Nutrición Hospitalaria

Nutr Hosp. 2014;30(2):453-461
ISSN 0212-1611 • CODEN NUHOEQ
S.V.R. 318

Original / *Otros*

Dietary restraint and subjective well-being in university students in Chile

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Abstract

Objective: **To characterize university students typologies according to chronic food restriction, satisfaction with life and food consumption.**

Materials and method: **A questionnaire was applied on a non-probability sample of 369 male and female students from five Chilean universities. The questionnaire included: Revised Restraint Scale (RRS), Satisfaction with Life Scale (SWLS), Satisfaction with Food-related Life (SWFL) and the Health-related Quality of Life Index. The survey included food and drink consumption habits, weight and approximate height and sociodemographic variables.**

Results: **Two factors in the RRS were detected by exploratory factor analysis: Preoccupation with Diet (PD) and Weight fluctuations (WF). A confirmatory factor analysis validated the bifactor structure of the RRS with an acceptable adjustment kindness. The cluster analysis allowed a distinction of four typologies with a significant variation in PD, WF, SWLS and SWFL scoring, number of days with mental health problems, frequency of alcoholic drinks consumption, restraint on the consumption of certain foods, drinks and spices, consumption frequency of fruit out of the main meals and types. Typologies did not differ on their body mass index.**

Conclusions: **Both, students preoccupied with diet and those who are not, experience higher levels of satisfaction with life and with food. Lower levels of global life satisfaction and satisfaction with food are related with the fluctuations in weight.**

(*Nutr Hosp.* 2014;30:453-461)

DOI:10.3305/nh.2014.30.2.7561

Key words: *Food restraint. Satisfaction with life. Satisfaction with food. Mental health.*

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Recibido: 30-IV-2014.
Aceptado: 19-V-2014.

RESTRICCIÓN ALIMENTARIA Y BIENESTAR SUBJETIVO EN ESTUDIANTES UNIVERSITARIOS EN CHILE

Resumen

Objetivo: **Caracterizar tipologías de estudiantes universitarios según restricción alimentaria crónica, satisfacción con la vida y con la alimentación.**

Material y método: **Se aplicó un cuestionario a una muestra no probabilística de 369 estudiantes de ambos géneros de cinco universidades de Chile. El cuestionario incluyó: Escala Revisada de Restricción Alimentaria (RRS), Satisfaction with Life Scale (SWLS), Satisfaction with Food-related Life (SWFL) y el Índice de Calidad de Vida relativo a la Salud. Se consultaron hábitos de consumo de alimentos y bebidas, peso y estatura aproximada y variables sociodemográficas.**

Resultados: **Mediante análisis factorial exploratorio se detectaron dos factores en la RRS: Preocupación por la Dieta (PD) y Fluctuaciones de Peso (FP). Mediante análisis factorial confirmatorio se validó la estructura bifactorial de la RRS con una aceptable bondad de ajuste. Mediante análisis clúster se distinguieron cuatro tipologías que difirieron significativamente en los puntajes de PD y FP, los puntajes de la SWLS y SWFL, número de días con problemas de salud mental, frecuencia de consumo de bebidas alcohólicas, restricción del consumo de algunos alimentos, bebidas y condimentos, frecuencia de consumo de fruta a deshora y género. Las tipologías no difirieron en su índice de masa corporal.**

Conclusiones: **Tanto los estudiantes que se preocupan por la dieta como los que no, experimentan mayores niveles satisfacción con la vida y con su alimentación. Menores niveles de satisfacción global y en el dominio de la alimentación se relacionan con las fluctuaciones de peso.**

(*Nutr Hosp.* 2014;30:453-461)

DOI:10.3305/nh.2014.30.2.7561

Palabras clave: *Restricción alimentaria. Satisfacción con la vida. Satisfacción con la alimentación. Salud mental.*

Introduction

Attending university is especially significant for the youth because it entails high levels of demand, competition and expectations that increase stress.[1] This period is also critical for the development of eating habits. Some studies report a low caloric intake in university students,[2,3] mostly observed in women,[4] which probably relates to gender stereotypes.[5] Other research indicates that many university students do not follow healthy diets,[6,7] which causes an increase in weight, fat and body mass index (BMI)[7]. Although a certain amount of weight gain can be expected at this stage in life, students who gain weight, particularly large amounts, may experience this as a significant stressor and resort to unhealthy weight control behaviors to cope with it. In this regard, youth are at a particularly high risk for disturbed eating behaviours[8] or abnormal practices associated with eating disorders (e.g. restraint, emotional, disinhibited, binge, and late-night snacking; weight, shape, and eating concerns; strict dieting; among others).[1]

