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Life, Family and Food Satisfaction in University Students

Berta Schnettler^{a,b,e,*}, Klaus G. Grunert^c, Edgardo Miranda-Zapata^d, Ligia Orellana^{e,f},
José Sepúlveda^{e,f}, Clementina Hueche^e, Natalia Salinas-Oñate^e, Germán Lobos^g,
Marianela Denegri^{e,h}, Cristian Adasme-Berriosⁱ

^a Universidad de La Frontera, Facultad de Ciencias Agropecuarias y Forestales, Temuco, Chile.

^b Universidad de La Frontera, Scientific and Technological Bioresource Nucleus (BIOREN-UFRO), Temuco, Chile.

^c Aarhus University, MAPP Centre, Denmark.

^d Universidad de La Frontera, Núcleo Científico y Tecnológico en Ciencias Sociales, Laboratorio de Investigación en Ciencias Sociales y Aplicadas (LICSA), Temuco, Chile.

^e Universidad de La Frontera, Núcleo Científico y Tecnológico en Ciencias Sociales, Centro de Excelencia en Psicología Económica y del Consumo, Temuco, Chile.

^f University of Sheffield, Sheffield, Department of Psychology, Sheffield, United Kingdom

^g Universidad de Talca, Facultad de Economía y Negocios, Programa de Investigación de Excelencia Interdisciplinaria en Envejecimiento Saludable (PIEI-ES), Talca, Chile.

^h Universidad de La Frontera, Facultad de Educación, Ciencias Sociales y Humanidades, Temuco, Chile.

ⁱ Universidad Católica del Maule, Facultad de Ciencias Sociales y Económicas, Talca, Chile.

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Abstract This study assesses the relationship between food satisfaction and family satisfaction and their relationships to university student life satisfaction, while also exploring the moderating role of the place of student residence, student self-health perception and the importance students assign to food in relation to well-being. A survey was applied to a convenience sample of 269 university students. The questionnaire included: the Satisfaction with Life Scale, Satisfaction with Food-related Life, the family subscale of the Multidimensional Students' Life Satisfaction Scale and the first item of the Health-related Quality of Life Index. Having controlled for gender and socioeconomic status, it was found that a student's life satisfaction was significantly related to food satisfaction and, to a lesser extent, family satisfaction. Food satisfaction was positively and significantly related to family satisfaction. A moderating role of student residence was not found. Student health self-perception was found to moderate the relationship between family and life satisfaction, whereas the importance assigned to food in relation to well-being was found to moderate the relationship between food and student life satisfaction. These findings suggest that, in order to increase student life satisfaction, it is important to improve family satisfaction for those students who have a negative health self-perception. Likewise, improving food satisfaction is relevant for those students who gave low importance to food in regard to their well-being.

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* Autor para correspondencia.

E-mail: berta.schnettler@ufrontera.cl

PALABRAS CLAVE

satisfacción con la vida, alimentación, familia, modelo de ecuaciones estructurales (SEM), rol moderador

Satisfacción con la vida, la familia y la alimentación en estudiantes universitarios

Resumen El objetivo de este estudio fue evaluar la relación entre la satisfacción con la alimentación y la satisfacción familiar, sus relaciones con la satisfacción con la vida de estudiantes universitarios y explorar el rol moderador del lugar donde el estudiante vive, su autopercepción de la salud y de la importancia asignada a la alimentación para el bienestar. Se aplicó una encuesta a una muestra por conveniencia de 269 estudiantes universitarios. El cuestionario incluyó la Escala de Satisfacción con la Vida, Satisfacción con la Alimentación, la subescala de Familia de la Escala Multidimensional de Satisfacción con la Vida de Estudiantes y el primer ítem del Índice de Calidad de Vida Relacionado con la Salud. Habiendo controlado por género y nivel socioeconómico, se encontró que la satisfacción con la vida del estudiante se relacionó significativamente con la satisfacción con la alimentación y, en menor medida, con su satisfacción familiar. La satisfacción con la alimentación se relacionó positiva y significativamente con la satisfacción familiar. No se encontró un rol moderador del lugar donde el estudiante vive. La autopercepción de salud del estudiante moderaría la relación entre la satisfacción con la vida y la familia, mientras la importancia asignada a la alimentación para el bienestar moderaría la relación entre la satisfacción con la vida y la alimentación. Estos resultados sugieren que para incrementar la satisfacción con la vida de los estudiantes, es importante mejorar la satisfacción con la familia en los estudiantes que tienen una mala autopercepción de salud, mientras que mejorar la satisfacción con la alimentación es relevante en los estudiantes que asignan baja importancia a la alimentación para su bienestar.

