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Research report

Eating habits and subjective well-being. A typology of students in Chilean state universities ☆

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ABSTRACT

The purpose of this study was to distinguish and characterize university student typologies according to their life satisfaction and satisfaction with their food-related life. An online survey was applied between June and August 2013 in five state universities in Chile, to 369 university students (mean age = 20.9 years, SD = 2.27). The survey included the Health-related Quality of Life Index-4 (HRQOL), Satisfaction with Life Scale (SWLS), Satisfaction with Food-related Life Scale (SWFL), as well as questions about the place of residence, importance of food for well-being, frequency of meals in the place of residence and the frequency of consumption of eight food groups. A cluster analysis was used to determine student typologies. Three typologies of students were distinguished with significant differences in the average scores of the SWLS and SWFL scales, self-perception of health, days with mental health problems, number of days of health-related incapacity, place of residence, socioeconomic status, importance of food for well-being, frequency of breakfast and dinner in the place of residence, frequency of consumption of meat, milk, fruits and vegetables. It was found that most students with higher levels of life satisfaction and satisfaction with food-related life live with their parents, eat at home more frequently, report fewer health problems, have healthful eating habits and consider food very important for their well-being. Although it is necessary to promote or improve the campaigns that foster healthful eating in the entire university population, these campaigns must be specifically targeted to students who do not receive direct support from their families.

Introduction

While adult life satisfaction has been studied extensively, life satisfaction in younger people (late teens and early 20s) has only received attention more recently (Proctor, Linley, & Maltby, 2009). Research on satisfaction with food-related life has also emerged of late (Grunert, Dean, Raats, Nielsen, & Lumbers, 2007) and has been mainly circumscribed to adult samples, while knowledge regarding satisfaction with food-related life in youths and the variables that affect them is still scarce. Recent studies support that food is one of the important domains of life that affect an individual's life satisfaction (Grunert et al., 2007; Schnettler, Crisóstomo et al., 2013; Schnettler, Miranda et al., 2013; Schnettler, Peña et al., 2013), suggesting that satisfaction with food-related life is positively related to overall life satisfaction.

This relation is associated to healthful eating behaviours and family interaction around food. Researchers have concluded that adults who eat more frequently with their families eat more healthfully and are more satisfied with their life and their food-related-life (Schnettler, Peña et al., 2013). However, these variables have not been studied in younger populations. Although there are several studies linking family meals and healthful eating habits in children and adolescents (Franko, Cousineau, Rodgers, Roehrig, & Hoffman, 2013; Larson, Neumark-Sztainer, Hanna, & Story, 2007; Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003; Nicklas, Reger, Myers, & O'Neil, 2000; Videon & Manning, 2003), the relationships between eating and well-being in young adulthood are less

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explored (Arnett, 2000). Some research results associate eating disorders with low levels of life satisfaction in young people (Halvorsen & Heyerdahl, 2006). Grant, Wardle, and Steptoe (2009) found a positive relation between a healthful diet and greater life satisfaction in university students in various countries. An exploratory study conducted with university students in southern Chile suggested that family support is associated with better eating habits, better health and greater satisfaction with life and food-related life (Schnettler, Denegri et al., 2013).

Given that some researchers have concluded that life satisfaction is age-sensitive (Clench-Aas, Bang, Dalgard, & Aarø, 2011; Gerstorf, Ram, Röcke, Lindenberger, & Smith, 2008) it can also be expected that satisfaction with food-related life will change over the years. Regarding life satisfaction, while adults are increasingly concerned about avoiding negative experiences and focusing on health-related aspects (Clench-Aas et al., 2011), younger people focus on pleasant experiences (McMahan & Estes, 2012). For example, young people mistakenly believe that life satisfaction decreases with age, which can lead to hedonist and unhealthful behaviours, such as an unhealthful diet, in order to make the most out of life during youth (Garry & Lohan, 2011). Boelsma, Brink, Stafleu, and Hendricks (2010) and Ares, De Saldamando, Giménez, and Deliza (2014) have linked food and well-being in adults, which in turn associates to physical health, body functioning, intellectual capacity, positive emotions and social contact and relationships. Therefore, studying the relationship between life satisfaction, satisfaction with food-related life and eating habits in young people can provide important input to make a positive impact in their adult life. However, to our knowledge, the psychometric properties and the relation between the Satisfaction with Food-related Life scale (SWFL) (Grunert et al., 2007) and the Satisfaction with Life Scale (SWLS) (Diener, Emmons, Larsen, & Griffin, 1985) have not been assessed previously with university students.

The study of food as a life domain in university students is particularly relevant because the period of university studies usually entails a change of lifestyle and increasing stress (Antúnez & Vinet, 2013), and the students become responsible for their meals (Cluskey & Grobe, 2009; Verger et al., 2009). This critical stage in the development of eating habits will affect their future health and the health of their future families (Brown, Dresen, & Eggett, 2005). University students who live away from home engage in riskier eating behaviours because of the pressures of independence and hurried lifestyles (Barker & Galambos, 2007; Brown et al., 2005), resulting in poor nutrition (Li et al., 2012). Furthermore, an inadequate diet during the university years could result in unfavourable physiological consequences that may lead to diet-related chronic diseases (Winkleby & Cubbin, 2004), and have negative psychological and social repercussions (Hidalgo, Hidalgo, Rasmussen, & Montaño, 2011). Various authors have described the nutritional vulnerability of university students whose eating habits are characterized by excessive consumption of high fat foods, sugars and salt, fast food and soft drinks, skipping meals frequently, taking a short time to eat, snacking, and consuming insufficient amounts of fruit, vegetables and fibre (Brannan, Biswas-Diener, Mohr, Mortazavi, & Stein, 2013; Guthrie, Lin, & Frazao, 2002), all of which are linked to unhealthful diets (Guthrie et al., 2002).

While the incidence of unhealthful eating behaviours among university students is well established, we know less about how such behaviours affect students' satisfaction with their food-related life and their overall life satisfaction. Some students may engage in unhealthful eating behaviours because of external pressures or lack of knowledge, but may be dissatisfied with their own behaviour, with negative consequences for their overall life satisfaction. Other students may enjoy their unhealthful behaviours because of sensory gratification or they feel that these behaviours fit their lifestyle. Insights into these relationships have important consequences for attempts to induce students to healthier eating habits, as students who are satisfied with their food-related life will be more difficult to address than students who are not.

In this study, we focus on Chilean public university students' satisfaction with life and its relation to the food domain. Studying the relationship between satisfaction with life overall and in domains of importance to young people is relevant because high life satisfaction can help absorb the negative consequences of stress, psychological problems and various disorders (Proctor et al., 2009). In addition, since eating habits during the university years are linked to high prevalence of overweight and obesity (Aguilar-Ye et al., 2010; Hidalgo et al., 2011), diet-related chronic diseases (Winkleby & Cubbin, 2004), and negative psychological and social repercussions (Hidalgo et al., 2011), identifying variables associated to students' satisfaction with food-related life may contribute to the development of strategies to prevent these negative effects.

Therefore, the aim of the present study was to distinguish and characterize university student types according to their life satisfaction, satisfaction with their food-related life, sociodemographic characteristics, general health and eating habits. Also, the psychometric properties and the relation between the SWFL and the SWLS were evaluated by use of confirmatory factor analysis (CFA). This methodology tests whether a particular factor model is consistent with the data (Lévy, 2006). In this study we address four hypotheses:

H_1: Life satisfaction is positively related to the students' satisfaction with food-related life.

H_2: Life satisfaction and satisfaction with food-related life are positively related to the students' healthful eating habits.