The notion of restrained eating was first introduced by Herman and Mack.[9] Dietary restraint behavior implies conscious attempts to reduce food intake in order to control body weight,[10,11] although this behavior is not clearly associated with lower body weight. While some data suggest that restraint may be a useful strategy to control body weight,[11,12] others report that an excessive restriction may have a counterproductive effect and may eventually be followed by weight gain[13]. The intent to diet may be disrupted by certain events such as distress,[9,14] access to pleasant foods, alcohol, and other factors that disrupt self-control.[14] The Restraint Theory[10] states that eating behavior is affected by a balance of forces, including physiological pressures to eat and a non-physiological, self-imposed resistance (i.e. restraint) to these pressures. The Restraint Theory has suggested that dietary restraint or dieting contributes to overeating and eating disorders.[15]

Some studies show that eating disorders in youth are related to poor psychological health[16-19] and low levels of life satisfaction.[16,17,20] Evidence also indicates that university students who have healthful eating habits have better emotional health, lower prevalence of overweight and obesity, and greater satisfaction with life.[21] Life satisfaction is the cognitive component of subjective well-being, either overall or by specific domains, such as health, family[22] and food, among others. Positive evaluations of life satisfaction are linked to happiness and the achievement of the "good life".[23] However, it seems that the relation between dietary restraint/weight gain and subjective well-being is different between men and women. Weight gain has been shown to be associated with greater well-being for men,[13] meanwhile studies reported that only for female university students dieting was associated with lower life satisfaction.[17,20]

Therefore, in this research we will develop a typology of university students from various regions in Chile based on their dietary restraint behaviors, and characterize them by their level of satisfaction with life and their food-related life, their eating habits and other health-related aspects. Studies conducted in Chilean universities report a prevalence of overweight and obesity of approximately 30-40%.[3,21] A previous study conducted with university students from Southern Chile indicates that the nutritional state of said students does not only relate to their life satisfaction but also to their satisfaction with food-related life.[21] However, to our knowledge, there have been no attempts to study the relation between dietary restraint and satisfaction in the domain of food, even though recent research concludes that food is among the important domains of life which affect an individual's well-being.[21,24] The dietary restraint behavior will be measured using the Revised Restraint Scale (RRS).[10] Our research will show that the distinction of chronic dieters and non-dieters, typical of many previous applications of the RRS, is too simple, and that perceived weight fluctuation is more important for satisfaction with life than diet concern.

Materials and method

A convenience sample was made up of 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, Universidad de Magallanes-Punta Arenas). All participants were volunteers, with a mean age of 20.9 years (SD = 2.27); 46.3% were men and 53.7% women; 95.4% resided in an urban area. To detect differences in terms of advancement in the university program, the sample inclusion criteria were students enrolled in first or third year at any of the aforementioned universities.

The questionnaire applied included the following scales:

– RRS (Revised Restraint Scale). The first measure of dietary restraint was developed by Herman and Mack[9] and was later revised to a 10-item scale by Herman and Polivy.[10] Factor analysis studies report two subscales: "Diet Concern" (DC) which evaluates the tendency of a person to restrain their food intake and the fear to gain weight, and "Weight Fluctuations" (WF), which registers weight fluctuation. The scores provide a measure of chronic food restriction and are commonly used to classify individuals into chronic dieters and non-dieters (usually using the median of the scores). In this research, the Spanish version of the RRS was used, which has shown adequate levels of internal consistency for each subscale (Cronbach's DC = 0.78; WF = 0.70-0.71) in previous studies in Chile.[25,26] However, as previous studies in Chile (and most other applications of the RRS) were based on female samples only, and as our own study includes

both males and females, we will conduct additional testing regarding the dimensionality and reliability of the RRS for a mixed gender sample.

– HRQOL-4 (Health-related quality of life index): developed by Hennessy et al.[27] consists of four items that explore the self-perception of health, recent physical health (physical illness and injuries), recent mental health (stress, depression and emotional issues) and recent limitations on activity (education, work or leisure). This study used the Spanish version of the HRQOL-4, which has shown a good level of internal consistency (Cronbach's $\alpha = 0.78$) in a previous study in Chile[21].

