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Schnettler, B., Adasme-Berríos , C., Grunert , K.G. et al. (2016) The Relation between Attitudes toward Functional Foods and Satisfaction with Food-Related Life. British Food Journal, 118 (9). pp. 2234-2250. ISSN: 0007-070X

https://doi.org/10.1108/BFJ-02-2016-0079

The Relation between Attitudes toward Functional Foods and Satisfaction with Food-Related Life

Journal:	*British Food Journal*
Manuscript ID	BFJ-02-2016-0079.R1
Manuscript Type:	Research Paper
Keywords:	Functional foods, Attitudes, Satisfaction with food-related life, University students

Abstract

Purpose – To assess the effect of attitudes towards functional foods (FF) on university students' satisfaction with food-related life and to distinguish student typologies, considering that the attitudes towards FF are not homogeneous among consumers.

Design/methodology - A survey was applied to 372 university students (mean age=20.4 years, SD=2.4) in southern Chile. The questionnaire included the Attitudes towards Functional Foods (AFF) questionnaire and the Satisfaction with Food-related Life (SWFL) scale, questions about consumption and knowledge about FF and socio-demographic characteristics.

Findings – Using Confirmatory Factor Analysis (CFA) and Structural Equation Modelling, it was found that attitudes toward functional foods directly and significantly influence students' satisfaction with food-related life. A cluster analysis applied to the Z-scores from the factors obtained by the CFA classified three typologies: Positive towards FF (36.3%), moderately positive towards FF (43.0%) and negative towards FF (20.7%). The positive towards FF type had a significantly greater SWFL score than the negative towards FF type. The types differ according to consumption and knowledge about FF.

Research limitations/implications – This study was conducted in the context of only one country in South America.

Originality/value – This study is the first that assesses the effect of AFF on satisfaction with food-related life in a sample of university students. Fostering positive attitudes towards FF will allow for a growth in the degree of satisfaction with food-related life of university students with features similar to those of the study sample.

Keywords: Functional foods, attitudes, satisfaction with food-related life, university students.

Paper type: Research paper.

The Relation between Attitudes toward Functional Foods and Satisfaction with Food-Related Life

Introduction

Functional food (FF) is an engaging research topic due to new trends in nutrition (Kljusurić and Čačić, 2014). Although numerous studies have been conducted that analyse the acceptance of FF in relation to age (for examples, see Siegrist *et al*., 2015; Annunziata *et al*., 2015; Kljusurić *et al*., 2015; Bruschi *et al*., 2015; Ares and Gámbaro, 2007; Barrios *et al*., 2008; Krystallis *et al*., 2008; Teratanavat and Hooker, 2006; Hellyer *et al*., 2012; Brečić *et al*., 2014; Büyükkaragöz *et al*., 2014), there are few studies that focus on Attitudes towards Functional Foods (AFF) of young people, such as university students (Kljusurić and Čačić, 2014).

While some authors indicate that young people are less interested in healthy food (Urala and Läthenmäki, 2007; Barrios *et al*., 2008; Büyükkaragöz *et al*., 2014), others suggest that they constitute an interesting group because they represent the future of consumers (Kolodinsky *et al*., 2008; Kljusurić and Čačić, 2014) and are more likely to accept novel products (Teratanavat and Hooker, 2006; Zychowicz-Jezewska, 2009; Brečić *et al*., 2014). The majority of studies on young people have focused on evaluating knowledge of FF (Labrecque *et al.,* 2006; Kolodinsky *et al.,* 2008; Markovina *et al.,* 2011; Savurdan and Aktas, 2011; Bilgiç and Yüksel, 2012; Kljusurić and Čačić, 2014), willingness to buy them (Zychowicz-Jezewska, 2009; Markovina et al., 2011; Kljusurić and Čačić, 2014), attitudes towards them (Labrecque *et al.,* 2006; Devcich *et al.,* 2007; Kolodinsky *et al*., 2008; O'Connor and White, 2010; Markovina *et al*., 2011; Bilgiç and Yüksel, 2012; Bruschi *et al.,* 2015), consumption (Naylor *et al*., 2009; O'Connor and White, 2010; Bilgiç and Yüksel, 2012; Kljusurić and Čačić *et al.,* 2015) and willingness to pay for them (Bruschi *et al.,* 2015).

Young people are a relevant group from a public health perspective in terms of long-term effects of healthy eating (Bruschi *et al*., 2015). Studies done on university students indicate that a large portion do not have healthy diets (Racette *et al*., 2008; Dubuisson *et al*., 2010;

Schnettler *et al*., 2013, 2015a), which is linked to a high prevalence of obesity (Smith-Jackson and Reel, 2012), chronic diseases (Winkleby and Cubbin, 2004; Costa Silva *et al*., 2011), and psychological effects (Schnettler *et al*., 2013; 2015a; El Ansari *et al*., 2015). The university period is a critical stage in the development of eating habits that affect future health (Barić *et al*., 2003).