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Life satisfaction is the cognitive factor of subjective well-being (SWB) or, stated differently, a positive assessment one makes of their overall life or of specific domains within their life (Diener, Emmons, Larsen, & Griffin, 1985; Diener & Ryan, 2009). There are two theoretical approaches used to describe life satisfaction and SWB: “bottom-up” and “top-down” (Pavot & Diener, 2008). The bottom-up causation approach suggests that specific variables cause SWB. Thus, from this perspective, overall life satisfaction is a combination of satisfaction in certain life domains (Brief, Butcher, George, & Link, 1993), implying that a person’s life satisfaction depends on their degree of satisfaction in various domains (e.g., family, health, leisure). Conversely, the top-down causation approach suggests that a person’s overall life satisfaction determines satisfaction in particular life domains (Lance, Lautenschlage, Sloan, & Varca, 1989). There is also evidence to support that both approaches can occur simultaneously (Brief et al., 1993), which is known as the “reciprocal” or “bidirectional” model (Lance et al., 1989). Additionally, the existing domains that affect overall life satisfaction tend to interact in various ways (Wilensky, 1960). The “spillover” model postulates that satisfaction in one realm has a chain reaction with other life domains that consequently produces positive results in other life domains. The compensatory model implies that life domains have a negative relationship with other life domains when these domains are compensated as a result of negative experiences (Wu, 2009). Finally, the segmentation hypothesis suggests that there is no relationship between different domains, i.e.: life domains are independent of one another (Judge & Watanabe, 1994).

Although the debate regarding the role of life domains in measuring subjective well-being has been on-going for decades (for a complete overview, see Hsieh, 2016), the importance of life domains in SWB remains a topic that merits further research (Hsieh, 2016). The current study focuses on the relationship between two life domains, family and

food and overall life satisfaction as well as how these domains interact. These two areas have not yet been analyzed in-depth in the literature. We adopted the bottom-up causation approach of measuring life satisfaction due to previous studies that have used a causal covariance structure analysis model with food satisfaction as the antecedent and life satisfaction as the consequent. This method has suggested that food satisfaction has a direct impact on overall life satisfaction in university students and adults in Chile (Schnettler et al., 2013; Schnettler, Miranda et al., 2015). In addition, Loewe, Bagherzadeh, Araya-Castillo, Thieme and Batista-Foguet (2014) showed that family life satisfaction was an important predictor of overall life satisfaction in Chilean workers. Regarding the interaction between domains, we chose the spillover model, due to the fact that previous studies had found a positive association between family and food, including healthier eating habits and better family relationships (Dwyer, Oh, Patrick, & Hennessy, 2015; Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Schnettler, Miranda et al., 2015; Speirs et al., 2016).

This study focuses on university students and analyzes the relationship between overall life satisfaction and within life domains that are of importance to young people. The relationship between family, food and overall life satisfaction is especially relevant during the university years. This stage is often marked by many changes and challenges for emerging adults (Blichfeldt & Gram, 2013) who often move away from the family home. This can result in a significant disruption to an individual’s support networks (Beck, Taylor, & Robbins, 2003). In addition, the university period is usually a time when students take responsibility for their food for the first time (Blichfeldt & Gram, 2013). Therefore, it becomes a critical stage in the development of eating habits, which will affect their future health (Aguilar-Ye et al., 2010). University students who live away from home engage in riskier eating behaviors because of the pressures

of independence and the hurried lifestyles associated with attending a university (Barker & Galambos, 2007).

Various studies have reported that higher levels of satisfaction with family relationships are associated with higher overall life satisfaction, regardless of age (Guarnieri, Smorti, & Tani, 2015; Loewe, et al., 2014). Notably, the influence of the family on an individual's well-being extends beyond childhood and adolescence (Thomson, Schonert-Reichl, & Oberle, 2015), continuing into emerging adulthood (Tinajero, Martínez-López, Rodríguez, Guisande, & Páramo, 2015). Positive family relationships and favorable environmental conditions may help individuals overcome life challenges, thus enhancing their life satisfaction during youth (Kwok, Cheng, & Wong, 2015). Schimmack, Diener and Oishi (2002) suggested that, for university students, family relationships are among the most important sources of life satisfaction.

Similarly, recent studies examining samples of adolescents (Vaqué, González, & Casas, 2012; Vaqué-Crusellas, González, & Casas, 2015; Schnettler, Lobos et al., 2017), young people (Schnettler, Denegri et al., 2015; Schnettler, Miranda et al., 2015), adults (Keller, Hartman & Siegrist, 2016; Schnettler et al., 2013; Schnettler, Lobos et al., 2015) and older adults (Grunert, Dean, Raats, Nielsen, & Lumbers, 2007) have suggested that food satisfaction has a direct relationship with overall life satisfaction. Studies have also reported that this relationship is associated with the hedonic pleasure linked to eating tasty foods as well as having healthy eating habits and better health (Schnettler, Lobos et al., 2015; Schnettler, Miranda et al., 2015).

At the same time, some studies have linked life satisfaction and food satisfaction with family interactions related to food (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Schnettler, Miranda et al., 2015). Food behavior is a learned behavior that reflects a family's beliefs, attitudes and practices (Levin & Kirby, 2012). Family meals can shield its members from the negative externalities associated with food by creating a foundation that promotes healthier eating habits in adolescents and adults (Dwyer et al., 2015). The role of food in family relationships also includes the affective dimension of food and shared meals as a moment of family cohesion. Family meals represent an important ritual of interaction among family members where family members express their love, maintain close relationships, resolve conflicts, foster cohesion (Speirs et al., 2016), and give social and emotional support (Schnettler, Denegri et al., 2015; Speirs et al., 2016). These behaviors are all positively related to higher levels of life and food satisfaction (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Schnettler, Miranda et al., 2015).

