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Original

Psychometric properties of the Spanish version of Food Craving Inventory (FCI-SP)

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Abstract

Objective: **The objectives of the study were to analyze the psychometric properties, factor structure and internal consistency of the Spanish version of the Food Craving Inventory (FCI-SP), as well as to determine its validity by evaluating the relationship of the FCI to different instruments.**

Methods: **The sample comprised a group of patients and a group of students. The patient group included 216 people diagnosed with adaptive, anxiety disorders, and mild or moderate depressive episodes without psychotic symptoms. The patient group included 79 men (36.57%) and 137 women (63.43%), and the mean age was 38.27 years (SD = 9.57). All the patients had clinical characteristics, which enabled them to be treated as outpatients. The group of students comprised 142 people, none of whom had any psychiatric history of note. In this group there were 53 men (37.32%) and 89 women (62.68%), and the mean age was 21.45 years (SD = 5.04).**

Results: **The best solution for the principal axis analysis revealed three factors (simple sugars/*trans* fats, complex carbohydrates/proteins, and saturated fats/high calorie content (fast food). The internal consistency of the FCI-SP and its subscales was determined by means of Cronbach's alpha, with values ranging between 0.78 and 0.95. The correlations with other instruments reflected adequate validity.**

Discussion: **The Spanish version of the FCI (FCI-SP) meets the psychometric requirements for measuring the food craving and shows adequate internal consistency and validity.**

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Key words: *Food Craving Inventory. Eating behaviour. Mental disorders. Psychometric validation.*

PROPIEDADES PSICOMÉTRICAS DE LA VERSIÓN ESPAÑOLA DEL INVENTARIO DE "FOOD CRAVING"

Resumen

Objetivo: **Los objetivos del estudio fueron analizar las propiedades psicométricas, la estructura factorial y la consistencia interna de la versión española del Food Craving Inventory (FCI-SP), así como determinar su validez mediante la evaluación de las relaciones del FCI-SP con diferentes instrumentos.**

Métodos: **La muestra estuvo formada por un grupo de pacientes y un grupo de estudiantes. El primero incluyó 216 pacientes diagnosticados de trastornos adaptativos, trastornos de ansiedad o episodios depresivos, leves o moderados, sin síntomas psicóticos, todos ellos en tratamiento ambulatorio. Este grupo de pacientes incluía 79 hombres (36,57%) y 137 mujeres (63,43%), con una edad media de 38,27 ± 9,57. El grupo de estudiantes estuvo formado por 142 participantes, sin patología psiquiátrica actual o en los antecedentes. En este grupo había 53 hombres (37,32%) y 89 mujeres (62,68%), siendo su edad media 21,45 ± 5,04.**

Resultados: **La mejor solución, mediante análisis de ejes principales, reveló tres factores (azúcares simples/grasas *trans*, hidratos de carbono complejos/proteínas y grasas saturadas/alto contenido calórico *(fast food)*. La consistencia interna se determinó mediante el coeficiente alfa de Cronbach, con valores entre 0,78 y 0,95. La correlación con otros instrumentos reflejó adecuada validez.**

Discusión: **La versión española del FCI (FCI-SP) reúne los requerimientos psicométricos para medir el *food craving* y muestra adecuada consistencia interna y validez.**

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Palabras clave: *Inventario de food craving. Conducta alimentaria. Trastornos mentales. Validación psicométrica.*

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Abbreviations

B: Bulimia.
BD: Body Dissatisfaction.
DT: Drive for Thinness.
EDI: Eating Disorders Inventory.
FCI-SP: Food Craving Inventory-Spanish version.
FCI: Food Craving Inventory.
GSI: Global Severity Index.
ICD: International Classification of Diseases.
KMO: Kaiser-Meyer-Olkin.
M: Mean.
PSDI: Positive Symptom Distress Index.
PSQ: Perceived Stress Questionnaire (G: General form; R: Recent form).
PST: Positive Symptom Total.
SCL-90-R: Symptom Checklist of Derogatis-Revised.
SD: Standard deviation.
SES: Self Esteem Scale.

Introduction

Although food craving has been linked to disorders such as bulimia, binge eating and obesity there is some controversy as regards the nature of this relationship, since the presence of food craving does not always — or necessarily— lead to disturbed eating behavior.[1-3] From the psychobiological and behavioral perspective various theories have been put forward in an attempt to explain the basis of food craving, although little consensus has yet to be reached.[4] Furthermore, the phenomenon seems to manifest in different ways according to several variables (gender, age, hunger state, time of day, and phase of the menstrual cycle), thereby giving rise to cravings for specific foods. Of these, craving for carbohydrates has been the most widely studied.[5-8] One key problem that has arisen in the context of research on food craving is how to define the concept itself, and studies vary as to whether they place greater emphasis on the behavioral or subjective aspects of the phenomenon. In the former case, food craving is regarded as an observable behavior (eating), leaving aside its cognitive/emotional aspects. As such it would be equivalent to the behavior that follows hunger. By contrast, the problem facing researchers who focus on the subjective aspects is how to isolate the desire that manifests as craving. One of the most widely accepted and comprehensive definitions to date is that proposed by Weingarten and Elston,[9] who refer both to the intense urge or desire to eat a specific food (or type of food), as well as to the difficulty of resisting this urge. As such they take into account both behavioral and cognitive/emotional (motivating) aspects.