Current literature suggests that AFF is not homogenous within consumers (Ares and Gámbaro, 2007; Herath *et al*., 2008; Krystallis *et al*., 2008; Schnettler *et al.,* 2015a), that there are differences associated with demographic variables in young people, such as gender (Kolodinsky *et al*., 2008; Bilgiç and Yüksel, 2012) and income level (Markovina *et al*., 2011); while others report a low or null association between these variables (O'Connor and White, 2010; Bruschi *et al*., 2015). Some authors suggest that cultural factors play a significant role in AFF (Siegrist *et al*., 2015; Labrecque *et al*., 2006; Kolodinsky *et al*., 2008).

Although in the developing countries of South America there is a growing interest in learning about consumer acceptance of FF (Soto *et al*., 2006; Ares and Gámbaro, 2007; Ares *et al*., 2008, 2009, 2010; Schnettler *et al*., 2010, 2015b; Harrar *et al*., 2011; Cruz *et al*., 2013; van Vliet *et al*., 2015), studies on young people have been scarce, with the exception of Jiménez *et al.* (2010), who studied the knowledge and intent of consumption in Argentina.

More than just a basic necessity, eating is associated with a search for happiness and well-being (Carrillo *et al*., 2013). Subjective well-being (SWB) is an assessment people make of their own lives, including happiness, pleasurable emotions, satisfaction with life and the relative absence of unpleasant emotional states. The cognitive component of SWB is satisfaction with life, whether overall or by specific domains (Diener *et al*., 1985, 1999). In the food domain, satisfaction with food-related life (SWFL) is defined as a person's overall assessment regarding eating habits (Grunert *et al*., 2007). Studies indicate that SWFL relates to healthier eating habits. In Korea, Kim *et al*. (2012) concluded that elderly people who were more satisfied with their food-related lives had balanced diets. Within adults in two regions in Chile, Schnettler *et al.* (2011, 2012) found that the probability of high SWFL increased if people practiced healthy

eating behaviours. Schnettler *et al.* (2013; 2015a) also determined that university students with healthier eating habits exhibit greater SWFL.

Studies have linked AFF with general well-being, satisfaction with life and food-related satisfaction (Menrad, 2003; Niva, 2007; Hailu *et al.,* 2009; Siró *et al.,* 2008). In Spain, Carrillo *et al.* (2013) reported that satisfaction with life influenced positive AFF. In Chile, Schnettler *et al.* (2015b) found that people who are more inclined to buy FF are more satisfied with their lives. However, the relationship between AFF and well-being in the food domain has not yet been studied in young people.

Although studies indicate that distinct components of SWB affect AFF, others suggest that the relation is the inverse (Menrad, 2003; Niva, 2007; Hailu *et al*., 2009; Siró *et al*., 2008; Silvi *et al*., 2014). In this study, the latter approach is adopted. Upon revising the definition of SWFL (Grunert *et al*., 2007), it is expected that a person's assessment regarding their food and eating habits would be positive if their eating habits favourably impact their health. Therefore, considering health conscious young consumers are more likely to have positive AFF (Naylor *et al*., 2009; Kljusurić and Čačić, 2014), and that university students with healthier diets have greater SWFL (Schnettler *et al*., 2013, 2015a), we hypothesise that AFF directly and significantly influence students' SWFL. Therefore, the aims of this study were to test this causal relationship using Structural Equation Modelling (SEM), and to distinguish university student typologies according to their AFF, SWFL, general knowledge of FF and socio-demographic characteristics.

Methods

Sample and procedure

The students were contacted on campus and only those who agreed to participate were surveyed. Thus a non-probabilistic sample was formed of 372 university students belonging to the six faculties of the University of La Frontera in Temuco, Chile. The inclusion criterion in the sample was enrolment status at the institution at the time of the survey.

Once students voluntarily agreed to participate, they signed an informed consent prior to completing the survey. A trained surveyor administered the questionnaires during October and November 2014, and the anonymity of the respondents was ensured. A pilot test of the questionnaire was conducted with 10% of the survey sample from the same university, following the same method of addressing the participants as in the definitive survey. Participants deemed the content of the questionnaire and its items as clear and appropriate. As the pilot test of the instrument was satisfactory, no changes were required in either the questionnaire or the interview procedure. The execution of the study was approved by the Ethics Committee of the Faculty de Agriculture and Forestry of the University de La Frontera.

Questionnaire.