Studies in Chile have shown that a significant number of university students live with their parents during their university years, which means they frequently eat at home (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Schnettler, Orellana et al., 2015). Evidence suggests that students living with their family have healthier eating habits and higher levels of food and overall life satisfaction in comparison to those who live away from their family (Barker & Galambos, 2007; Li et al., 2012; Schnettler, Denegri et al., 2015; Schnettler, Miranda et al., 2015). At the same time, researchers have concluded that students with a positive health self-perception had higher scores in life satisfaction (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Zullig, Valois, Huebner, & Drane, 2005) and food sat-

isfaction (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015). In this regard, researchers have concluded that students who eat more frequently with their families eat more healthfully, which prevents unfavorable physiological consequences that may lead to chronic diet-related disease (Winkleby & Cubbin, 2004) and have negative psychological and social repercussions (Hidalgo, C, Hidalgo, A, Rasmussen, & Montaña, 2011). In addition, in a sample of adolescents from Spain, Vaqué et al. (2012) reported that food satisfaction helped motivate adolescents to care for their health. Likewise, it has been reported that those who expressed food as being important to their well-being had higher levels of life and food satisfaction in samples of university students (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015), adolescents and adults (Schnettler, Lobos et al., 2017). In this regard, Schnettler, Lobos et al. (2017) suggested that parents, especially mothers, seem to model the importance they assign to food as being related to their children's well-being. Therefore, we expect to find that the place of student residence serves a moderating role as does their self-health perception. We also expect the importance assigned to food in relation to one's well-being to have a moderating role in the model relating life satisfaction, food and family satisfaction. This, to the best of our knowledge, has not been previously addressed.

Therefore, based on the "bottom-up" theoretical approach to life satisfaction (Pavot & Diener, 2008) and the "spillover" model of the interaction of life domains (Wu, 2009), the first aim of this study was to assess the relationship between food satisfaction and family satisfaction and their relationships to university students' life satisfaction. Therefore, given this background and the decision to use the bottom-up theoretical approach to life satisfaction (Brief et al., 1993), we pose the following hypotheses:

H1: Food satisfaction is positively related to students' overall life satisfaction.

H2: Family satisfaction is positively related to students' overall life satisfaction.

Based on the spillover model of the interaction between life domains (Wu, 2009), we pose the following hypothesis:

H3: Food satisfaction is positively related to family satisfaction.

Secondly, this study sought to explore the moderating roles of the place of student residence, their health self-perception and the importance assigned to food for well-being. In this regard, the pose the following hypotheses:

H4: The place of student residence moderates the relationship between food satisfaction and students' overall life satisfaction.

H5: The place of student residence moderates the relationship between family satisfaction and students' overall life satisfaction.

H6: The student's health self-perception moderates the relationship between food satisfaction and students' overall life satisfaction.

H7: The student's health self-perception moderates the relationship between family satisfaction and students' overall life satisfaction.

H8: The importance that students give to food in relation to their well-being moderates the relationship between food satisfaction and students' overall life satisfaction.

H9: The importance that students give to food in relation to their well-being moderates the relationship between family satisfaction and students' overall life satisfaction.

Method

Sample and Procedure

The Ethics Committee of the Universidad de La Frontera approved the following study method. Prior to conducting the survey, the questionnaire was pre-tested on 30 university students with similar characteristics. As no problems were detected during the pre-test, no changes were made to the questionnaire.

A power analysis was carried out using the G*power 3.1 program. Then, a minimum sample size of 244 participants was established (Cronbach's $\alpha = .05$, effect size = 0.6, power $(1-\beta) = 0.95$, allocation ratio $N2/N1 = 1.0$). The inclusion criterion was enrollment at a university in 2013. Undergraduate program directors at 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) signed authorization letters allowing research to be conducted on their students. Participants were recruited through printed or e-mailed invitation letters sent by the program directors. This letter explained the online survey and the strictly confidential treatment of the information obtained. The survey link (QuestionPro, Inc.) was sent to program directors,

who then distributed it to students between March and May 2015. The participants read the consent form on the first page on the survey and a PDF version of this document was made available for download. Students agreed to participate by checking a box at the bottom of the first page. The response rate was 37%.

The convenience sample consisted of 269 students (63.6% women) from the five aforementioned state universities. Although the minimum sample size required was 244, we collected data from more participants based on the expectation of our error responses. A post hoc analysis suggested that the power $(1-\beta) = 0.96$ given Cronbach's α , sample size, and effect size. Participants were enrolled in the following programs: Agronomy, Public Accounting, Psychology, Biotechnology, Commercial Engineering and Veterinary Medicine. All participants were volunteers with a mean age of 22.5 years old ($SD = 2.5$). 95.5% resided in an urban area (Table 1). The sample mainly consisted of students living with their parents all year round or students living with their parents during weekends or vacations. Most students belonged to the middle-middle and lower-middle socioeconomic statuses (SES). Education level and head of household occupation were used to determine a family's SES (Adimark, 2004).