H_3: Life satisfaction and satisfaction with food-related life are positively related to the frequency of family meal times.

H_4: Life satisfaction and satisfaction with food-related life are positively related to the students' better general health.

Methods

Sample

A convenience sample comprised 369 students from five state universities located in different geographical areas of Chile (Universidad de Tarapacá, Arica; Universidad de Chile, Santiago; Universidad de Talca, Talca; Universidad de La Frontera, Temuco; and Universidad de Magallanes, Punta Arenas). The inclusion criterion was being a first-year or third-year student (enrolled in 2011 or 2013, respectively) at the aforementioned universities.

Procedure

The Ethics Committee of the Universidad de La Frontera approved the study protocol. A pilot test of the questionnaire was conducted with 30 students from the same university. Participants deemed the content of the questionnaire and its items as appropriate and clear. Undergraduate programme directors in each university signed authorization letters to conduct the research among their students. Participants were recruited through printed or e-mail invitation letters sent by the programme directors. This letter explained the online survey and the strictly confidential treatment of the information obtained. The survey link (QuestionPro, Inc) was sent to programme directors, who distributed it to students between June and August 2013. As an incentive, as stated in the invitation letter, students who answered the survey would enter a raffle to win one of two gift cards per university, each worth approximately $200 USD. The participants read the informed consent in the survey front page and a PDF version of this document was available for

download. Students agreed to participate by checking a box at the bottom of the front page. The response rate was 39%, which is similar to the one obtained by Yim, Sinha, Diaz, Kirsner, and Salgado (2014) in an online survey for a sample of university students in the USA. It exceeds the response rate (approximately 17–19%) obtained in other studies with similar methodology in samples of university students from the USA (Renshaw & Cohen, 2014) and the UK (McGavock & Spratt, 2014).

Instruments

- Health-related quality of life index (HRQOL-4): developed by Hennessy, Moriarty, Zack, Scherr, and Brackbill (1994), consists of four items that explore the self-perception of health, recent physical health, recent mental health, and recent limitations on activity. According to Kline (2000) a "good level" of internal reliability measured using Cronbrach's alpha coefficient ranged $0.7 \leq \alpha < 0.9$. Toet, Raat, and van Ameijden (2006) validated the Dutch version of the HQROL-4, reporting good reliability (Cronbach's alpha of three of the four items was 0.77). This study used the Spanish-language version, which has shown good internal consistency (Cronbach's α of 0.78) in a previous study in Chile (Schnettler, Denegri et al., 2013). In the present study, Cronbach's α of three (items measuring recent physical health, recent mental health, and recent limitations on activity) of the four items was 0.76.
- Satisfaction with Life Scale (SWLS): developed by Diener et al. (1985), is a scale consisting of five items grouped into a single factor to evaluate overall cognitive judgments about a person's own life ("In most ways my life is close to my ideal"; "The conditions of my life are excellent"; "I am satisfied with my life"; "So far I have gotten the important things I want in life", "If I could live my life over, I would change almost nothing"). Respondents must indicate their degree of agreement with the statements using a 6-point Likert scale (1: disagree completely, 6: agree completely). The reliability estimate (Cronbach's α) in various studies, including those conducted in Chile, has ranged between 0.79 and 0.89 (Schnettler, Denegri et al., 2013; Schnettler, Peña et al., 2013). In the present study, Cronbach's α was 0.88.
- Satisfaction with Food-related Life Scale (SWFL): proposed and tested by Grunert et al. (2007), it consists of five items grouped into a single dimension ("Food and meals are positive elements"; "I am generally pleased with my food"; "My life in relation to food and meals is close to ideal"; "With regard to food, the conditions of my life are excellent"; "Food and meals give me satisfaction in daily life"). Respondents must indicate their degree of agreement with the statements using a 6-point Likert scale (1: disagree completely, 6: agree completely). This scale showed good internal consistency (Cronbach's α between 0.79 and 0.88) in studies conducted in European countries (Grunert et al., 2007) and Chile (Schnettler, Denegri et al., 2013; Schnettler, Miranda et al., 2013; Schnettler, Peña et al., 2013). In the present study, Cronbach's α was 0.79.

Spanish-language versions of the SWLS and SWFL were used in this study. Both scales have shown good levels of internal reliability in previous studies conducted in Chile (Schnettler, Denegri et al., 2013; Schnettler, Miranda et al., 2013; Schnettler, Peña et al., 2013).

Once the three scales had been administered, students were asked about the frequency of meals in their residence and the frequency of consumption of eight groups of foodstuffs and drinks listed by the National Statistics Institute in the Surveys of Family Budgets (Instituto Nacional de Estadísticas, 2008): bread; cereals and pasta; meat; fish and seafood; milk and dairy products; fruit; vegetables; and soft drinks. This method of data collection on students' dietary habits was chosen over other widely used methods, such as the food frequency questionnaire, due to the geographical distribution of the sample and cultural variables that influence eating habits of the Chilean population throughout the country. While in northern Chile (Universidad de Tarapacá) eating habits are influenced by the indigenous Aymara culture, in the central area (Universidad de Chile and Universidad de Talca), there is a greater influence of Spanish cuisine. Eating habits in the Araucanía region (Universidad de La Frontera) are influenced both by the native Mapuche culture and the cuisine introduced by immigrants mainly from German, Swiss and Italian origin. Similarly, in the extreme southern part of Chile (Universidad de Magallanes), Croatian immigrants have influenced eating habits. Thus we chose not to use a food frequency questionnaire because one of its limitations is that, if the food list does not include a food or foods that contributes significantly to intake for some segment of respondents, it may not provide an accurate qualitative picture of the intake (Freudenheim, 1993; Shai, Shahar, Vardi, & Fraser, 2004; Subar et al., 2001).

Then, the students were asked to rate the importance of food for their well-being using a 6-point Likert scale (1: not important at all, 6: extremely important). Finally, the students were asked to indicate their age, gender, area of residence, ethnic origin, place of residence during the semester, the education level and occupation of the head of the household. The last two variables are used to determine the socioeconomic status (SES) (Adimark, 2004), categorized as high, upper middle, middle-middle, lower middle, low, and very low.

Statistical analysis

To assess the relation between the SWFL and SWLS scales, a causal covariance structure analysis model was formulated, with SWFL as the antecedent and SWLS as the consequent, using confirmatory factor analysis (CFA). CFA was performed on LISREL 8.8 (Scientific Software International, Inc.). The parameters were estimated by robust maximum likelihood. Four psychometric indexes were estimated. Following Lévy (2006), the average variance extracted measured the proportion of variance extracted by a latent factor, compared to the total variance of that factor, including the variances of the measurement error of the factor items. Also, the compound reliability or compound Cronbach's α was obtained by an adaptation of Fornell and Larcker's formula. The convergent validity was found by inspecting the significance of the t values of the factor loadings for each factor. The discriminant validity was obtained by comparing the extracted variance for each factor analysed, with the square of the correlation between the factors (in this case the path coefficient between SWFL and SWLS) (Lévy, 2006). The goodness of fit of the model was assessed using the following fit indices: the goodness-of-fit index (GFI), the adjusted goodness-of-fit index (AGFI), and the root mean square error of approximation (RMSEA). A model fits reasonably well if the GFI and AGFI are greater than 0.90, and the RMSEA is smaller than 0.08 (Hu & Bentler, 1999). The initial evaluation of the causal covariance structure analysis model with SWFL as the antecedent and SWLS as the consequent, using the five items from each scale revealed a poor level of fit (RMSEA = 0.114, GFI = 0.89, AGFI = 0.84) according to Kline (2000). In a previous study with an adult sample, it was necessary to omit an item from the SWFL (Schnettler, Miranda et al., 2013) and this study proceeded similarly. The best goodness of fit was obtained by eliminating the items Food 1 (Food and meals are positive elements) and Food 2 (I am generally pleased with my food) from the SWFL, and the items Life 4 (So far I have gotten the important things I want in life) and Life 5 (If I could live my life over, I would change almost nothing) from the SWLS. Considering the content of these items, their elimination from the SWLS is consistent with the age of the survey participants.