The questionnaire contained closed questions. The first two questions referred to students' general knowledge about FF; Question 1: "Have you heard, seen or read about functional foods?" (Yes/No), Question 2: "Do you know what it means for food to be functional?" (Yes/No). Then the interviewer read the definition of FF provided by the Institute of Nutrition and Food Technology (INTA, in Spanish, nd) accepted in Chile: "Functional foods are foods that in natural or processed form contain components that have beneficial health effects beyond nutrition". After this, the respondents were asked if they consume FF.

Next, the students responded to questions on AFF, using the following scales:

The AFF questionnaire developed by Urala and Lähteenmäki (2007) consists of 25 items grouped into four factors: "Reward from using FF" (REW, 8 items); "Necessity for FF" (NEC, 8 items); "Confidence in FF" (CON, 4 items) and "Safety of FF" (SAF, 5 items) (Table 1). The respondents were asked to indicate their degree of agreement with the statements using a 6-level Likert scale (1 = disagree completely), to 6 (agree completely). Urala and Lähteenmäki (2007) reported Cronbach's α of 0.75-0.85 for the factors. More recently, using exploratory and confirmatory factor analysis, Carrillo *et al.* (2013) confirmed the structure of four factors of AFF with 21 items and Cronbach's α of 0.651-0.823 for the factors. Although Carrillo *et al.*

(2013) had previously been conducted the AFF in Spanish, we chose to translate the AFF questionnaire from Urala and Lähteenmäki´s (2007) original English version to adapt it to Chilean culture. Two bilingual translators translated the original items of the AFF questionnaire from English to Spanish. A third bilingual translator then back-translated the Spanish version of the scale into English. The differences found were resolved through discussion, with all translators arriving at an agreed final version of the scales (Table 1).

The SWFL scale was developed by Grunert *et al*. (2007). It evaluates cognitive judgements on the person's food-related life. It consists of five items grouped into a single dimension: F1. Food and meals are positive elements; F2. I am generally pleased with my food; F3. My life in relation to food and meals is close to ideal; F4. With regard to food, the conditions of my life are excellent; F5. Food and meals give me satisfaction in daily life. Respondents were asked to indicate their degree of agreement with the statements using a 6-point Likert scale (1: disagree completely 6: agree completely). A Spanish-language version of the SWFL was used in this study, which showed good levels of internal consistency with previous studies with university students in Chile (Schnettler *et al.,* 2013; 2015a). In this study, the SWFL presented an adequate level of internal consistency (Cronbach's α= 0.868) and the existence of a single factor for all the items (explained variance: 62.3%). The mean SWFL score of all participants was 21.2 (SD = 5.1, range = 5-30).

Scales without midpoint (i.e. 6 point Likert scales) were used, as previous testing of the instruments suggested a tendency by university students to concentrate answers at the midpoint (Schnettler et al., 2013; 2015a).

Classification questions were included to establish gender, age, area of residence, place of residence during the semester and the education level and occupation of the head of the household. The last two variables are used to determine socioeconomic status (SES), categorized as high, upper middle, middle-middle, lower middle, low, and very low. These variables, conceptually, are related to income, cultural level and the stock of wealth

accumulated by the family group, allowing a simple but adequate estimate of the socio-economic level of Chilean households (Adimark, 2004).

Statistical analyses

The effect of AFF on the student's SWFL was assessed by SEM, which tests the causal relationship of a series of regression equations simultaneously separated and interdependent, and includes the factor analysis to explain latent constructs (which are not directly observable), specified in a theoretical model (Hair *et al*., 2007).

Anderson and Gerbing (1988) recommended the use of SEM through a two-step approach. First of all, a measurement model was estimated using Confirmatory Factor Analysis (CFA), and SEM was used to test causal relationships. To evaluate the goodness of fit of the model, diverse indicators were used: Chi-square to df ratio ($\chi 2/df < 5.0$); comparative fit index (CFI close to 0.9 or 1.0), goodness of fit index (GFI close to 0.9 or 1.0) and normed fit index (NFI close to 0.9 or 1.0) and the robustness of mean squared error approximation (RMSEA) with values lower than 0.08 (Hair *et al*., 2007; Kline, 2011). The analysis was performed with AMOS 20 and IBM SPSS 20.

In terms of construct validity, we assessed convergent validity calculating the standardized factor loadings (ideally values > 0.3), composite reliability (values > 0.6), average variance extracted (values > 0.5) and Cronbach's alpha internal reliability coefficient (values > 0.7) (Bagozzi *et al*., 1991; Fornell and Larcker, 1981; Hair *et al*., 2007).

A bootstrap procedure was applied to assess the stability of parameters estimated in the model. Five thousand subsamples were created from the original following the procedure proposed by Byrne (2010).