Instruments

The questionnaire included the following scales:

Satisfaction with Life Scale (SWLS; Diener et al., 1985).

It is a scale consisting of five items grouped into a single factor used to evaluate overall cognitive judgments a person holds about their own life (e.g. "In most ways my life is close to my ideal"). The respondents were asked to indicate their degree of agreement with the five statements using

Table 1 Socio-Demographic Characteristics of the Sample

Characteristic	Total
Gender (%)	
Female	63.6
Male	36.4
Age [Mean (SD)]	22.5 (2.5)
Place of residence during study period (%)	
With parents the entire year	49.8
With parents the entire year although commutes for the day to attend class	5.2
With their parents only on weekends or for vacations	27.5
Independent of parents	17.5
SES (%)	
High and upper-middle	12.3
Middle-Middle	29.4
Lower-Middle	31.2
Low	21.6
Very low	5.6

a 6-level Likert scale (1 = *completely disagree* to 6 = *completely agree*). This study used the Spanish-language version of the SWLS, which has showed good internal consistency (Cronbach's α between .87 and .88) in previous studies with university students in Chile (Schnettler et al., 2015ab). In this study, the SWLS also showed a good level of internal consistency (Cronbach's α = .89). SWLS scores are the sum of items of each scale. Higher scores indicate higher levels of life satisfaction. The mean SWLS score for all participants was 21.47 (SD = 5.26, range = 5-30).

Satisfaction with Food-Related Life (SWFL; Grunert et al., 2007). It is a scale consisting of five items grouped into a single dimension used to evaluate a person's overall assessment of their food and eating habits (e.g. "Food and meals are positive elements"). The respondents were asked to indicate their degree of agreement with the five statements using a 6-level Likert scale (1 = *completely disagree* to 6 = *completely agree*). This study used the Spanish-language version of the SWFL which has shown good internal consistency (Cronbach's α between .79 and .88) in previous studies with university students in Chile (Schnettler, Denegri et al., 2015; Schnettler, Miranda et al., 2015; Schnettler, Orellana et al., 2015). In this study, the SWFL also showed a good level of internal consistency (Cronbach's α = .82). SWFL scores are the sum of the items of each scale. Higher scores indicate higher levels of food satisfaction. The mean SWFL score for all participants was 19.36 (SD = 4.67, range = 5-30).

The Family subscale from the Multidimensional Students' Life Satisfaction Scale (MSLSS; Huebner, 1994). It is a 40-item self-reporting scale designed for children aged 8-18 years old. The MSLSS was used given that the participants are in the stage of emerging adulthood. Emerging adulthood is a life period (roughly from 18 to 25 years of age) that bridges adolescence and adulthood in modern, westernized societies. People's social lives often expand during this time and they are influenced, not only by peer relationships, but also by parental ones (Ahmed & Brumbaugh, 2014). Emerging adults typically are in a period of life in which they pursue higher education or vocational training over an extended duration and delay marriage or a permanent love relationship. Emerging adults are typically free from the dependency and monitoring that characterizes childhood or adolescence (Sussman & Arnett, 2014), yet they are not burdened with the full responsibilities of adulthood (e.g. taking care of others). The MSLSS measures youth life satisfaction in five life domains: family, friends, school, self and living environment (Huebner, 2001). The Family subscale consists of seven items (e.g. "My family gets along well together"). The respondents were asked to indicate their degree of agreement with the seven statements using a 6-level Likert scale (1 = *completely disagree* to 6 = *completely agree*). This study used the Spanish-language version of the Family subscale, which has shown good internal consistency (Cronbach's α = .90) in previous studies with university students in Chile (Schnettler, Miranda et al., 2015; Schnettler, Orellana et al., 2015). In this study, a factor analysis detected a single factor that grouped together the seven items from the subscale (explained variance: 70.9%) with a good level of internal consistency (Cronbach's α = .93). Family subscale scores are the sum of the items of each scale. Higher scores indicate higher levels of

family satisfaction. The mean Family subscale score for all participants was 31.59 (SD = 7.94, range = 7-42).

Students were asked to indicate their health self-perception using the first item of the Health-related Quality of Life Index (HRQOL-4; Hennessy, Moriarty, Zack, Scherr, & Brackbill, 1994). The first item measures general health self-perception using a 5-point Likert scale (1 = *very poor*; 5 = *excellent*). This study used the Spanish-language version of item 1 of the HRQOL-4 (Schnettler, Miranda et al., 2015). Finally, students were asked to rate the importance of food in relation to their well-being using a 6-point Likert scale (1 = *not important at all*, 6 = *extremely important*).

Statistical Analysis

The two-step procedure recommended by Anderson and Gerbing (1988) was used to measure the relationship between food satisfaction and family satisfaction and their relationship with university students' life satisfaction. First, a measurement model was estimated using confirmatory factor analysis (CFA) and structural equation modeling (SEM) was used to test relationships. The analyses were implemented using the software Mplus v. 7.3. Considering the ordinal scale of the items, the polychoric correlation matrix was used to perform both analyses. The estimation method used was robust unweighted least squares (ULSMV), following Forero, Maydeu-Olivares and Gallardo-Pujol (2009).