– SWLS (Satisfaction with Life Scale): developed by Diener et al.[22] is a scale consisting of 5 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").

– SWFL (Satisfaction with Food-related Life Scale): proposed and tested by Grunert et al.[24] 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").

On the SWLS and SWFL scales the respondents must indicate their degree of agreement with the statements using a 6-point Likert scale (1: disagree completely, 6: agree completely). This study used the Spanish versions of the SWLS and SWFL, which has shown good levels of internal consistency in previous studies in Chile.[21]

Students were also asked about the frequency of consumption of nine groups of foodstuffs and drinks categorized by the National Statistics Institute in the Surveys of Family Budgets. Then, they were asked whether they restrained the intake of certain foods, drinks and condiments, as well as their reasons to do so. They were also asked about the frequency of snacking between meals and the perceived importance of food for their well-being using a 6-point Likert scale (1:not important at all, 6: totally and completely important). Finally, their estimated weight and height were consulted in order to obtain their BMI (kg/m^2).

The execution of the study was approved by the Ethics Committee of the Universidad de La Frontera. Prior to the survey, the questionnaire was pretested with 30 students from said university with similar characteristics. As no problems were detected in the pretest, no changes were required in the questionnaire. The survey was administered through an online survey program (QuestionPro Inc) in June and August 2013. The participants signed informed consent statements before responding.

To evaluate the psychometric properties of the RRS, an exploratory factor analysis (EFA) was used followed by a confirmatory factor analysis (CFA). The EFA was implemented using SPSS 16.0 and the CFA using LISREL 8.8. The parameters were estimated by robust maximum likelihood. A bifactorial structure was assumed to exist for RRS. The variance extracted by the indicator variables of the latent factors was calculated. This indicator measures the proportion of variance extracted by a latent factor with respect to the total variance of that factor, including the variances of the measurement error of the factor items.[28] The compound reliability or compound Cronbach was obtained by an adaptation of Fornell and Larcker's formula,[28] which calculates the proportion between the sum of the standardized factor loadings of the items of a factor (indicator variables) squared, and the same amount plus the error variances associated with the items. 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 against the correlation between two factors. This test compares the extracted variance for each of the factors analyzed with the square of the correlation between the factors. The extracted variance for the factors must be greater than the value of the correlation; if this condition is fulfilled, it may be concluded that discriminant validity exists between the factors.[28] A CFA model fits reasonably well if the goodness-of-fit index (GFI) and the adjusted goodness-of-fit index (AGFI) are greater than 0.90, and if the root mean square error of approximation (RMSEA) is lower than 0.08.[28]

To distinguish student types on the basis of chronic dietary restraint, a cluster analysis (hierarchical conglomerates) was used, with linkage by Ward's method and the squared Euclidian distance as the measure of similarity between objects. This analysis was applied to the Z-scores resulting from the factor analysis of the RRS scale. The number of groups was obtained by the percentage change of the recomposed conglomeration coefficients. To describe the segments, Pearson's Chi^2 test was applied to the discrete variables and a one-factor analysis of variance for the continuous variables. Because Levene's test indicated non-homogenous variances, the averages of variables with significant differences ($P \leq 0.001$ or $P \leq 0.05$) were separated according to Dunnett's T3 test for multiple comparisons.

Results

Both the SWLS and the SWFL presented adequate levels of internal consistency (Cronbach's α: 0.876 and 0.791, respectively) and a single factor grouped the five items of each scale (explained variance: 67.9 and 54.9%, respectively). The average score for the SWLS was 22.02 (SD = 5.3) and for the SWFL 18.46 (SD =

Table I
Results of factor analysis of principal components for the RRS in university students from various regions of Chile, August 2013

Items	*Component*	
	Diet concern (DC)	*Weight fluctuations (FP)*
8. Do you have feelings of guilt after overeating?	0,837	0,129
1. How often are you dieting?	0,747	0,130
5. Would a weight fluctuation of 2.5 kilos affect the way you live your life?	0,736	0,001
7. Do you give too much time and thought to food?	0,713	0,196
4. In a typical week, how much does your weight fluctuate?	0,046	0,786
3. What is the maximum amount of weight gain (in kilos) within a week?	0,295	0,752
2. What is the maximum amount of weight (in kilos) you have ever lost within 1 month?	0,042	0,752
Variance explained by component (%)	34,3	24,5
Cumulative variance (%)	34,3	58,8
Cronbach's α per component	0,768	0,703