A cluster analysis (hierarchical conglomerates) was used to determine typologies of university students according to their AFF, with linkage by Ward's method and the squared Euclidian distance as the measure of similarity between objects (Hair *et al*., 2007). This analysis was applied to the Z-scores resulting from the factor analysis of the AFF questionnaire, only considering items that remained on the scale according to the results of the CFA. The number of

groups was obtained by 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 for the continuous variables. Because Levene's test indicated non-homogenous variances, the averages of variables with significant differences ($P \leq 0.001$ or $P \leq 0.05$) were separated according to Dunnett's T3 test for multiple comparisons.

Results

The mean age of the sample was 20.4 years. In terms of gender, 56.5% were women, and 90.3% resided in an urban area (Table 2). The sample was similar to the student population in Chile in 2013 in terms of gender, area of residence (CNED, 2014) and age (Navarrete *et al.*, 2013). It included students living with their parents all year round (35.5%) or only weekends/during vacations (38.7%). Most students belonged to families, the head of which had completed secondary school only (39.2%) and university studies (40.8%). In terms of socio-economic situation, 32.5% belonged to the middle-middle SES and 35.5% to lower-middle (Table 2). Of all respondents, 83.6% answered that they had no prior knowledge of FF. Of the 16.4% remaining, only 8.1% indicated knowledge of the meaning of FF. After reading the definition, 70.4% of respondents indicated that they consume FF.

Measurement and structural model

The first step was to validate the scales through a CFA (AFF and SWFL). Following Stevens (2009), items were eliminated that had factor loadings below 0.40. Therefore, the following items were eliminated from the AFF: "I am prepared to compromise on the taste of a food if the product is functional", "I actively seek out information about functional foods", "It is great that modern technology allows the development of functional foods", "Health effects are not appropriate in delicacies" and "Exaggerated information is given about health effects". The results showed a good fit of the data (Table 3). The internal consistency of the model was assessed by a composite reliability test. The majority of constructs were above 0.7, the average

variances extracted were close to or above 0.5 and the internal consistency (Cronbach's α close to or above 0.7) showed good indicators of reliability and validity. Therefore, the measurement model presented an adequate internal validity.

Once the scales were validated, the structural model was tested through the Maximum Likelihood algorithm. The structural model had a good fit of the dataset and the indices were within acceptable limits, and exceeded the minimum values recommend in the literature ($\chi 2$ = 607.13, df = 265, $p < 0.01$, $\chi 2/df = 2.29$, RMSEA = 0.06, CFI = 0.91, GFI = 0.88, NFI = 0.85).

Figure 1 shows the results of the model in which AFF is a second order dimension composed by four underlying dimensions in the sample of university students. Considering that all negatively worded statements from the AFF were reversed (Urala and Lähteenmäki, 2007), we can suggest that the second order dimension composed by the four dimensions represent positive AFF. The direct relationship between AFF and SWFL was confirmed ($\beta = 0.17$, t = 2.40, $p = 0.05$). Therefore, the results confirm that the SWFL was determined by the attitudes toward FF in the university student sample under study.

Typologies of university students

Cluster analysis resulted in three student typologies with significant differences in the average z-score values of the four AFF factors ($p \leq 0.001$) (Table 4). The types also differed in terms of the average SWFL score ($p \leq 0.05$) (Table 5) and knowledge of FF and consumption ($p \leq 0.05$) (Table 6). They are as follows:

Positive towards FF: Group 1 (n = 135), which represent 36.3% of the sample, presented the highest scores (significantly higher) on the four AFF factors (Table 4). Group 1 had the highest score on the SWFL, but did not differ statistically from Group 2 (Table 5). Group 1 contained a greater portion of students with prior knowledge of FF (25.9%) and of the meaning of FF (12.6%) (Table 6).

Moderately positive towards FF: Group 2, which represented 43.0% of the sample (n = 160), had positive scores in the factors "REW" and "NEC", but negative scores in the other two components of AFF (Table 4). This group presented a score on the SWFL that did not differ from Groups 1 and 3 (Table 5).

Negative towards FF: Group 3 represented 20.7% of the sample (n = 77); it had AFF factors scores significantly lower than the rest of the groups (Table 4). The score obtained on the SWFL was significantly lower than Group 1 (Table 5). Group 3 contained a greater portion of students who had no prior knowledge of FF (92.2%), nor its meaning (98.7%), and who had no previous consumption (44.2%) (Table 6).