In terms of construct validity, we assessed convergent validity by inspecting the standardized factor loadings of each scale (ideally > 0.5) as well as their significance, composite reliability (values > 0.7) and average variance extracted (AVE, values > 0.5) (Hair, Anderson, Tatham, & Black, 2007). Discriminant validity was obtained by comparing the AVE for each construct with the square of the correlation between the scales (Lévy & Varela, 2006).

The Tucker-Lewis Index (TLI) and the Comparative Fit Index (CFI) were used to determine the model fit of the data. The TLI shows an acceptable fit with a value higher than 0.95, while 0.97 is considered a cutoff for establishing a good fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003). Models with CFI values near 0.95 are considered an acceptable fit (Hu & Bentler, 1999). In addition, the Root Mean Square Error of Approximation (RMSEA) was considered. The RMSEA is a badness of fit measure. Thus, a good fit is found when its value is lower than 0.06 whereas an acceptable fit corresponds to a value lower than 0.08 (Hu & Bentler, 1999).

In order to control for the effects of gender and SES in modeling the fit of the data, both variables with a direct effect on the SWLS dependent variable were incorporated. The SES analysis grouped the statuses of high and upper-middle and middle-middle into the high level (41.7%) and the SES statuses of lower middle, low and very low into the low level (54.9%).

In order to test the moderating roles of the place student residence (henceforth Place), their health self-perception (henceforth Health) and the importance assigned to food in relation to well-being (henceforth Importance), a multi-group analysis was performed in order to establish the differences between the structural parameters (relationship between SWFL and SWLS and the relationship between the Family subscale and SWLS) in each context determined by categorizing each possible moderating variable. In order to

create more heterogeneous groups, the multigroup analysis separately considered students who were living with their parents throughout the year and had the opportunity to eat with their families (49.8%) and those who did not (50.2%). According to student's health self-perception, those who had a good health self-perception (good, very good and excellent; 78.6%) and those who did not (very poor and fairly; 21.4%) were considered separately. According to the importance assigned to food in relation to well-being, those who considered food as important to their well-being (very important, extremely important; 61.1%) and those who did not (not at all important, hardly important and slightly important; 38.9%) were considered separately.

Results

According to the first item of the HRQOL-4, most students had a good (45.7%) or very good (27.5%) health self-perception. 2.6 % of the students had a very poor health self-perception, 18.8% had a fair health self-perception and 5.4% had an excellent health self-perception.

The greatest proportion of students considered food *slightly* (31.0%), *very important* (39.9%) and *extremely important* (21.2%) to their well-being. Only a small proportion of students considered food *not at all important* (1.1%) and *hardly important* (6.8%) for their well-being.

Measurement and Structural Model

The first step carried out was to validate the scales through CFA. The scales used in the analysis satisfied the composite reliability test (above 0.7) and AVE values (above 0.5) (Table 2). The value of the squared correlation between the SWFL and SWLS was lower than the AVE of the scale factors, which verified the discriminant validity between the constructs (Lévy & Varela, 2006). The discriminant validity between the SWLS and the Family subscale and between the SWFL and the Family subscale was also verified. For each scale, the standardized factor loadings for all items were above 0.5 and statistically significant. Thus, it was concluded that there was convergent validity. Therefore, the measurement model presented adequate internal validity.

Having controlled for gender and SES, the structural model (Figure 1) showed an acceptable fit for the data ($RMSEA = .067$, $CFI = .954$, $TLI = .947$). The path coefficient of 0.426 indicated a medium level relationship between the SWFL and SWLS. The path coefficient between the Family subscale and the SWLS was direct and significant, which

also indicated a medium level relationship. However, the value was slightly lower. Therefore, the results indicate that a student's life satisfaction is related to food satisfaction and, to a lesser extent, a student's family satisfaction. Given these results, it is possible to accept Hypotheses 1 and 2. The correlation (standardized covariance) value of 0.432 indicated a medium level relationship between the SWFL and the Family subscale. Therefore, it is also possible to accept Hypothesis 3.

The data resulting from the multigroup analysis that considered the Place variable as a category and compared the structural parameters of the model for both conditions of Place (students who were living with their parents throughout the year and had the opportunity to eat with their families vs. those who did not), presented an acceptable fit ($RMSEA = .070$; $CFI = .948$; $TLI = .943$). Significant statistical differences were not found for the structural parameters in each category of Place (relationship between SWFL and SWLS $p = .152$; relationship between Family subscale and SWLS $p = .297$). Therefore, the Place variable was not found to have a moderating role in relation to the structural parameters of the model, leading to a rejection of Hypotheses 4 and 5.