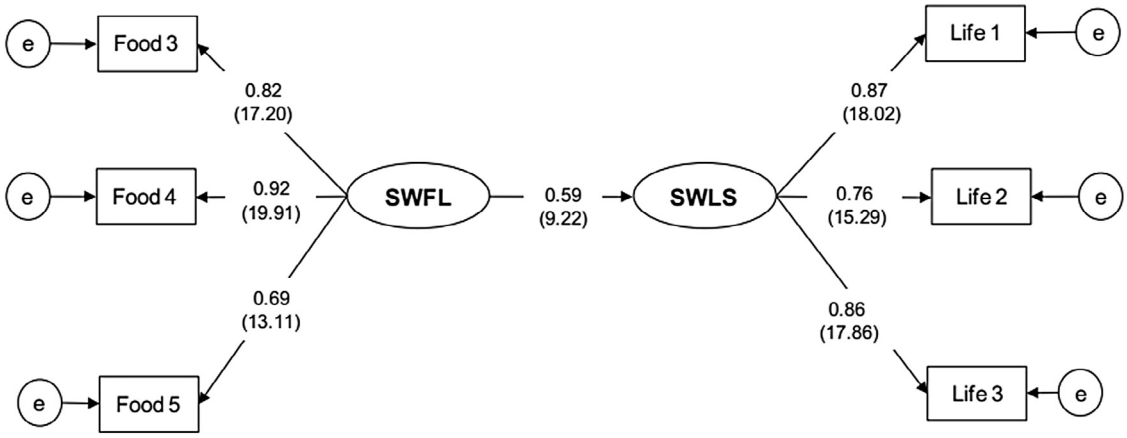

Fig. 1. Confirmatory factor analysis established best-fitting model of Satisfaction with food-related life scale (SWFL) and Satisfaction with life scale (SWLS) in a university student sample.
Values not in parentheses correspond to standardized factor loadings.
Values in parentheses correspond to t values.
Standardized factor loadings for all the items were statistically significant ($P \leq .001$)
Food 3: My life in relation to food and meals is close to ideal.
Food 4: With regard to food, the conditions of my life are excellent.
Food 5: Food and meals give me satisfaction in daily life.
Life 1: In most ways my life is close to my ideal.
Life 2: The conditions of my life are excellent.
Life 3: I am satisfied with my life.
e: error terms.

Once the GFI, AGFI and RMSEA values were obtained (Fig. 1), it was concluded that the causal model with the SWFL as the antecedent and the SWLS as the consequent showed a reasonable goodness of fit to the data (RMSEA = 0.077, GFI = 0.97, AGFI = 0.93) (Hu & Bentler, 1999; Kline, 2000). The path coefficient of 0.59 indicated a medium level of relationship between the two constructs, consistent with what had been obtained before from an adult sample (Schnettler, Miranda et al., 2013). Both scales presented good values of average extracted variance (SWFL = 0.586, SWLS = 0.519) and compound Cronbach's α (SWFL = 0.800, SWLS = 0.763) (Lévy, 2006). In both scales, the standardized factor loadings for all items were statistically significant; therefore, it was concluded that there was convergent validity. The value of the squared correlation between the SWFL and SWLS (0.34) was lower than the extracted variances of the scale factors, which verified the discriminant validity between the constructs (Lévy, 2006). Therefore, from these results it is possible to accept hypothesis 1.

Cluster analysis was conducted to determine types of students according to their SWLS and SWFL scores. As a grouping algorithm, the hierarchical conglomerates option and the Ward method of conglomeration were used. The measure of similarity between objects was the squared Euclidean distance (Hair, Anderson, Tatham, & Black, 1999). This analysis was carried out with the cluster procedure of SPSS 16.0 (SPSS Inc.). The number of groups was obtained by observing the dendrogram, which was confirmed by the percentage change in the recomposed conglomeration coefficients. To find differences between the typologies, the Crosstab procedure and Pearson's Chi^2 test were applied to the discrete variables ($P \leq 0.05$). Because the Crosstab tables were larger than 2×2 in the present research, the adjusted standardized residuals were used to distinguish and describe differences between groups. An adjusted residual greater than 1.96 (2.0 is used by convention) indicates that the number of cases in that cell is significantly larger than would be expected if the null hypothesis were true. An adjusted residual less than −2.0 indicates that the number of cases in that cell is significantly smaller than would be expected if the null hypothesis were true (Agresti, 2002). To distinguish differences between the typologies for the continuous variables, an analysis of variance was carried out (99% confidence level). Since the Levene's statistic indicated non-homogeneous variances in all the continuous variables analysed, the variables for which the analysis of variance resulted in significant differences ($P \leq 0.001$) were subjected to Dunnett's T3 multiple comparisons test.

Results

The mean age of the sample was 20.9 years (SD = 2.27); 53.7% were women; 95.4% resided in an urban area, 85.6% were of Chilean origin (Table 1). The sample obtained presents a similar composition to the population of university students enrolled throughout the country in 2013, in terms of gender, area of residence (CNED, 2014) and age (Navarrete, Candia, & Puchi, 2013). However, this sample shows a greater proportion of students with native background (Mapuche and Aymara) than the one reported by Blanco and Meneses (2011), corresponding to 6.7% of the general student population. This is due to the inclusion of the Tarapacá and de La Frontera universities in this study. Both institutions are located in the Arica and Parinacota region and La Araucanía region, respectively, which have the largest indigenous population in the country (Instituto Nacional de Estadísticas, 2005).

The sample comprised mainly students living with their parents all year (57.2%) or living with their parents on weekends or for vacations (23.0%) (Table 1). The high proportion of students living with their parents during the year can be explained by the existence of universities in most regions of Chile, to cover the long geography of the country (Chile extends in the southern hemisphere between parallels 17°29′57″ S and 56°32′ S, in a 4270 km span). Since there is a public university plus several private universities in almost all regions of Chile, usually in the regional capital city, most students come from the same region where the institution is located. This is the case of four of the five universities considered in this study (Universidad de Tarapacá, Universidad de Talca, Universidad de La Frontera and Universidad de Magallanes). The largest proportion of students belonged to families where the head of the household had

Table 1
Socio-demographic characteristics of university students sample from Chile, August 2013 (n = 369).

Characteristic	Total
Sex, %	
Female	53.7
Male	46.3
Age, years	20.9 (2.27)
Mean (SD)	
Zone of residence, %	
Urban	95.4
Rural	4.6
Ethnic origin, %	
Chilean	85.6
Ethnic origin (Mapuche, Aymara)	9.5
Others	4.9
Place of residence during study period, %	
With parents the entire year	57.2
With parents the entire year although he/she travels for the day to attend class	10.6
With their parents only on weekends or for vacations	23.0
Independent of parents	9.2
Education level of the head of the household, %	
Primary	13.8
Secondary	35.8
Tertiary	43.1
Postgraduate	7.3
Socioeconomic level, %	
High and upper-middle[a]	21.4
Middle-middle[b]	28.2
Lower-middle[c]	24.1
Low[d]	20.1
Very low[e]	6.2

Note: The national currency values (Chilean pesos) were converted to US dollars using the average 2013 value (Ch$495.31/US$1).