Extraction method: Principal components analysis, Rotation method: Varimax with Kaiser normalization. Rotation has converged in 3 iterations. Measure of sampling adequacy: Keiser-Meyer-Olkin (KMO) = 0.764. Bartlett's Test of Sphericity, approximate Chi-square = 580,897; gl = 21; p = 0.000. Note: the remaining item should qualified the following standards: the eigenvalues of each extracted factor should be more than 1.000; the factor loadings of each reserved item should be more than 0.40; each item should be only loaded on a single factor; each factor should include at least 3 items.

4.8), from a theoretical maximum score of 30. Cronbach's α for the HRQOL-4 was 0.76. According to the first question from the HRQOL-4, most students perceived their health as good (37.1%) or very good (32.5%). The average number of days with physical health problems in the last month was 4.7 (SD = 5.9), the average with mental health problems was 7.5 days (SD = 8.4) and the average number of days in which the students could not carry on their usual activities due to health problems was 2.8 (SD = 4.1).

Most of the students eat bread (74.0%), soft drinks (55.0%), milk and dairy products (44.4%) and vegetables (47.2%) on a daily basis; two or three times per week they eat cereals and pasta (57.5%) and meat (50.1%); fruit is consumed daily (20.3%) or two or three times per week (36.3%); and occasionally fish and seafood (50.7%) and alcoholic beverages (43.9%). The majority of participants do not restrict consumption of sugar (59.6%), pastries (68.0%), salt (59.6%), fried and fatty food (47.4%), pasta and rice (88.3%), red meat (80.5%) and alcohol (45.8%). Regarding snacking between meals, 35.8% reported doing it "sometimes" and 33.3% "almost always". These snacks were mostly sweets (26.7%), yogurt (29.7%) and fruit (44.1%). 31.2% and 39.6% of the sample considered that food issues are "important" and "very important" for their personal well-being, respectively. The average BMI of the sample was 23.44 kg/m^2 (SD = 3.3). The nutritional state of the participants was in the low weight range for 1,6% of the sample (BMI < 18.5), normal weight range for 71.5% (BMI 18.5-24.99), overweight for 22.8% (BMI ≥ 25) and obesity for 4.1% (BMI ≥ 30).

Using EFA, two dimensions were detected on the RRS: Diet Concern (DC) and Weight Fluctuations (WF) that grouped seven of the ten original items (table I). Item 6 was eliminated because it presented communality values below 0.4. Items 9 and 10 were eliminated because they did not load on a single factor. This result contradicts research that found an acceptable goodness of fit for the RRS with all items, though most have been conducted on women.[29,30] These results partially correspond to those obtained by Mak and Lai[31] in a sample of adolescents of both genders in Hong Kong (DC: items 1, 5, 7, 8, and 9; WF: items 2, 3, and 4). Some of the previous studies on the subject report a deficient behavior of item 9 of the RRS,[25,26] which was also observed in the present research. Such variations can be due to the cultural context in which the instrument is applied. However, as noted above most previous applications have been based on female samples, and gender composition can hence be an additional source of variation in the pattern of item loadings. For the remaining items in this study, the DC and WF subscales presented an acceptable level of internal consistency. The CFA performed with the seven items of the RRS meant that the bifactorial structure could be validated with an acceptable goodness-of-fit (RMSEA = 0.074, GFI = 0.93, AGFI = 0.91). The standardized factor loadings for the seven items were statistically significant; therefore, it may be concluded that there is convergent validity. Both subscales presented acceptable values of extracted variance (DC = 0.470, WF = 0.401). Both subscales presented acceptable values of compound Cronbach's alpha (DC = 0.570, WF = 0.501). The value of the squared correlation between DC and WF (0.37) was lower than the extracted variances of the subscales, which verifies the discriminant validity between the constructs studied (fig. 1). Using the median of the RRS (14) considering seven out of 10 original items, 54.2% of the sample classified as chronic dieter and 45.8% as non-dieter.