Discussion

This study is the first to assess the effect of university students' AFF in relation to SWFL. The estimation of a causal model consisting of the AFF as an antecedent construct and the SWFL as a consequent construct resulted in a positive and significant path coefficient. Therefore, AFF directly and significantly influences students' SWFL. While these results are in line with studies which suggest that FF contribute to consumer well-being (Menrad, 2003; Niva, 2007; Hailu *et al.,* 2009; Siró *et al.,* 2008; Silvi *et al.,* 2014), the causal character of the obtained results is noteworthy. More specifically, a positive perception of components "REW," "NEC," "CON" and "SAF" (Urala and Läthenmäki, 2007) can positively affect well-being. However, the path coefficient was low. This could be related to the low level of prior knowledge of FF within the sample, since 83.6% had not previously heard of FF. This percentage is higher than studies done in other parts of the world (Bilgiç and Yüksel, 2012; Markovina *et al*., 2011; Kljusurić and Čačić, 2014), but are similar to results by Jiménez *et al.* (2010) in Chile's neighbouring country, Argentina, who reported that only 21% of the sample had heard of FF in a study conducted in 2006. The low level of prior knowledge of FF in the study sample may require the intervention of government authorities (Ministries of Health and Education) through communication campaigns while young consumers are still establishing food habits (Markovina

et al., 2011). Indeed, there is evidence that providing information about FF to young people with limited prior knowledge of these foods improves their acceptance and even increases their willingness to pay for FF (Hellyer *et al*., 2012). In this respect, however, it bears mentioning that having included the definition of FF before the students responded to the AFF questionnaire may have influenced our results. That is to say, the information provided may have affected a positive attitude towards FF among the students, and we may expect less positive attitudes in the study sample had we not given them the definition of FF. Therefore, further studies should aim to further investigate the relationship between providing or not providing information on FF and attitudes toward FF, amongst young people as much as those with little knowledge or familiarity with FF.

The low path obtained within the AFF and the SWFL can also correspond to low interest in young people (Urala and Läthenmäki, 2007; Barrios *et al.,* 2008; Büyükkaragöz *et al.,* 2014), since the majority have not experienced serious health problems, and the relevance of a healthy diet is perceived as low (Urala and Läthenmäki, 2007; Siró *et al.,* 2008). Future studies should evaluate the weight of this relationship in older people, especially those who have demonstrated a greater interest in FF.

In line with previous studies suggesting that acceptance of FF is not homogenous (Ares and Gámbaro, 2007; Herath *et al.*, 2008; Krystallis *et al.*, 2008; Schnettler *et al.*, 2015a), we distinguished three types of university student, based on their attitudes towards FF. In this regard, the characteristics of the typologies permit posing another possible explanation regarding the low relationship between the AFF and the SWFL. Although the type "Positive towards FF" had scores significantly higher than the group "Negative towards FF" in the SWFL, the typology "Moderately positive towards FF" was statistically similar to the other groups. The attitude and level of SWFL of the "Positive towards FF" and "Negative towards FF" supported results of a prior study on adults indicating that people who are more inclined to buy FF have a higher SWFL (Schnettler *et al.,* 2015b). However, despite evidence suggesting that higher levels of satisfaction with food-related life are related to healthier eating habits,

(Schnettler *et al.*, 2013, 2015b), the characteristics of the "moderately positive towards FF" suggest that AFF is not among the variables with most influence on SWFL. This finding should be investigated in future studies. Nevertheless, it can also be suggested that positive attitudes towards the components "REW" and "NEC" have greater influence than positive attitudes towards the factors "CON" and "SAF" on satisfaction with food-related life, which should also be examined in further studies.

Generally speaking, the attitudes toward FF and the declared consumption of FF for the three groups is in line with various authors' results, with regard to the relation between positive attitudes to FF and greater consumption, both in samples of adults (Urala and Lähteenmäki, 2007) and young people (Kolodinsky *et al.*, 2008; O'Connor and White, 2010). However, a detailed analysis of the link between AFF and consumption highlights which attitudes are most influential in consumption. A study with similar results regarding AFF and consumption by Urala and Lähteenmäki (2007) reported that the best predictors for FF consumption were "REW" and "NEC" factors of which the type "Negative towards FF" had negative scores, while the other two had positive scores. The negative scores of the group "Negative towards FF" in the "CON" factor are notable as well. This suggests that a lower consumption rate can be associated with the consumer not believing that FF would deliver the promised health benefits (Siegrist *et al.,* 2015). Also, most students in this group had no prior information about FF or its meaning, which suggests a link between a lack of knowledge of FF, a lack of belief in their effects and a low or null consumption. In this regard, it is improbable that a person will believe in the benefits of FF if they have a little knowledge of them (Bilgiç and Yüksel, 2012; Grunert *et al.*, 2011; Schnettler *et al.*, 2015 b). Considering that Markovina *et al*. (2011) concluded in Croatia that advertising has a high impact on knowledge of FF among university students, the FF industry – which has a vested interest in marketing to university students with similar characteristics to those in the sample of this study – should emphasise this marketing tool. While aspects associated with "Reward" and "Necessity" FF should be communicated and recapitulated to the three identified types, special emphasis must be placed on communicating

aspects associated with FF "Confidence" and "Safety" to the "Negative towards FF" type. This would result in increased consumption of FF amongst this group, which had low scores in these factors and the lowest percentage of students consuming FF. In addition, we might suggest that advertising aimed at increasing the demand for FF in university students with similar characteristics to the study sample, consider social networks as an important medium, as these are widely used by this type of consumer in Chile.