[a] *High and upper-middle* represents 7.2% of the population. The household head's education averages 16.2 years, which typically means he/she completed university studies. Monthly income in high and upper-middle homes ranges between US$3500 and $7200 or more.

[b] *Middle-middle* represents 15.4% of the Chilean population. The household head's education averages 14 years, which typically means he/she completed technical studies or did not complete university studies. Monthly income in middle-middle homes ranges between US$1400 and $2500.

[c] *Lower-middle* represents 22.4% of the population. The household head's education averages 11.6 years, which typically means he/she completed high school studies. Monthly income in lower-middle homes ranges between US$830 and $1050.

[d] *Low* represents 34.8% of the population. The household head's education averages 7.7 years, which typically means he/she did not complete 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 he/she did not complete elementary school studies. Monthly income in very low homes is ≤ US$330.

an educational level of high school (35.8) and university (43.1%). 28.2% of the sample belonged to the middle-middle SES and 24.1% to lower-middle (Table 1).

In the first question from the HRQOL-4 (Hennessy et al., 1994), most students perceived their health as good (37.1%) or very good (32.5%). Students reported a high number of days with mental health problems (Mean = 7.5, SD = 8.4). 31.2% considered eating as very important for their well-being (31.2%), and 39.6% considerably important (Table 2).

53.1% of the students had breakfast daily in their residence, and they mainly had lunch daily (30.9%), or two or three times per week (35.5%) in that place. The highest proportion did not have dinner (35.9%) in their residence, whereas 25.8% had dinner there daily (Fig. 2). Most of the students ate bread daily (74.0%), cereals and pasta two or three times per week (57.5%), meat two or three times per week (50.1%), fish and seafood occasionally (50.7%), milk and dairy products daily (44.4%), fruit daily (29.3%) or two or three times per week (36.3%), vegetables daily (47.2%) and soft drinks daily (55.0%) (Fig. 3).

Table 2
Self-perception of health, days on which the student was affected by health problems and importance of eating for their well-being of university students sample from Chile, August 2013 (n = 369).

Characteristic	Total
Self-perception of health (HRQOL-4), (%)	
Very poor health	2.2
Fair health	22.5
Good health	37.1
Very good health	32.5
Excellent health	5.7
The number of days on which the respondent's physical health was not good in the last month (HRQOL-4), n	4.7 (5.9)
Mean (SD)	
The number of days on which the respondent's mental health was not good in the last month (HRQOL-4), n	7.5 (8.4)
Mean (SD)	
The number of days on which the person could not perform their usual activities due to health concerns (HRQOL-4), n	2.8 (4.1)
Mean (SD)	
Importance of food for well-being, %	
Not at all important	0.3
Hardly important	3.0
Slightly important	10.6
Very important	31.2
Considerably important	39.6
Completely important	15.4

Following the CFA results, cluster analysis was performed, taking into account the sum score of only the remaining three items from each scale. Therefore, the theoretical score for each scale ranged between 3 and 18. The mean score of all participants (n = 369) was 12.6 (SD = 3.3) on the SWLS and 10.6 (SD = 3.3) on the SWFL. Cluster analysis resulted in the identification of three types of students. According to analysis of variance, the types differed significantly in the average scores of the SWLS and SWFL, the number of days with mental problems and the number of days on which the students could not perform their usual activities due to their health in the last month ($P \leq 0.001$) (Table 3). According to the Crosstab procedure and Pearson's Chi^2 test, the types also differed in the residence during the semester, SES, importance assigned to eating for personal well-being ($P \leq 0.05$), and in the self-perception of health ($P \leq 0.001$) (Table 4). They differed in the frequency with which the students had breakfast ($P = 0.000$) and dinner ($P = 0.013$) in their residence (Fig. 4), the frequency of consumption of meat ($P = 0.002$), milk and dairy products ($P = 0.005$), fruits ($P = 0.004$) and vegetables ($P = 0.015$) (Fig. 5). No significant differences were observed between typologies according to age, gender, area of residence, education level of the head of the household, ethnic origin, year of enrolment, or the university attended; nor regarding the number of days with physical health problems in the last month, frequency with which the students eat lunch at their residency, frequency of consumption of bread, cereals and pasta, fish and sea food, and soft drinks ($P > 0.1$).

Group 1 **"satisfied with their life and their food-related life"** (35.8% of the sample, n = 132) had significantly higher scores than the other groups on the SWLS and SWFL scales. This group registered the lowest number of days affected by mental health problems and limitations on daily activities due to health problems, although it did not differ statistically from Group 2 (Table 3). Based on the adjusted standardized residuals analysis, Group 1 had a greater presence of students who lived with their parents all year (68.9%), perceived their health was very good (50.8%), considered eating was considerably important for their well-being (50.0%) (Table 4), tended to have breakfast (66.7%) and dinner (37.9%) daily in the place where they lived (Fig. 4), and consumed milk and dairy products (54.5%), fruits (41.7%) and vegetables (57.6%) daily (Fig. 5).

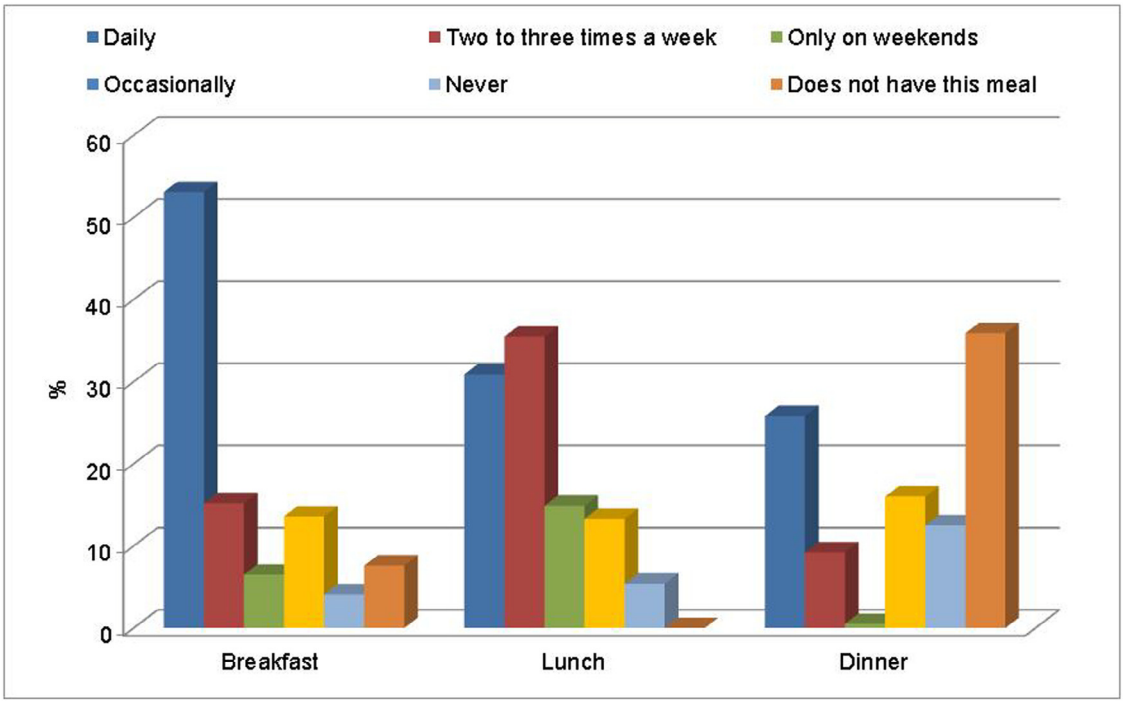

Fig. 2. Frequency of meals at the place of residence reported in a university students sample from Chile, August 2013 (n = 369).