Using a cluster analysis, four student types were detected with significant differences in the Z-scores (table II) of the two components obtained from the RRS (p ≤ 0,001). The types differed significantly in the scores of the SWLS, SWFL (p ≤ 0.05) and number of

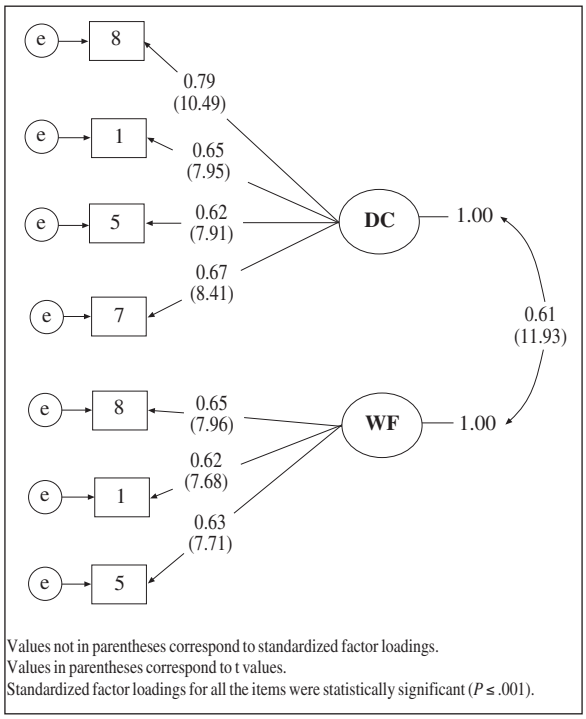

Fig. 1.—Confirmatory factor analysis established best-fitting model of RRS in an university student sample.

days with mental health problems (p ≤ 0.001) (table III). They also differed in the importance assigned to food for personal well-being (p≤0.05), gender (p≤0.001) (table IV), restricted consumption of salt, alcohol (p ≤ 0.05), pastries, fried and fatty food, pasta and rice and the frequency of consumption of alcoholic beverages (p ≤ 0.001) (table V).

Group 1 "Satisfied with life, moderately satisfied with their food-related life, unconcerned about diet and weight fluctuations" (53.8%): participants in this group had a low score on the subscale DC, but it was significantly higher than Group 2's score. They also presented a low score on the subscale WF but did not differ statistically from Group 4 in this regard (table II). Group 1 had the highest scores on the SWLS and SWFL but did not differ significantly from Group 4. This group reported the least number of days affected by mental health problems, but it did not differ from Group 2 (table III). It comprised a high proportion of students who think that food is "totally and completely important" for their well-being (11.6%) (table IV). There was a greater presence of students who did not restrict sugar consumption (71.2%), pastries (77.8%), fried and fatty foods (55.1%) and pasta and rice (94.4%).

Group 2 "Moderately satisfied with their lives and food-related life, concerned about weight fluctuations" (17.1%): this group scored significantly lower than the others in DC. The WF score was significantly higher than in Groups 1 and 4 (table II). The scores of the SWLS and SWFL were significantly lower than in Groups 1 and 4, but higher than in Group 3 (table III). This group was composed of a higher proportion of men (58.7%) and considers considered that food is "somewhat important" for their well-being (22.2%) (table IV). This group had a greater proportion of students that restricted the consumption of pasta and rice because they disliked it (4.8%), and of alcohol to prevent diseases (28.6%) (table V).

Group 3 "Moderately satisfied with life, dissatisfied with their food-related life, concerned about diet and

Table II
Z score averages of groups obtanied from cluster analysis, students of universities in Chile, August 2013

Component	*Group 1 (n = 198)*	*Group 2 (n = 63)*	*Group 3 (n = 39)*	*Group 4 (n = 69)*	*F*	*P-value*
Diet Concern	-0.321 c	-0.874 d	0.396 b	1.495 a	199.957	0.000**
Weight fluctuations	-0.549 c	0.807 b	1.871 a	-0.219 c	229.211	0.000**

**Significant at 1%. Letters in horizontal orientation indicate statically significant differences according to Dunnett's T3 Comparison test (p ≤ 0,001), for non-homogeneous variables.