It bears highlighting that the typologies distinguished did not differ statistically according to socio-demographic variables; thus, the results support studies that suggest that socio-demographic variables are not sufficient in explaining differences in AFF (O'Connor and White, 2010; Bruschi *et al.*, 2015).

Considering that cultural factors play a significant role in the acceptance of FF (Labrecque et al., 2006; Siegrist et al., 2015), a limitation of this study is that it was only conducted in one country. Also, the non-probabilistic sample and its relatively small size do not allow generalization of results. All data were self-reported, thus responses may be affected by recall bias or social desirability. Also, this study did not include variables related to consumers' perception of FFs, such as functional ingredients, taste and price, which is relevant due to previous studies having shown that functional characteristics of FF can play an important role in stimulating the interest of young consumers (Ares and Gámbaro, 2007, Krystallis *et al.,* 2008). Therefore, future studies should link these variables with AFF and levels of SWFL.

Conclusions

The results of this study demonstrate that AFF directly and significantly influence the SWFL in this non-probabilistic study sample. This finding is novel because students are a vulnerable group from a nutritional point of view, and forming positive AFF can lead to improved future health (Barić *et al.,* 2003). Therefore, our findings suggest that forming positive AFF in students with similar characteristics to the study sample increases SWFL.

The characteristics of the three typologies indicate that positive AFF are related to higher consumption, therefore, from a public health point of view as much as from the FF industry's perspective, it is necessary to increase knowledge of FF to change attitudes and increase consumption. This can result in lower future medical expenses and increase market participation when students become responsible for purchasing. To achieve this goal, the FF industry must generate effective advertising campaigns to educate young people about FF and its benefits, spreading awareness about the importance and future benefits of a healthy diet. Advertising campaigns should take aspects related to "Reward from using FF" and "Necessity for FF" as much into account as those related to "Confidence in FF" and "Safety of FF", so as to increase demand among the students with the lowest current consumption of FF. Also, they must develop FF capable of replacing the advantages of sweets such as chocolate or cookies. Schnettler *et al*. (2013) found that almost 90% of the sample of university students surveyed in southern Chile consumes these products between meals. Therefore, attributes such as flavour, convenience, and price must be carefully considered in marketing.

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Table 1.

Items and factors of AFF developed by Urala and Lähteenmäki (2007) and their Spanish translation.

Code	Item
FF REW Reward from using functional foods	
REW1	Functional foods help to improve my mood Los alimentos funcionales ayudan a mejorar mi estado de ánimo
REW2	My performance improves when I eat functional foods Mi rendimiento mejora cuando como alimentos funcionales
REW3	Functional foods make it easier to follow a healthy lifestyle Los alimentos funcionales hacen que sea más fácil seguir un estilo de vida saludable
REW4	I can prevent disease by eating functional foods regularly Puedo prevenir enfermedades consumiendo alimentos funcionales con regularidad
REW5	The idea that I can take care of my health by eating functional foods gives me pleasure La idea de que puedo cuidar mi salud consumiendo alimentos funcionales me da placer
REW6	Functional foods can repair the damage caused by an unhealthy diet Los alimentos funcionales pueden reparar el daño causado por una dieta poco saludable
REW7	I am prepared to compromise on the taste of a food if the product is functional Estoy preparado a ceder en cuanto al sabor de un alimento si el producto es funcional
REW8	I actively seek out information about functional foods Busco activamente información sobre los alimentos funcionales
FF NEC Necessity for functional foods	
NEC1	Functional foods are completely unnecessary * Los alimentos funcionales son completamente innecesarios
NEC2	Functional foods are a total sham * Los alimentos funcionales son una farsa total
NEC3	The growing number of functional foods on the market is a bad trend for the future* El creciente número de alimentos funcionales en el mercado es una mala tendencia para el futuro
NEC4	For a healthy person it is worthless to use functional foods * Para una persona sana es inútil usar alimentos funcionales
NEC5	It is great that modern technology allows the development of functional foods Está muy bien que la tecnología moderna permita el desarrollo de alimentos funcionales
NEC6	I only want to eat foods that do not have any medicine-like effects * Sólo quiero comer alimentos que no tengan ningún efecto similar al de la medicina
NEC7	Health effects are not appropriate in delicacies * Los efectos sobre la salud no son apropiados en alimentos deliciosos
NEC8	Functional foods are consumed mostly by people who have no need for them *