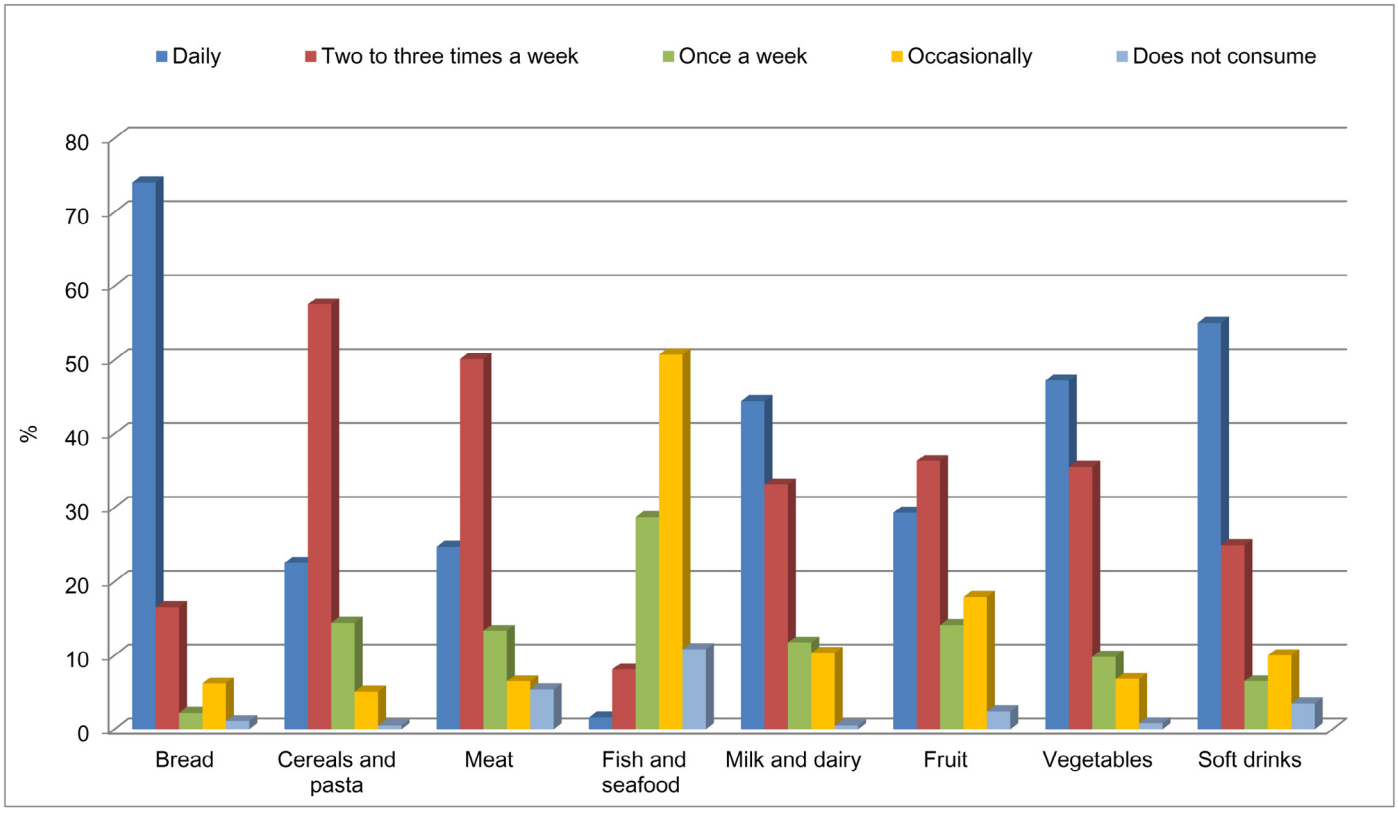

Fig. 3. Frequency of consumption of eight groups of foodstuffs and drinks of university students sample from Chile, August 2013 (n = 369).

Group 2 "**moderately satisfied with their life, unsatisfied with their food-related life**" (38.4%, n = 142) had a significantly higher score than Group 3 on the SWLS, but did not differ statistically from Group 3 in the score on the SWFL (Table 3). Based on the adjusted standardized residuals analysis, this group had greater presence of students with a good self-perception of their health (45.1%), were middle-middle on the SES (34.5%), and considered eating as not at all important (5.1%) or hardly important (16.0%) for their well-being

Table 3
Satisfaction with life (SWLS), Satisfaction with food-related life (SWFL) mean scores and days on which the student was affected by mental health problems and could not perform their usual activities due to health concerns of the groups obtained using cluster analysis in university students from Chile, August 2013 (n = 369).

	Group 1 (n = 132)	Group 2 (n = 142)	Group 3 (n = 95)	F	P-value
SWLS Mean (SD)	15.01 a (1.65)	13.26 b (1.99)	7.30 c (1.66)	301.986	0.000**
SWFL Mean (SD)	13.96 a (1.62)	8.80 b (1.72)	7.19 b (2.51)	283.445	0.000**
The number of days on which the respondent's mental health was not good in the last month, n Mean (SD)	4.79 b (5.63)	6.99 b (7.64)	13.49 a (8.33)	18.746	0.000**
The number of days on which the person could not perform their usual activities due to their health, n Mean (SD)	2.27 b (3.54)	2.31 b (3.28)	4.58 a (3.32)	5.876	0.001**

Note: Theoretical scores of SWLS and SWFL scales ranged between 3 and 18.
** Significant at P ≤ .001. Different letters (a, b, c) in rows indicate statically significant differences according to Dunnett's T3 Comparison test for non homogenous variances.
Group 1 "Satisfied with their life and their food-related life".
Group 2 "Moderately satisfied with their life, unsatisfied with their food-related life".
Group 3 "Unsatisfied with their life and their food-related life".

(Table 4). Group 2 had the highest proportion of students who had breakfast where they lived only two to three times per week (22.5%) (Fig. 4), and a lower presence of students who ate fruit daily (23.2%) (Fig. 5).

Group 3 "**unsatisfied with their life and their food-related life"** (25.7%, n = 95) had a significantly lower score on the SWLS compared to the other groups. Members of this group reported significantly more days affected by mental health problems and more days when they could not perform their normal activities due to health reasons (Table 3). Based on the adjusted standardized residuals analysis, Group 3 contained a higher proportion of students who lived away from the family home (22.9%), had a self-perception of their health being very poor (7.5%) and fair (46.3%), and belonged to the low SES (34.3%) (Table 4). In this typology, a greater proportion of students skipped breakfast (20.9%) and dinner (48.5%) (Fig. 4), and only occasionally ate meat (14.9%), milk and dairy products (20.9%), fruits (28.4%) and vegetables (14.9%) (Fig. 5).

Table 4
Characteristics (%) with significant differences of the groups obtained using cluster analysis in university students from Chile, August 2013 (n = 369).