Table III
Average scores fort he SWLS and SWFL scales and number of days with mental health problems in groups obtained by cluster analysis in university students from various regions in Chile, August 2013

	Group 1 (n = 198)	*Group 2 (n = 63)*	*Group 3 (n = 39)*	*Group 4 (n = 69)*	*F*	*P-value*
SWLS	21.74 a	18.01 b	16.25 c	20.42 a	3.992	0.007*
SWFL	19.13 a	16.25 b	13.41 c	18.25 a	3.304	0.005*
Days with mental health problems	5.72 b	6.57 b	11.44 a	11.14 a	11.391	0.000**

*Significant at 5%.
**Significant at 1%.
Letters in horizontal orientation indicate statically significant differences according to Dunnett's T3 Comparison test, for non-homogeneous variables.

Table IV
Characteristics (%) with statistically significant differences in groups of university students from various regions of Chile obtained by cluster analysis, August 2013

	Group 1 (n = 198)	*Group 2 (n = 63)*	*Group 3 (n = 39)*	*Group 4 (n = 69)*
Gender		*P = 0.000*		
Male	49.5	58.7	56.4	20.3
Female	50.5	41.3	43.6	79.7
Importance of eating habits for well-being		*P = 0.004*		
Not important at all	0.2	1.6	0.2	0.2
Very little important	3.8	3.2	2.4	0.2
Slightly important	10.1	22.2	7.7	2.5
Important	34.3	27.0	33.3	24.6
Very important	39.9	31.7	43.6	43.5
Totally and completely important	11.6	14.3	12.8	29.0

P values obtained by Chi^2 test.

weight fluctuations" (10.6%): scored high in DC, although significantly lower than Group 4. The WF score was significantly higher than in the remaining groups (table III). Scores on the SWLS and SWFL were significantly lower than in the other groups. Similarly, participants in Group 3 had the highest average number of days affected by mental health problems, though this did not differ statistically from Group 4 (table IV). This group consisted of a higher proportion of students who consume alcoholic beverages weekly (38.5%), restrict salt intake for health reasons (15.4%) and consumption of fried and fatty foods to prevent disease (53.8%) (table V).

Group 4 "Satisfied with life, moderately satisfied with their food-related life, concerned about dieting" (18.7%): this group had a significantly higher DC score than other groups. The score on WF was low (table II). It did not differ statistically from Group 1 in the scores of the SWLS and SWFL, and from Group 3 in the number of days affected by mental health problems (table III). This group was composed of a higher proportion of women (79.7%) and it considered that food is totally and completely important for their well-being (29.0%) (table IV). It also consisted of a higher proportion of students who consumed alcoholic beverages only occasionally (56.5 %), restricted sugar intake due to health reasons (14.5%) and to prevent disease (34.8 %), and restricted fried and fatty foods for the same reasons (14.5 and 47.8 %, respectively), restricted the consumption of pasta and rice due to health problems (14.5%) and alcohol to prevent disease (29.0%) (table V).

The types did not differ in mean BMI [Group 1 = 23.4 kg/m^2 (SD = 3.3); Group 2 = 23.7 kg/m^2 (SD = 3.9); Group 3 = 23.7 kg/m^2 (SD = 3.1), Group 4 = 23.1 kg/m^2 (SD = 2.7)]. According to the RRS scores and median, 32.8% of students in Group 1 correspond to chronic dieters; in Group 2 this figure reaches 42.9%, while in both Groups 3 and 4 100% of students may be considered chronic dieters.

Discussion

The results support a two-factor structure for the RRS in a sample of university students of both genders from various regions in Chile. Based on the scores on these two components of the RRS, Diet Concern and Weight Fluctuations, four student types were distinguished and characterized by their levels of life satisfaction and satisfaction with food-related life, number of days affected by mental health problems, importance given to food for personal well-being and certain eating habits. The most frequent type (Group 1, 53.8%) reported low concern for dieting and weight fluctuation. The second type (Group 2, 17.1%) reported concern about weight fluctuation, while the third type (Group 3, 10.6%) reported concern over both aspects, and the fourth one (Group 4, 18.7%) showed high concern over dieting. A rather interesting finding is the fact that all four types contain chronic dieters based on the RSS scores, which suggests that there may be different types of chronic dieters, and not just dieters and non-dieters. However, the median for the RRS in this study was below than the medians reported in research on women only.[25,29,30] While groups 3 and 4 stand out because 100% of the students in each one would classify as chronic dieters according to their overall RRS score, they clearly represent different types of dieters. The population of restrained eaters therefore seems to consist of two subpopulations:[32] The first type comprises successful dieters, who are characterized by high restraint and low tendency toward overeating, thus having a low susceptibility toward failure of restraint.[32] This type of dieter belongs in Group 4. The second type is made up of unsuccessful dieters, who are characterized by high restraint and high tendency toward overeating, thus having a high susceptibility toward failure of restraint,[32] traits which belong to Group 3.