	Los alimentos funcionales son consumidos en su mayoría por personas que no necesitan de ellos
FF CON: Confidence in Functional Foods	
CON1	Functional foods promote my well-being Los alimentos funcionales promueven mi bienestar
CON2	The safety of functional foods has been very thoroughly studied La seguridad de los alimentos funcionales se ha estudiado en profundidad
CON3	I believe that functional foods fulfil their promises Creo que los alimentos funcionales cumplen con lo que prometen
CON4	Functional foods are science-based top products Los alimentos funcionales son productos superiores basados en la ciencia
FF SAF: Safety of functional foods	
SAF1	If used in excess, functional foods can be harmful to health * Si se usan en exceso, los alimentos funcionales pueden ser perjudiciales para la salud
SAF2	In some cases functional foods may be harmful for healthy people * En algunos casos, los alimentos funcionales pueden ser perjudiciales para las personas sanas
SAF3	Using functional foods is completely safe El uso de alimentos funcionales es completamente seguro
SAF4	The new properties of functional foods carry unforeseen risks * Las nuevas propiedades de alimentos funcionales conllevan riesgos imprevistos
SAF5	Exaggerated information is given about health effects * Se proporciona información exagerada sobre los efectos en la salud

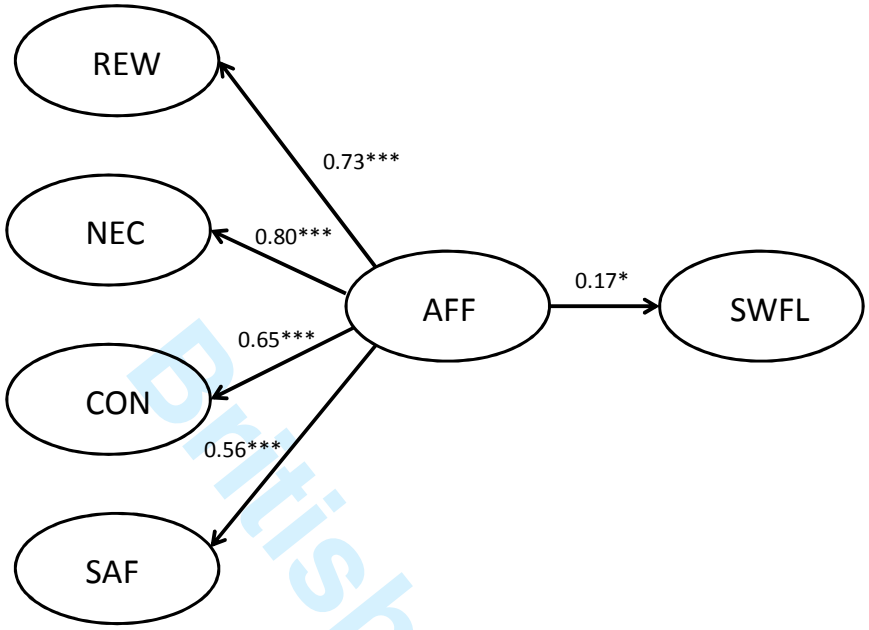
* Indicates reversed scored items.

Table 2.

Socio-demographic characteristics of a university student sample in Chile, November 2014. (n = 372).

Characteristic	Total
Gender, %	
Female	56.5
Male	43.5
Age	20.4
Mean (SD)	(2.4)
Zone of residence, %	
Urban	90.3
Rural	9.7
Place of residence during study period, %	
With parents the entire year	35.5
With parents the entire year although he/she travels for the day to attend class	16.1
With their parents only on weekends or for vacations	38.7
Independent of parents	9.7
Education level of the head of the household, %	
Elementary	14.2
Secondary	39.2
University	40.8
Postgraduate	5.7
Socioeconomic level, %	
High and upper-middle[a]	14.8
Middle-middle[b]	32.5
Lower-middle[c]	35.0
Low[d]	22.8
Very low[e]	4.8

[a] *High and upper-middle* represents 7.2% of the population. The household head's education averages 16.2 years, which typically indicates completed university studies. Monthly income in high and upper-middle homes ranges between US$3,500 and $7,200 or more. [b] *Middle* represents 15.4% of the Chilean population. The household head's education averages 14 years, which typically means completed technical studies or incomplete university studies. Monthly income in middle homes ranges between US$1,400 and $2,500. [c] *Lower-middle* represents 22.4% of the population. The household head's education averages 11.6 years, which typically means completed high school studies. Monthly income in lower-middle homes ranges between US$830 and $1,050. [d] *Low* represents 34.8% of the population. The household head's education averages 7.7 years, which typically means incomplete high school studies. Monthly income in low homes ranges between US$415 and $620. [e] *Very low* represents 20.3% of the population. The household head's education averages 3.7 years, which typically means incomplete elementary school studies. Monthly income in very low homes is ≤ US$330.