	Group 1 (n = 132)	Group 2 (n = 142)	Group 3 (n = 95)
Place of residence during study period	*P* = .010		
With parents the entire year	68.9	50.7	50.7
With parents the entire year but commutes for the day to attend class	7.7	12.6	7.5
With parents on weekends and on vacation	18.9	25.4	18.9
Does not live with parents	4.5	11.3	22.9
Self-perception of health	*P* = .000		
Very poor health	0.1	2.1	7.5
Fair health	12.8	20.4	46.3
Good health	28.0	45.1	32.8
Very good health	50.8	26.8	11.9
Excellent health	8.3	5.6	1.5
Socioeconomic status	*P* = .014		
High and upper middle	25.8	21.1	11.9
Middle-middle	27.3	34.5	19.4
Lower middle	25.0	23.2	25.4
Low	19.7	14.1	34.3
Very low	2.3	7.0	9.0
Importance of food for well-being	*P* = .031		
Not at all important	0.8	5.1	0.1
Hardly important	2.3	16.0	5.9
Slightly important	3.8	13.4	13.4
Very important	25.8	30.1	40.3
Considerably important	50.0	25.0	25.4
Completely important	17.4	13.4	14.9

P values obtained by Pearson χ^2 test.
Group 1 "Satisfied with their life and their food-related life".
Group 2 "Moderately satisfied with their life, unsatisfied with their food-related life".
Group 3 "Unsatisfied with their life and their food-related life".

Discussion

In keeping with the proposed aims, three types of university students were distinguished who differed in life satisfaction and satisfaction with food-related life, health-related aspects, residence during the semester, SES, frequency of meals in their residence, and consumption of some foods.

The results of this study showed a relationship between life satisfaction and satisfaction with food-related life of the university students and their eating habits, with the role of family in this relationship being significant. The students in Group 1 "**satisfied with their life and their food-related life"** mainly lived with their parents all year, had breakfast and dinner most frequently where they lived and had healthful eating habits according to the recommendations of the Instituto de Nutrición y Tecnología de los Alimentos [INTA] (2013) for the Chilean population aged between 19 and 30 years. Together with the highest proportion of students who consumed milk or dairy products, fruits and vegetables daily, this finding is consistent with the reports that family encourages healthful eating in students (Hammons & Fiese, 2011; Larson et al., 2007; Neumark-Sztainer et al., 2003; Videon & Manning, 2003). Also, it is associated with fewer skipped breakfasts (Larson et al., 2007; Neumark-Sztainer et al., 2003; Videon & Manning, 2003), more frequent dinners (Larson et al., 2007), higher intakes of fruit and vegetables (Franko et al., 2013; Larson et al., 2007; Neumark-Sztainer et al., 2003; Videon & Manning, 2003), and calcium-rich foods (Neumark-Sztainer et al., 2003; Videon & Manning, 2003). These results confirm the positive relation between a healthful diet and a greater life satisfaction in university students (Grant et al., 2009), and the relation between a greater life satisfaction and satisfaction with food-related life with healthful eating behaviours and family interaction around food reported by Schnettler, Peña et al. (2013) in an adult sample. Therefore, from these results it is possible to accept hypotheses 2 and 3. This study also contributed to the findings reported by Grant et al. (2009) and Schnettler, Peña et al. (2013). Grant et al. (2009) concluded that life satisfaction was positively associated with eating fruit and limiting fat intake in students aged 17–30. Our results indicate that not only fruit consumption is linked

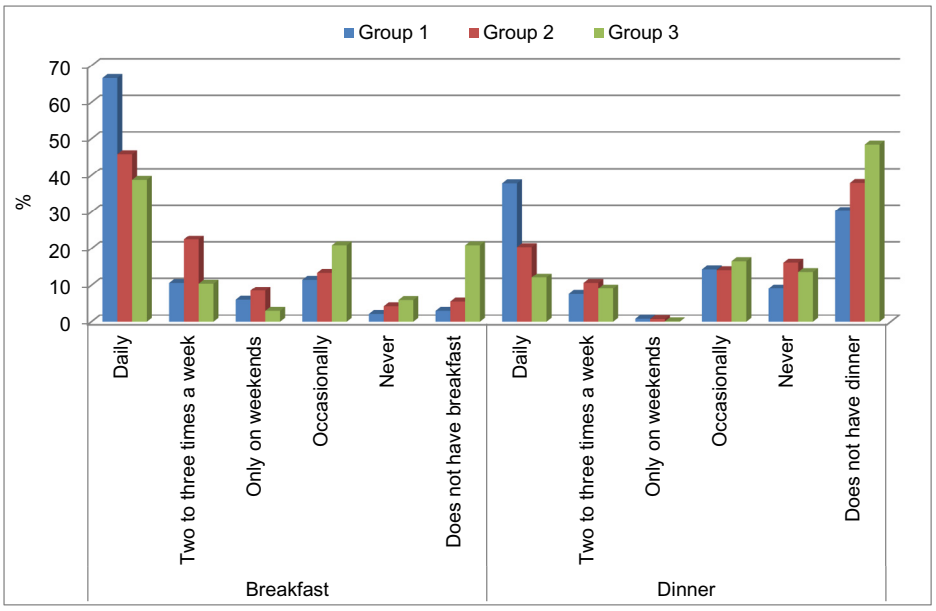

Fig. 4. Frequency of meals at the place of residence with significant differences of the groups obtained using cluster analysis in university students from Chile, August 2013 (n = 369).
Group 1 "Satisfied with their life and their food-related life".
Group 2 "Moderately satisfied with their life, unsatisfied with their food-related life".
Group 3 "Unsatisfied with their life and their food-related life".

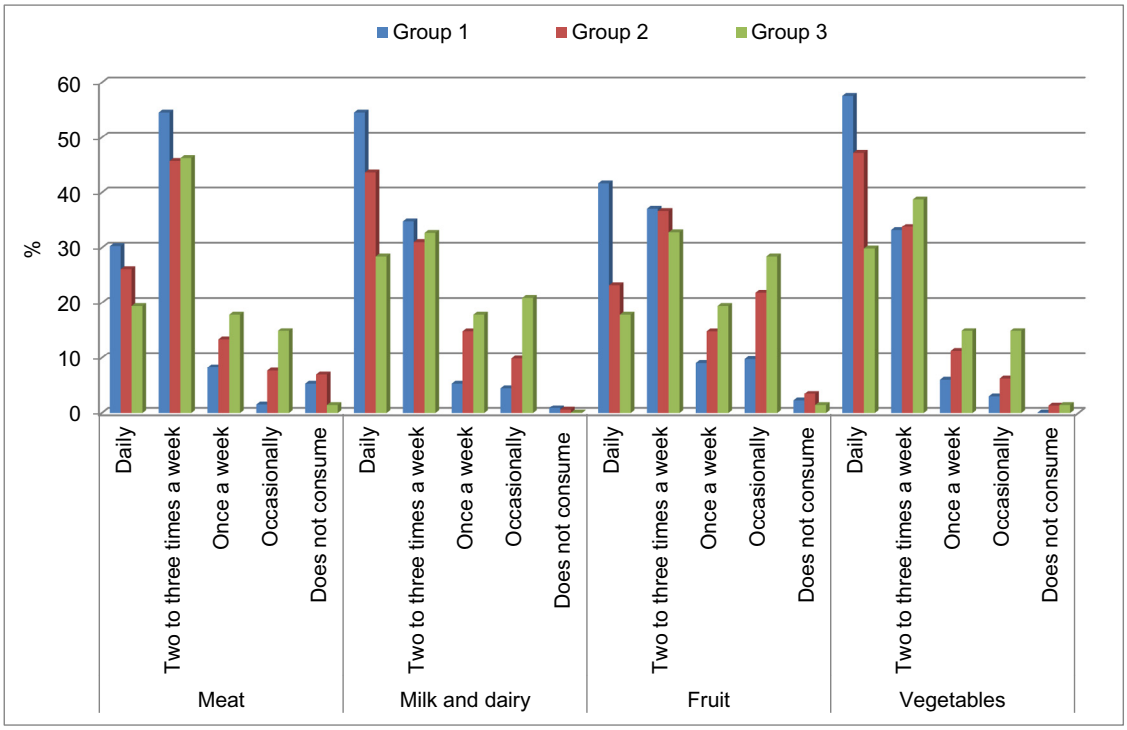

Fig. 5. Frequency of consumption of foodstuffs with significant differences of the groups obtained using cluster analysis in university students from Chile, August 2013 (n = 369).
Group 1 "Satisfied with their life and their food-related life".
Group 2 "Moderately satisfied with their life, unsatisfied with their food-related life".
Group 3 "Unsatisfied with their life and their food-related life".