The data resulting from the multigroup analysis considering the Health variable as a category and comparing the structural parameters for both conditions of Health (good health self-perception vs. those who did not) presented a good fit ($RMSEA = .052$; $CFI = .948$; $TLI = .942$). Significant statistical differences were not observed for the regression parameter of the relationship between SWFL and SWLS ($p = .287$). Therefore, the Health variable was not found to have a moderating role on this model parameter, leading to a rejection of Hypothesis 6. On the contrary, significant statistical differences for the regression parameter of the relationship between the Family subscale and SWLS were observed ($p = .015$). Therefore, the Health variable was found to have a moderating role on this model parameter, which presented a greater value ($\gamma = .420$) for those students who had a good health self-perception compared to those who did not ($\gamma = .191$). Therefore, it is possible to accept Hypothesis 7.

The data resulting from the multigroup analysis that considered the Importance variable as a category and compared the structural parameters of the model for both conditions of Importance (food is important vs. Unimportant to their well-being) showed an acceptable fit ($RMSEA = .067$; $CFI = .948$; $TLI = .942$). Significant statistical differences were observed for the regression parameter of the relationship between SWFL and SWLS ($p = .003$). Therefore, the Importance variable was found to have a moderating role on this mod-

Table 2 Composite Reliabilities, Average Variance Extracted (AVE), Correlations and Squared Correlations between the Satisfaction with Life Scale (SWLS), Satisfaction with Food-Related Life scale (SWFL) and Family Subscale from the MSLSS

Scale/Subscale	Composite reliability	AVE	SWLS	SWFL	Family subscale
SWLS	0.919	0.697	-	0.288	0.236
SWFL	0.842	0.533	0.537	-	0.137
Family subscale	0.947	0.720	0.486	0.371	-

Note. The values over diagonal indicate squared correlations between constructs.

Note. The values under diagonal indicate correlations between constructs.

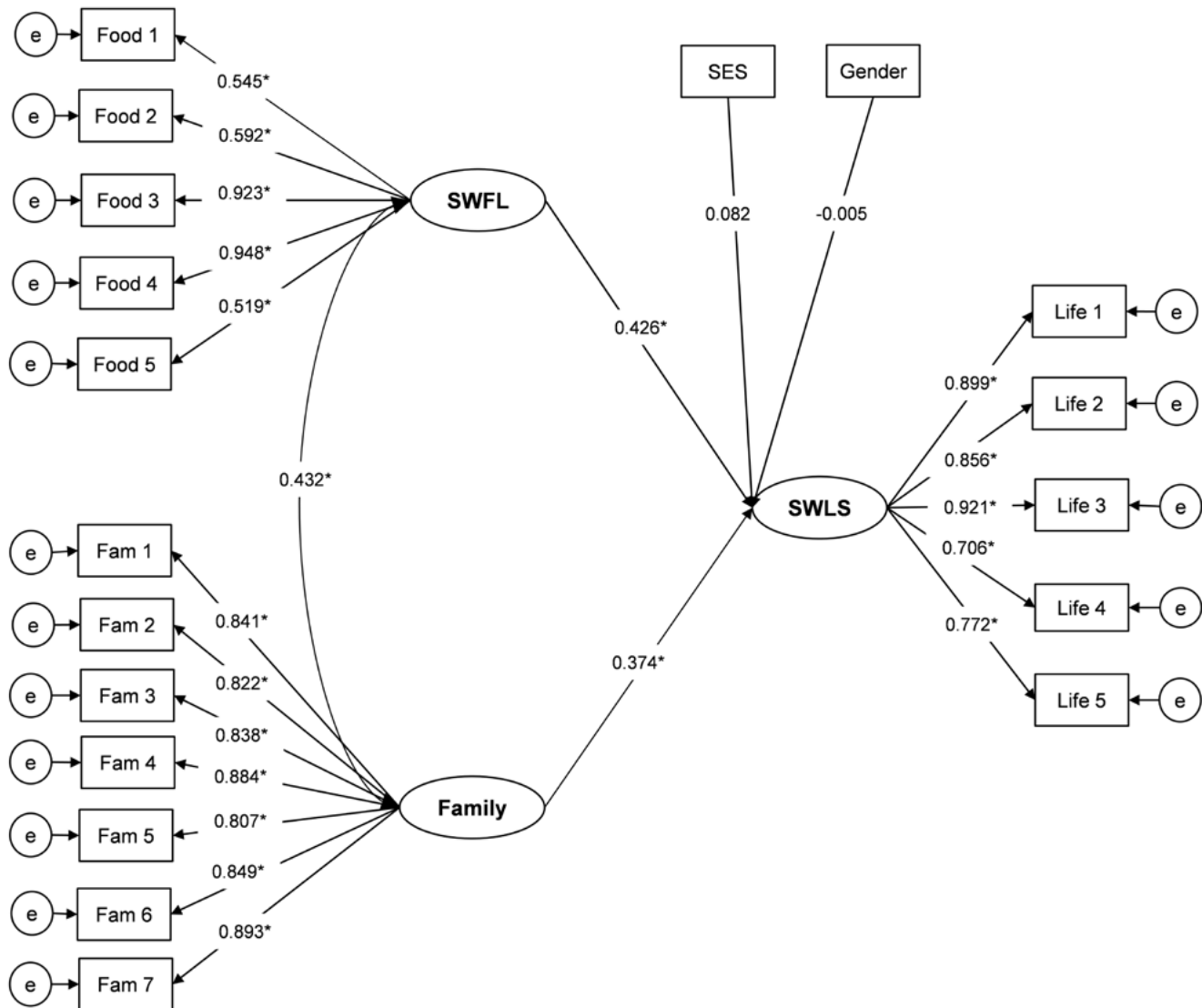


Figure 1. SEM that explains the relationship between food satisfaction (SWFL) and family satisfaction (Family subscale of the MSLSS) and their relationships with life satisfaction (SWLS) in a university student sample.