*p = 0.05; **p = 0.01; ***p = 0.001

χ^2/df = 2.29; CFI=0.91; GFI=0.88; NFI=0.85; IFI=0.91; RMSEA=0.06

Figure 1.
Structural equation model that explains the effect of the Attitudes towards Functional Food (AFF) on the student´s Satisfaction with food-related life (SWFL).

1

Table 3.
Reliability of the standardized confirmatory factor analysis (CFA)

Construct	Indicators	Standarized loadings (*t*-value)		Composite reliability (Average variance)		Measurement model
FF REW	Cronbach's α	0.87		0.87	(0.53)	$\chi 2 = 605.882$
	REW1	0.732	*(9.553)*			
	REW2	0.748	*(9.560)*			*df* = 261
	REW3	0.784	*(9.731)*			
	REW4	0.824	*(9.924)*			$\chi 2$ /*df* = 2.321
	REW5	0.676	*(10.194)*			
	REW6	0.560	*a*			*p* = 0.000
FF NEC	Cronbach's α	0.85		0.86	(0.53)	
	NEC1	0.838	*(9.917)*			*RMSEA* = 0.062
	NEC2	0.898	*(10.187)*			
	NEC3	0.838	*(9.913)*			*CFI* = 0.910
	NEC4	0.651	*(8.724)*			
	NEC6	0.499	*(7.364)*			*GFI* = 0.878
	NEC8	0.519	*a*			
FF CON	Cronbach's α	0.68		0.72	(0.40)	*NFI* = 0.853
	CON1	0.513	*(5.924))*			
	CON2	0.705	*(6.707)*			
	CON3	0.827	*(6.859)*			
	CON4	0.414	*a*			
FF SAF	Cronbach's α	0.73		0.74	(0.43)	
	SAF1	0.673	*(8.722)*			
	SAF2	0.820	*(9.283)*			
	SAF3	0.508	*(7.247)*			
	SAF4	0.566	*a*			

SWFL	Cronbach's α	0.816		0.82	(0.49)
	F1	0.411	*(6.865)*		
	F2	0.644	*(10.618)*		
	F3	0.676	*(12.697)*		
	F4	0.901	*(11.915)*		
	F5	0.784	*a*		

a Fixed parameter

Table 4.

Z-scores averages from the components of the Attitude toward Functional Foods questionnaire (AFF) of groups obtained from cluster analysis in a university student's sample of Chile, November 2014.

Component	Group 1 (n = 135)	Group 2 (n = 160)	Group 3 (n = 77)	F	P-value
Reward for using FF (REW)	0.497 a	0.090 b	-1.059 c	89.314	0.000 **
Necessity for FF (NEC)	0.582 a	0.167 b	-1.368 c	203.156	0.000 **
Confidence in FF (CON)	0.883 a	-0.327 b	-0.868 c	174.575	0.000 **
Safety of FF (SAF)	0.656 a	-0.144 b	-0.851 c	85.189	0.000 **

**Significant at 1%.

Letters in horizontal orientation indicate statically significant differences according to Dunnett's T3 Comparison test ($p \leq 0{,}001$), for non-homogeneous variables.

Table 5.

Satisfaction with food-related life (SWFL) average score from cluster analysis in a university student's sample of Chile, November 2014.

	Group 1 (n = 135)	Group 2 (n = 160)	Group 3 (n = 77)	F	P-value
SWFL	21.84 a	20.88 ab	19.68 b	6.306	0.002 *

*Significant at 5%.

Letters in horizontal orientation indicate statically significant differences according to Dunnett T3 Comparison test (p≤0,001), for non-homogeneous variables.

Table 6.
Characteristics with statistically significant differences in groups of university students of Chile obtained by cluster analysis. November 2014.

	Group 1 (n = 135)	Group 2 (n = 160)	Group 3 (n = 77)
Has seen or read about FF		**P = 0.001**	
No	74.1	87.5	92.2
Yes	25.9	12.5	7.8
Knows what FF means		**P = 0.014**	
No	87.4	92.5	98.7
Yes	12.6	7.5	1.3
Consumes FF		**P = 0.005**	
No	23.7	27.5	44.2
Yes	76.3	72.5	55.8

P value corresponds to the (bilateral) asymptotic significance obtained in Pearson's Chi squared Test.