A greater presence of women in Group 4 is consistent with studies that indicate a higher dietary restraint

Table V
Eating habits (%) with statistically significant differences in groups of university students from various regions of Chile obtained by cluster analysis, August 2013

	Group 1 (n = 198)	*Group 2 (n = 63)*	*Group 3 (n = 39)*	*Group 4 (n = 69)*
Frequency of consumption of alcoholic beverages		*P = 0.001*		
2-3 times a week	5.6	4.8	2.6	1.4
Once a week	16.7	11.1	38.5	4.3
Occasionally	40.9	50.8	25.6	56.5
Does not consume	36.9	33.3	33.3	37.7
Restriction on sugar consumption restriction		*P = 0.000*		
No	71.2	66.7	46.2	27.5
Restraint over health problems	3.5	4.8	10.3	21.7
Restraint to avoid diseases	22.2	22.2	33.3	42.0
Restraints because I dislike it	3.0	6.3	10.3	8.7
Restriction on pastry consumption		*P = 0.000*		
No	77.8	65.1	59.0	47.8
Restraint over health problems	2.0	4.8	10.3	14.5
Restraint to avoid diseases	14.6	19.0	23.1	34.8
Restraints because I dislike it	5.6	11.1	7.7	2.9
Restriction on salt consumption		*P = 0.048*		
No	63.6	61.9	43.6	55.1
Restraint over health problems	3.0	7.9	15.4	7.2
Restraint to avoid diseases	29.8	23.8	38.5	29.0
Restraints because I dislike it	3.5	6.3	2.6	8.7
Restriction on fried foods and fat consumption		*P = 0.001*		
No	55.1	55.6	35.9	24.6
Restraint over health problems	7.6	4.8	5.1	14.5
Restraint to avoid diseases	30.3	33.3	53.8	47.8
Restraints because I dislike it	7.1	6.3	5.1	13.0
Restriction on pasta and rice consumption		*P = 0.000*		
No	94.4	88.9	79.5	75.4
Restraint over health problems	1.5	4.8	7.5	14.5
Restraint to avoid diseases	3.5	1.6	12.8	10.0
Restraints because I dislike it	0.5	4.8	0,2	0.1
Restriction on alcohol consumption		*P = 0.002*		
No	50.0	41.3	56.4	31.9
Restraint over health problems	3.5	7.9	7.7	5.8
Restraint to avoid diseases	12.1	28.6	5.1	29.0
Restraints because I dislike it	34.3	22.2	30.8	33.3
Frequency of fruit consumption in between meals		*P = 0.011*		
Never	20.2	16.7	15.4	13.2
Occasionally	53.9	68.3	48.7	42.6
Frequently	25.9	15.0	35.9	44.1

P values obtained by Chi^2 test.

in women than in men.[4,17] Also, the higher proportion of men in Group 2 is in line with studies that indicate that men are less concerned about eating and weight than women,[12] although there is evidence that male students tend to increase their BMI more than their female counterparts.[7]

Contrary to reports in previous studies, which have shown that chronic dieters have a higher BMI than non-dieters,[18,25] no significant differences in each type's BMI were found in this study. Also there were no differences found between years of attendance, although the literature states that dietary restraint predicts weight gain over the first year of university attendance.[13] Likewise, no differences were detected between universities. This should be a matter of concern, in the sense that students with dietary restraint seem to be present in several regions of the country. Thus this is a problem that must be approached crosswise by both Education and Health authorities. The significant higher number of days with mental health problems in Groups 3 and 4 is consistent with studies that associate dietary restraint with a poor psycholog-

ical health.[16-19] Indeed, greater weight concern is an important mediator of the development of depressive symptoms.[19]