* $p < 0.01$

Food 1: Food and meals are positive elements.

Food 2: I am generally pleased with my food.

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.

Fam 1: My family gets along well together.

Fam 2: I enjoy being at home with my family.

Fam 3: My family is better than most.

Fam 4: Members of my family talk nicely to one another.

Fam 5: My parents and I do fun things together.

Fam 6: My parents treat me fairly.

Fam 7: I like spending time with my parents.

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.

Life 4: So far I have gotten the important things I want in life.

Life 5: If I could live my life over, I would change almost nothing.

e: error terms.

el parameter, which presented a greater value ($\gamma=.517$) for those who considered food an important factor in relation to their well-being compared to those who did not ($\gamma=.243$). These results support Hypothesis 8. Conversely, significant statistical differences were not observed for the regression parameter of the relationship between the Family subscale and SWLS ($p = .538$). Therefore, no moderating role for the Importance variable on this model parameter was found, leading to a rejection of Hypothesis 9.

Discussion

The results obtained in this study contribute to the knowledge of satisfaction within different life domains, which remains a topic that merits further research (Hsieh, 2016). The results of the CFA and SEM suggest that there is a positive interaction between the domains of food and family, which is consistent with the “spillover” model (Wu, 2009). This finding is in line with studies that have linked food satisfaction and family interaction around foods (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Schnettler, Miranda et al., 2015), which may be associated with the affective dimension of food and meals (Speirs et al., 2016).

The results of the SEM analysis confirm the positive relationship between food satisfaction and overall life satisfaction as reported previously in studies examining university students and adolescents (Keller et al., 2016; Schnettler et al., 2013; Schnettler, Lobos et al., 2015; Schnettler, Lobos et al., 2017; Vaqué et al., 2012, 2015). The SEM results suggest a positive relationship between family satisfaction and overall life satisfaction in students and also confirms the importance of family relationships as a source of life satisfaction in university students and youth (Kwok et al., 2015; Schimmack et al., 2002; Tinajero et al., 2015).

Nonetheless, this study is noteworthy as it is the first to show that the relationship between family satisfaction and life satisfaction is less significant than the relationship between food satisfaction and life satisfaction in university students. Pavot and Diener (1993) argued that, although there may be some general agreement regarding the components needed for a high quality of life, individuals are likely to assign different weights to each component. In this regard, in Spain, Vaqué-Crusellas et al. (2015) found that food satisfaction was the second variable that most contributed to explaining the overall life satisfaction of adolescents after satisfaction with interpersonal relationships. Similar results were reported recently in a sample of Chilean adolescents (Schnettler, Lobos et al., 2017). Nevertheless, a possible explanation for the results from Vaqué-Crusellas et al. (2015), Schnettler, Lobos et al. (2017) and those obtained in this study could be that people may weigh life domains differently during different life developmental stages (Bardo & Yamashita, 2014). Some authors have suggested that, for university students, family relationships appear to be among the most important domains of life satisfaction and have also found that family support heavily influences their life satisfaction (Guarnieri et al., 2015; Kwok et al., 2015; Schimmack et al., 2002; Schnettler, Denegri et al., 2015; Tinajero et al., 2015). However, university students are also becoming increasingly involved in other contexts beyond their family (social, work, higher education) during this time (Guarni-

eri et al., 2015). This could explain the decreased effect of family satisfaction. Regardless, healthy family relationships should be encouraged in families with young adult children in the university period in order to improve their well-being.

Likewise, the period of time spent at university has been characterized as one of high nutritional vulnerability (Blichfeldt & Gram, 2013) whether they live with their family or not because, in the latter case, academic demands prevent emerging adults from being present during every meal served at home. The university period is a stage of life characterized by many challenges, different stressors, nutritional vulnerability and the possibility of facing health-related problems, physically and mentally, in different countries including Chile (Barker & Galambos, 2007; Blichfeldt & Gram, 2013; Beck et al., 2003; Blichfeldt & Gram, 2013; Hidalgo et al., 2011; Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Winkleby & Cubbin, 2004). Therefore, it may be said that, during this time, food becomes a domain in which students are assuming greater responsibility, potentially improving the level of overall life satisfaction in undergraduate students.