As regards the biological basis of food craving the specific craving for carbohydrates has been related to serotonin, a neurotransmitter which has also been linked to depression and obesity, among other disorders. Following the model of addictions, food craving has also been associated with the dopamine/acetylcholine ratio in certain brain areas such as the nucleus accumbens.[10-12]

In addition to the difficulties of conceptualizing food craving and specifying its biological basis, another problem concerns its measurement. Indeed, some measurement instruments suffer from a lack of clarity and the potential contamination that follows from an inadequate prior definition of food craving (cognitive/emotional aspects vs. behavioral aspects). Confusion may also arise from measuring food craving in general, without taking into account the tendency to crave specific foods or food types. Alternatively, while specific foods have sometimes been considered they may be grouped together, for example, on the basis of their macronutrient content. Finally, some of the instruments developed have not been subjected to an adequate analysis of their psychometric properties.[12-14]

In the context of psychopathology, and in addition to its relationship with eating disorders, food craving has been linked to the presence of various psychological symptoms such as social anxiety and depression.[15]

Given the above there is a clear need to develop instruments for measuring the specific craving of certain foods, since their subsequent consumption may have serious implications in terms of excess weight gain or obesity and the problems associated with this. It was in this context that the Food Craving Inventory (FCI) was developed in two consecutive studies, the second of which gave rise to the definitive form of the questionnaire, focusing exclusively on the subjective aspect of craving. This decision was made due to the fact that participants found it difficult to distinguish the specific desire or urge from the actual consumption of a given food.[16]

The general aim of the present study was to analyze the psychometric properties of a Spanish version of the FCI (FCI-SP), specifically its factor structure and internal consistency. In addition, we analyzed the relationships between the FCI-SP and the specifically eating-related subscales of the Eating Disorders Inventory-2 (EDI-2),[17] as well as with the psychopathological variables (somatization, obsessions, interpersonal sensitivity, depression, anxiety, hostility, paranoid ideation and psychoticism) and global indexes (Global Severity Index, GSI; Positive Symptom Total, PST; Positive Symptom Distress Index, PSDI) of Derogatis' Symptom Checklist (SCL-90-R).[18,19] Relationships were also studied between the FCI-SP and both the degree of perceived stress, as measured by the Perceived Stress Questionnaire (PSQ),[20,21] and self-esteem, in this case using the Self Esteem Scale (SES).[22,23] The analyses of both factor structure and validity constitute tests of the construct validity of food craving, which needs to be assessed with respect to all types of validity. Finally, we analyzed any gender differences with respect to scores on the FCI-SP and the presence of craving for specific foods, on the basis of the factor structure obtained.

Methods

Participants

The sample comprised a group of patients and a group of students. The patient group included 216 people diagnosed (in accordance with ICD-10 criteria) with adaptive disorders (F43.20, F43.21 and F43.22), anxiety disorders (F41.1 and F41.2), and mild or moderate depressive episodes without psychotic symptoms (F32.1 and F32.2). Diagnoses were made by means of two structured clinical interviews (according to ICD-10 criteria), the first being conducted by a clinical psychologist and the second by a psychiatrist. Only those cases for which there was diagnostic agreement were accepted. The patient group included 79 men (36.57%) and 137 women (63.43%), and the mean age was 38.27 years (SD = 9.57). All the patients had clinical characteristics which enabled them to be treated as outpatients. The group of students comprised 142 people, none of whom had any psychiatric history of note. In this group there were 53 men (37.32%) and 89 women (62.68%), and the mean age was 21.45 years (SD = 5.04). Students were recruited from the Pablo de Olavide University (Seville) and the Atenea High School (Seville).

Measures

Food Craving Inventory (FCI)

The FCI is a self-report inventory designed to measure food craving. The preliminary original version contained 37 items and the Spanish version developed here was based on this. However, only the subjective part of the inventory was used (without subsequently measuring the amount of the craved food eaten). This is consistent with the procedure followed in the final stage of the original study (i.e. with respect to each food category, people are asked: *Over the past month how often have you experienced a craving for the food?*). In the original study, 14 of the 37 items were hypothesized to form a fats subscale, 10 a sweets subscale, and 13 a starches/carbohydrates subscale. The factor structure was found to be determined by 28 items distributed across four factors (high-fat foods, sweets, starches and carbohydrates, and fast-food fat). Each item is scored from 0 to 4 (where 0 = never; 1 = rarely; 2 = sometimes; 3 = often; and 4 = always/almost every day) according to the strength of the craving. The inventory shows adequate internal consistency (Cronbach's a of 0.86 for the fats and sweets subscales, 0.84 for the starches/complex carbohydrates subscale, 0.76 for the fast-food subscale, and 0.93 for the inventory as a whole). In order to apply the FCI in our setting the inventory underwent a translation/back-translation standard procedure. This included adaptation of the food types mentioned in the items so as to give them socio-cultural relevance for a Spanish population. Thirty-five participants were randomly selected from the sample for preliminary testing in order to confirm that the items could be read and understood by them. During test administration the participants were asked for their interpretations of the questions. Their suggestions and comments were then used to prepare the instructions and to ensure that the participants had no difficulties reading the items. The inventory is shown in Appendixes A (English version) and B (Spanish version).