Our study sheds new light on the relationship between life satisfaction and dietary restraint. Previous studies (though only with females) have reported lower life satisfaction for chronic dieters.[17,20] However, in our study, Group 4, which consists only of restraint eaters, has a SWLS score which is at the same level as that of the unrestrained eaters in Group 1. This suggests that, of the two components of the RRS, it is mostly the weight fluctuations component that is associated with satisfaction with life. Successful restraint eaters, where dietary restraint is not accompanied by weight fluctuations, may hence be as satisfied with their life as non-restrained eaters. The discrepancy in the SWLS score between groups 3 and 4 also contradicts studies that indicate that mental health problems correlate negatively with life satisfaction.[23] One possible explanation is that distress and depression can increase eating in some people, particularly dieters, and inhibit eating in others.[14] Therefore, it can be suggested that while students in Group 4 are reacting to mental health problems by eating less, students from Group 3 react the opposite way, using eating as a coping mechanism to reduce stress. Therefore, even though both groups are chronic dieters and report a similar number of days with mental health problems, the significant differences between SWLS scores for both groups can be attributed to the fact that students in one group can successfully maintain their weight (Group 4) while the others cannot (Group 3).

A similar situation is reflected in the differences in the SWFL scores. While Group 4 was moderately satisfied with their food-related life and has a mean score similar to the unrestrained eaters in Group 1, Group 3 is dissatisfied, which may also be associated with the subpopulation of dieters[32] to which people in this group belonged. A remarkable aspect in those types with higher levels of satisfaction with food-related life (Groups 1 and 4), is that both had a greater presence of students who believe that food is "totally and completely important" to their well-being. This is consistent with previous research conducted in Chile, which relates satisfaction with life and with food-related life with eating habits inside and outside the home in university students.[21] However, from these results it is possible to unveil the relationship between the importance that students place on their eating habits and their level of satisfaction in this respect, whether they are chronic dieters or not.

The levels of dietary restraint in all four student types were not related to the frequency of consumption of foodstuffs groups. Nonetheless, differences regarding consumption of alcohol were detected, and the most frequent consumption was found in Group 3. Because alcohol contains a significant number of nonessential calories,[33] it would be expected that restrained eaters would impose strict rules about alcohol consumption and avoid consuming alcohol. However, paradoxically, research demonstrates that restrained eaters may be more likely than unrestrained eaters to use compensatory eating strategies when they consume alcohol,[30] which is what may be happening in Group 3.

An important result to highlight corresponds to differences in food restriction and the reasons for such restrictions. Research on food selection indicates that the two aspects that people consider most important in their everyday food choices are taste and health. Thus, it is possible that when selecting food to eat, the individual will experience conflict between choosing the tasty option and the healthy (low-calorie) option.[34] Although a previous study with university students in Southern Chile indicated that satisfaction with life and food-related life may be associated with hedonistic reasons for food consumption, more than for nutritional or health reasons,[35] the present results suggest that some students care to avoid eating foods that negatively affect their health and weight. This is evident in the reasons given by most students from Group 4 to restrict the consumption of sugar, pastries, fatty and fried foods, pasta and rice, and students from Group 3 to restrict the intake of salt and fatty and fried foods. It is also noteworthy that students in Group 4 eat healthy food like fruits as a snack between meals. By contrast, the high proportion of students from Group 1 that does not restrict the consumption of any food, indicate hedonistic reasons related to food choices, thus choosing tasty foods.

Therefore, the results of this study indicate that both students who are concerned about their diet and weight and those who are not can experience higher levels of satisfaction with life and food-related life. Lower levels of satisfaction, overall and in the domain of food, may be related to weight fluctuations more than to dietary concerns. Both situations would be independent of the number of days with mental health problems reported by students.

Limitations of this study include the non-probabilistic nature of the sample and its relatively small size, which does not allow generalization of the results. Also, all data were self-reported, thus responses may be affected by social desirability and recall or response bias. Another limitation of the study lies in asking only the frequency of food consumption and not the amount ingested; therefore, it is not possible to analyze the real nutritional contribution of their intake. Also, inquiries about types of diet and ideal weight were not considered. These aspects must be dealt with in future studies.

Our study employs a mixed gender sample. The fact that three items were omitted from the original RRS scale, which worked fine with a female only sample previously also in Chile, may indicate that the psychometric properties of the RRS scale may differ depending on the gender composition of the scale. This as well is a topic for future research.

Acknowledgements

These results belong to the Fondecyt Project 1130165.

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