to a higher satisfaction with life. Consumption of other healthful foods, such as dairy products and vegetables, is also positively associated to life satisfaction. Plus, consuming these foods is associated to a higher satisfaction with food-related life. In addition, our results show the relation between certain meals, i.e. breakfast and dinner, and satisfaction with life and food-related life in university students, linked to living with their parents throughout the year. Working with an adult sample (mean age 38.4, DS = 13.8), Schnettler, Peña et al. (2013) concluded that unhealthful eating behaviours such as eating frequently in restaurants, or eating pre-made food, along with

a lesser frequency of eating at home (lunch and dinner) are associated with a lower level of satisfaction with life and food-related life. The results of the aforementioned study and the present one are consistent on the relationship between eating habits and frequency of meals at home, and levels of satisfaction with life and the food-related life. Nevertheless, our results contribute to the knowledge on foods that have a positive effect on satisfaction with life and food-related life in university students. Additionally, although in both studies the frequency of dinner at home is related to the levels of overall subjective well-being and in the domain of food, the study of Schnettler, Peña et al. (2013) highlights the importance of lunch for higher well-being in adults, while breakfast contributes positively to university students' well-being, probably because it provides energy to better face daily academic activities. However, it is noteworthy that in both studies more frequent dinners at home is related to higher levels of satisfaction with life and food-related life. This may relate to the fact that, on many occasions, breakfast and lunch are not shared with the family due to the different schedules of all household members, and this might be compensated by sharing dinner. In this regard, it is possible to suggest that a greater frequency of family meals favours a healthful diet, as well as a positive level of overall and food-related subjective well-being for adults and university students who have the opportunity to live with their parents (Schnettler, Denegri et al., 2013). Increased family support impacts positively on university students' life satisfaction (Brannan et al., 2013; Ong, Ho, & Ho, 2013). According to the results of this study, this support may be related to the frequency of shared family mealtimes being associated with greater family cohesion (Welsh, French, & Wall, 2011), because shared meals are an important time for individuals to interact with their families (Larson et al., 2007; Woodruff & Kirby, 2013).

The characteristics of Group 3 **"unsatisfied with their life and their food-related life"**, with the most students who lived away from home and skipped both breakfast and dinner, confirm the poor nutrition associated with university students who live away from home (Barker & Galambos, 2007; Brown et al., 2005; Cluskey & Grobe, 2009; Li et al., 2012). Accordingly, it has been reported that young adults who skip breakfast more frequently have lower intakes of protein, fibre, vitamins and minerals (Arnett, 2000; Neumark-Sztainer et al., 2003). With respect to the nutritional recommendations of the Instituto de Nutrición y Tecnología de los Alimentos [INTA] (2013) for this age group in Chile, the number of those who comply with the daily consumption of dairy, fruits and vegetables is very low. When students live with their parents during childhood and adolescence, parents are responsible for creating availability of and accessibility to foods (Rodenburg, Oenema, Kremers, & van de Mheen, 2012). Results from a qualitative study by Denegri et al. (2014) suggest that this comfortable situation remains for university students when they stay at the parental home. These students claim to be satisfied with their food-related life because living with their parents allows them to have more complete and balanced meals. However, this situation changes when students move out to attend the university. Denegri et al. (2014) determined that these students are not satisfied with their eating habits, mainly due to academic responsibilities that keep them from being able to prepare good meals and to have mealtimes on schedule. Thus, the lack of time negatively impacts food selection, organization, preparation and intake. This leads to inadequate eating behaviours such as skipping meals or eating foods with high energy density or fast food (Troncoso & Amaya, 2009). These behaviours are less likely when living with parents, because they contribute to their children's eating behaviours by expressing norms and values, by setting rules and regulations (such as meal times), and by their own behaviour (Rodenburg et al., 2012).

In addition, the greatest presence of students in the low SES in Group 3 is consistent with the finding that fruit and vegetable intake is lowest among youths from lower SES (Fahlman, McCaughtry, Martin, & Shen, 2010; Neumark-Sztainer et al., 2003). It has been described that young people who frequently eat with their families have a higher protein intake (Neumark-Sztainer et al., 2003). The opposite occurs in Group 3, where some type of meat is consumed only occasionally. One potential explanation for this finding is that families from lower socioeconomic backgrounds may not have access to or be able to afford nutritious food (Pelletier & Laska, 2012). Another possibility lies in the budgetary restrictions that affect university students, which can reduce the consumption of healthful foods (Verger et al., 2009), particularly among those who live on their own. All these may negatively affect satisfaction with food-related life in these students. Likewise, these results confirm that SES is related to the students' life satisfaction (Proctor et al., 2009). Notably, SES was the only socio-demographic characteristic where differences were detected among the student types. However, considering the variables used to determine the students' SES (Adimark, 2004), it is possible to suggest an indirect link to the parents' education level. Several studies indicated that parental education is one of the most important determinants of children's diets (Dubois, Farmer, Girard, Burnier, & Porcherie, 2011; Ovaskainen et al., 2009; Sausenthaler et al., 2007). In this regard, studies with families with children aged between 18 months and 5 years in the UK (Ohly et al., 2013) and aged 8–12 years in The Netherlands (Rodenburg et al., 2012) show that children and their parents have healthful eating habits when parents had a higher education. In this study, students from low SES report that the heads of their household reached middle school or high school level. Thus it can be expected that a lower level of education in parents from Group 3 is linked to less knowledge about health and food that may negatively influence eating habits of their children from a young age, because poor eating habits in childhood track into adulthood (Fisk et al., 2011). However, since the questionnaire did not ask the families' eating habits nor parents' level of education on health and food, these aspects must be dealt with in future research and constitutes a limitation of this study.

In addition, these study results link students' life satisfaction and satisfaction with food-related life with health problems. Therefore, from these results it is possible to accept hypothesis 4. In terms of differences in the Health-related quality of life index (Hennessy et al., 1994), Group 3 had more students who reported negative general and mental health, while Group 1 had the greatest proportion of students who reported being in very good health and fewer days affected by mental health problems. These results may be associated with the family support students receive regarding food, because family meal frequency has been found to be associated inversely with depressive symptoms among adolescents (Neumark-Sztainer, Wall, Story, & Fulkerson, 2004). However, since the questionnaire used in this study did not assess depressive symptoms, this aspect must be dealt with in future research and constitutes another limitation of this study. Our finding also confirms that social eating is associated with psychological well-being during this stage of increasing independence from the family unit (Arnett, 2000). Previously, researchers have concluded that students with a negative self-perception of their health scored lower in life satisfaction (Schnettler, Denegri et al., 2013; Zullig, Valois, Huebner, & Drane, 2005) and satisfaction with food-related life (Schnettler, Denegri et al., 2013). However, results from this study indicate that the level of life satisfaction and satisfaction with food-related life in university students not only relates to general health. Our findings show that higher levels of life satisfaction and satisfaction with food-related life are related to better mental health. This result is particularly important because it has been reported that most undergraduate students are late adolescents, a stage during which mental health disorders, such as mood and anxiety disorders, tend to emerge with particular intensity (Harrington, 2002). Antúnez and Vinet (2013) obtained similar results in a recent study of college students in southern Chile.