Contrary to what was expected (Barker & Galambos, 2007; Li et al., 2012; Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015; Schnettler, Miranda et al., 2015; Schnettler, Orellana et al., 2015), the multigroup analyses showed that the place of student residence in the model relating life satisfaction, food satisfaction and family satisfaction did not serve a moderating role. Therefore, interventions that promote and strengthen these aspects may positively impact the life satisfaction of a student, regardless of their place of residence. Likewise, contrary to what was expected (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015), the multigroup analysis did not support a moderating role of the student's health self-perception in the relationship between food satisfaction and life satisfaction. Therefore, interventions that promote a higher level of food satisfaction may positively impact the student's life satisfaction, regardless of the student's health self-perception. However, it is noteworthy that student health self-perception would have a moderating role in the relationship between family satisfaction and life satisfaction. This finding may be related to the quality of family social support and the kind of health issues that are more common in university students. It has been reported that most undergraduate students are considered emerging adults, a stage during which mental health disorders, such as mood and anxiety disorders, tend to emerge with particular intensity (Antúnez & Vinet, 2013; Sussman & Arnett, 2014). In this regard, previous studies examining undergraduate students in Chile have associated a low health self-perception with a higher incidence of mental health problems and decreased family social support (Schnettler, Denegri et al., 2015; Schnettler, Miranda et al., 2015). Shahdadi, Mansouri, Nasiri and Bandani (2017) found that better mental health in students will improve their perception of the family support received, thus strengthening the relationship between family and life satisfaction. Therefore, interventions to promote student life satisfaction should propitiate healthy family relationships, with special focus given to students who have a bad health self-perception. In addition, university authorities may use this knowledge to design and develop activities that help prevent mental health disorders and,

consequently, improve levels of life satisfaction. Regarding a possible moderating role of the importance that students give to food in relation to their well-being, our results only support the moderating role of this variable in the relationship between food and life satisfaction. This finding is congruent with previous results reported in studies examining samples of university students (Schnettler, Denegri et al., 2015; Schnettler, Lobos et al., 2015), adolescents and adults (Schnettler, Lobos et al., 2017) and also confirms that domain importance plays an important role in the relationship between overall life satisfaction and domain satisfaction (Hsieh, 2016). Therefore, interventions aiming to promote a higher level of food satisfaction should be focused on those students who gave a low importance to food in relation to their well-being. This, in turn, may increase the positive impact of food satisfaction on student life satisfaction. In this regard, this type of student should be incorporated into academic activities specially designed to raise awareness of the benefits of adequate nutrition to their physical and mental health. These activities should integrate content related to the meaning of food (pleasure, social interaction, identity, nutrition), nutritional requirements, risks associated with inadequate nutrition and of developing chronic non-communicable diseases and the preparation of healthy and tasty food, among others.

The limitations of this study include its cross-sectional design, which does not allow us to test for causality among food satisfaction and life satisfaction or between family satisfaction and student's life satisfaction. Therefore, in order to test causality between the aforementioned constructs, new research that considers experimental, quasi-experimental or longitudinal designs is required. Another limitation is related to the convenience student sample used and its relatively small size, which did not permit the results to be generalized, and the fact that it only addressed two life domains. All data was self-reported, thus, responses may be affected by social desirability, recall or response bias. Although we assessed the moderating role of student's health self-perception, an alternative model including physical and mental health problems should be tested. These aspects must be addressed in future studies.

In spite of these limitations, this is the first study to assess the relationship between food satisfaction and family satisfaction and their relationship with life satisfaction, suggesting that both life domains have a positive relationship with the life satisfaction of university students and also that both domains interact positively with each other. These findings suggest that interventions to improve the levels of food satisfaction and family satisfaction may improve life satisfaction in university students in developing countries in South America. Therefore, future research should identify variables which improve satisfaction in both life domains. However, interventions aimed at improving student life, food and family satisfaction must include the university authorities, other institutions linked to the Ministry of Education and the student's families. Vis-à-vis food satisfaction, students less satisfied should receive the food allowance card funded by the Chilean government in order to access food and meals that comply with the minimum calories and nutrients required. Regarding family satisfaction, less satisfied students should be assigned older students as tutors who support them both in the academic and social environment. In this sense, tutors could encourage students to

take opportunities to establish friendly relationships with peers, given 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 food satisfaction as eating involves socializing and building relationships. In addition, being in the company of friends enhances the experience of eating, which in turn makes the experience more beneficial to student well-being (Brown, Edwards & Hartwell, 2013). Regarding student families, communication campaigns must be developed so that parents can become aware that their children still need their support and adequate nutrition during the university stage.

In addition, this is the first study to explore the moderating roles of the place of student residence, their health self-perception and the importance assigned to food in relation to well-being in the model that related life satisfaction, food and family satisfaction. In this regard, our findings show that improving food and family satisfaction is important for students, regardless of the place of student residence. However, at the same time, our findings show that, in order to increase student life satisfaction, it is especially important to improve family satisfaction in those students who have a bad health self-perception, whereas improving food satisfaction is particularly relevant in those students who gave a low importance to food in relation to their well-being. Nevertheless, future research should test other variables that may moderate and also mediate the relationship between food, family and life satisfaction in university students, not only in Chile, but also in other developing countries and developed countries. At the same time, future research should incorporate other life domains which may be important for student life satisfaction, such as friends, leisure, university and living environment, and should test the way these domains interact.

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