any conflict of interest.

Annex 1: Scales and items.

Concept	Items	Authors
Willingness to consume functional foods	Would you try this product category? AF1: Cholesterol lowering spread AF2: Enriched Milk with Omega-3 (EPA y DHA), calcium, folic acid... AF3: Probiotics yogurts AF4: Calcium Fortified Juice AF5: Fortified Cereals with fiber y minerals AF6: Snack bar with added fibre AF7: Sweets and chewing gums with xylitol AF8: Energy Drinks PH1: Low-fat cheese PH2: Organic Bread	Urala and Lähteenmäki (2007)
	REC1: Functional foods help to improve my mood REC2: My performance improves when I eat functional foods REC3: Functional foods make it easier to follow a healthy lifestyle REC4: I can prevent disease by eating functional foods regularly REC5: The idea that I can take care of my health by eating functional foods gives me pleasure REC6: Functional foods can repair the damage caused by an unhealthy diet	Urala and Lähteenmäki (2007)

Concept	Items	Authors
Attitudes towards functional foods (reward necessity confidence safety)	REC7: I am prepared to compromise on the taste of a food if the product is functional REC8: I actively seek out information about functional foods NEC1: Functional foods are completely unnecessary NEC2: Functional foods are a total sham NEC3: The growing number of functional foods on the market is a bad trend for the future NEC4: For a healthy person it is worthless to use functional foods NEC5: It is great that modern technology allows the development of functional foods NEC6: I only want to eat foods that do not have any medicine-like effects NEC7: Health effects are not appropriate in delicacies NEC8: Functional foods are consumed mostly by people who have no need for them NEC9: It is pointless to add health effects to otherwise unhealthy foods	Urala and Lähteenmäki (2007)
	CON1: Functional foods promote my well-being CON2: The safety of functional foods has been very thoroughly studied CON3: I believe that functional foods fulfil their promises CON4: Functional foods are science-based top product	Urala and Lähteenmäki (2007)
	SEG 1: If used in excess, functional foods can be harmful to health SEG2: In some cases functional foods may be harmful for healthy people SEG3: Using functional foods is completely safe SEG4: The new properties of functional foods carry unforeseen risks SEG5: Exaggerated information is given about health effects	Urala and Lähteenmäki (2007)
Healthy lifestyle behaviour	HLB1: I participate in moderate physical activities such as running, cycling, walking or swimming 30 minutes five to seven days a week HLB2: I eat 2 pieces of fruit a day HLB3: I eat vegetables every day HLB4: Normally, I avoid foods high in fat and calories as potato chips, soft drinks or fatty meats	Downes (2008)
Motivators to healthy lifestyle	MOT1: I may live longer MOT2: I want to be healthy MOT3: I believe that God wants me to take care of my body MOT4: I feel more energetic MOT5: I want to manage my weight MOT6: I have someone to encourage me or help me MOT7: I have seen others get sick from unhealthy behaviors	Downes (2008)
Barriers to healthy lifestyle	BAR1: I am not motivated BAR2: I do not have someone to encourage or help me BAR3: I live in an unsafe neighborhood BAR4: I have too many other things to do BAR5: I have health problems BAR6: I don't know what to do BAR7: I am unable to afford healthy foods	Downes (2008)

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