Therefore, this study intends to contribute to the detection of variables that are associated with better mental health during the university years. University authorities may use this knowledge to design and develop activities that prevent mental health disorders and, concurrently, improve levels of life satisfaction and satisfaction with food related student life.

Students in Group 2 **"moderately satisfied with their life, unsatisfied with their food-related life"** presented some unhealthful eating practices that might affect their satisfaction in the food domain. However, their health self-reports were consistent with studies associating good health with higher levels of life satisfaction in university students (Schnettler, Denegri et al., 2013; Zullig et al., 2005). Therefore, the incongruity between life satisfaction and satisfaction with food-related life in these students may be related to the lower importance they assigned to food for their well-being. This is in contrast to what was observed in Group 1, where 50% considered that food is very important for their well-being. This indicates that it is not just students' eating habits that are related to their life satisfaction and satisfaction with food-related life, and further research is required to examine these results and their causes in more detail.

The relation between the satisfaction with life and satisfaction with food-related life was assessed through causal covariance structure analysis, with SWFL as the antecedent and SWLS as the consequent using CFA. It is noteworthy that this relation had not been assessed previously with university students. The medium level of relation obtained between the SWFL and the SWLS confirmed that food is among the important domains of life that affect the individual's life satisfaction (Grunert et al., 2007; Schnettler, Crisóstomo et al., 2013; Schnettler, Miranda et al., 2013; Schnettler, Peña et al., 2013). It is also suggested that food may be important for overall life satisfaction for some people more than for others. In the previous study conducted with an adult sample, the conclusion reached was that the validity of the relationship between the two constructs is culture-specific, because the relationship between the scales was different in Europe from that in South America (Schnettler, Miranda et al., 2013). In European countries, a significant relationship between the scores of both scales was obtained using all five items of each (Grunert et al., 2007). In South America, a significantly higher correlation and a causal model (SWFL as antecedent and the SWLS as consequent) with a good fit to the data were obtained using only four items of the SWFL (Schnettler, Miranda et al., 2013). The results of this study indicate that the relationship between the two constructs may also be related to the participants' ages, because a good fit of the model was achieved when two items from the SWLS and two from the SWFL were eliminated. This confirms the need for researchers to have access to reliable and valid instruments or measures validated among diverse segments of the population (Sousa & Rojjanasrirat, 2011).

Limitations of this study include the non-probabilistic sample and its relatively small size, which does not allow generalization of the results. Additionally, although the sample is representative of the population of university students in the country in terms of gender, area of residence and age, it has a higher proportion of descendants of the original indigenous peoples of Chile students than reported in the general student population. All data were self-reported; thus responses may be affected by recall bias or social desirability, even though the participants were assured the information would be kept strictly confidential. Another limitation was asking about the frequency of food consumption, leaving out the amount ingested; therefore, it was not possible to analyse the nutritional contribution. Inquiries about the places where students had their meals when not at their residence were not included. These aspects must be dealt with in future studies.

However, the present study is one of the first to analyse the relationship between satisfaction with life, satisfaction with food-related life and eating habits in university students. These students are faced with the pressures of college life and must deal with significant changes in their eating habits, especially those who do not live with their parents during the semester. Therefore, this research underscores the importance of the students' families in maintaining healthful eating habits and their impact on satisfaction with life and with food-related life in university students. Another notable aspect is that the sample was composed of first and third year students of several programmes from five state universities in different areas of Chile, and none of these characteristics was a source of variation among the groups. This allows suggesting, preliminarily, that nutritional problems and low subjective well-being affect Chilean university students of different ages and at different universities and must be addressed through a national strategy and university populations.

As for the implications for research and practice, the study results indicated that a significant proportion of the student sample did not have a healthful diet and did not consume important nutrients as frequently as recommended, which negatively affects their nutrition, health, and well-being. This is particularly important in the case of students that do not live with their parents during their university years. While it is necessary to promote or improve the campaigns that foster healthful eating in the entire university population (including the type of students that belong to the group "**satisfied with their life and their food-related life"**), with emphasis on not skipping meals and eating the right amount of food the body needs, these campaigns must be specifically aimed at students who do not receive direct support from their families. That is, they should focus mainly on the students who fall into the type "**unsatisfied with their life and their food-related life"**. In this sense, the university authorities and other institutions linked to the Ministry of Education should create programmes that make up for the social support provided by families in students who do not live with their parents throughout the academic period, seeking to improve or at least match the quality of life for students in this situation.

The first step of these programmes should include the detection of students with these characteristics through a survey applied to freshmen at the beginning of their first semester. Following the results of this study, the survey should consider at least the SWLS, SWFL and HRQOL-4 scales, place of residence during the semester, eating habits and variables to determine the student's SES. This survey should also include scales to measure depression, anxiety and stress, among other mental health problems. Once students are identified as **"unsatisfied with their life and their food-related life"**, different strategies should be implemented in order to improve their level of satisfaction with life and food-related life. As a starting point, these students should receive the food allowance card funded by the Chilean government, in order to access food and meals that comply with the calories and minimum nutrients required according to the Instituto de Nutrición y Tecnología de los Alimentos [INTA] (2013) for the population of this age. Additionally, to improve the students' financial situation, programme departments should encourage and facilitate the participation of these students in paid activities that are compatible with their academic obligations, such as research assistant, university promotion, etc. To make up for family support, these students should be assigned older students as tutors who support them both in the academic and social environment. In this sense, tutors should encourage students to participate in cultural and recreational activities (music events, sports activities, student organizations, etc.) organized by the university, as opportunities to establish friendly relations with peers. There is evidence that social support from friends and peers has a major influence on life satisfaction (Oberle, Schonert-Reichl, & Zumbo, 2011). This may even improve the level of satisfaction with food-related life. In a qualitative study with UK university students, Brown, Edwards, and Hartwell (2013) concluded that eating involved socializing and building

relationships and that being in the company of friends enhanced the experience of eating, which in turn made them experience more well-being. Students with a high number of days affected by mental health problems or symptoms of a specific mental illness should be referred to student health services to receive the necessary treatment.

At the same time, research that focuses on the reasons why food is or is not considered important for personal well-being is required, since this would relate to eating habits and their possible effects on the student's future life. This is especially relevant to improve the quality of life for students in the type **"moderately satisfied with their life, unsatisfied with their food-related life"**, who must become conscious of and be educated about the importance of their eating habits for their physical and mental health, academic performance, and general well-being. As in the case of the previous type, the first step in an intervention is to identify these students. Therefore, the survey described for detecting the type "unsatisfied with their life and their food-related life" should include a question to rate the importance of food for their well-being. Students who believe that food is not at all important, hardly important or slightly important for their well-being, should be incorporated into academic activities specially designed to raise awareness of the benefits of adequate food for their physical and mental health. This type of activity does not yet exist in Chilean universities, and should be designed by a multidisciplinary team including nutritionists, physicians, psychologists and chefs, among others. These activities should integrate content relating to the meaning of food (pleasure, social interaction, identity, nutrition), nutritional requirements, risks associated with inadequate nutrition and of developing chronic non communicable diseases, functional properties of food, healthy and tasty food preparation, among others, by using teaching–learning methodologies that are interactive, practical and motivational for the student.

Finally, this is the first study to evaluate the psychometric properties of the relationship between the SWLS and SWFL scales in university students, providing reliable instruments for samples of university students from other countries. However, future researchers should evaluate the model structure invariance found, particularly in terms of cultural differences related to food, through cross-cultural studies with students from different countries. It is noteworthy because eating practices are a fundamental part of social groups' cultural identity, and culture as a whole is decisive in the formation of behaviours and attitudes towards food (Rozin, 1990).

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