Eating Disorders Inventory-2 (EDI-2)

For this study the Body Dissatisfaction (BD), Bulimia (B), and Drive for Thinness (DT) scales were administered. The BD subscale measures dissatisfaction with the overall shape and size of those parts of the body most related to eating disorders. The B subscale was designed to assess the tendency to think about and to engage in overeating episodes. The DT subscale measures excessive concern with dieting, preoccupation with weight, and fear of weight gain. With regards to eating disorders the DT subscale has been used as a screening test. The internal consistency of the test, and its subscales, ranges between 0.83 and 0.92 in patient samples, and between 0.65 and 0.93 for various non-clinical samples. Test-retest reliability ranges between 0.41 and 0.97 depending on the sample.

Symptom Checklist-90-Revised (SCL-90-R)

This self-report instrument measures nine dimensions of psychological symptoms and yields three global indexes of distress. The dimensions measured are somatization, obsessive-compulsive, interpersonal sensitivity, depression, phobic anxiety, hostility, paranoid ideation and psychoticism. The ninth subscale refers to miscellaneous symptoms whose low factor loading prevents them from being included in the other subscales. The SCL-90-R also yields three global indexes of distress that measure the severity of general psychopathology: a) the GSI or Global Severity Index, which measures the degree of general distress; b) PST or Positive Symptom Total, which refers to the number of symptoms reported by the subject; and c) the PSDI or Positive Symptom Distress Index, which measures the intensity of symptoms and relates general distress to the number of symptoms PSDI. The value of Cronbach's a range from 0.81 to 0.90, and the instrument shows adequate concurrent and predictive validity.

Perceived Stress Questionnaire (PSQ)

The Spanish version of the PSQ was used here.[21] This questionnaire was designed to measure stress, and consists of 30 items that differentially measure the *general* (PSQ-G) and *recent* (PSQ-R) forms of perceived stress. The validation study for the Spanish population showed excellent psychometric properties (internal consistency was 0.9 for the PSQ-G and 0.87 for the PSQ-R), and the

questionnaire has been used in research, demonstrating good predictive value in stress-related diseases.

Self-Esteem Scale (SES)

Once again, the Spanish version was used.[23] The scale comprises ten items that are scored using a Likert format (from *strongly agree* to *strongly disagree):* the higher the score, the higher the degree of self-esteem. The Spanish version of the instrument shows adequate internal consistency (Cronbach's a coefficient = 0.87), test-retest reliability (r = 0.72) and construct validity.

Procedure

After obtaining informed consent from all participants the abovementioned questionnaires were administered to the patients in the clinical group. This was done in individual sessions with no time limit and in the therapeutic context. Each patient's therapist was present at the beginning of the session and explained how to complete the questionnaire. Having ensured that the instructions had been understood the therapist then left the room so as not to be present while the patient completed the measures. The therapist then returned at the end of the session. Participation was completely voluntary in both the clinical and control (student) groups, and none of the participants received any form of recompense. In the student group the questionnaires were administered in group sessions, and it was left to each individual to decide whether or not they wished their responses to remain anonymous.

Statistical analysis

Data are expressed as means ± standard deviations. For the study of gender differences we considered the proportion of men and women, the analysis being by means of χ^2. A multivariate analysis of variance was then conducted to study differences (gender) with respect to the three factors obtained. Associations between variables were studied by means of the Pearson correlation coefficient. The method of factor analysis was principal axes with varimax rotation, and Cronbach's alpha coefficient was used to determine the internal consistency of the FCI-SP.

Results

Factor structure and internal consistency

A separate factor analysis was performed for the two groups (patients and students) using principal axis extraction with varimax rotation. Several indicators of the high degree of inter-relationship between the variables confirmed the relevance of this analysis. In the group of patients, Bartlett's test of sphericity gave $X^2 = 4701.07$ ($p < 0.0001$), while the Kaiser-Meyer-Olkin (KMO) index of sample adequacy was 0.921. In the group of students Bartlett's test gave $X^2 = 2121.82$ ($p < 0.0001$) and the KMO index was 0.834. The number of factors was determined by considering those with eigenvalues above 1, as well as through examination of the scree plot. Items with a factor loading ≥ 0.45 and which loaded on a single factor were maintained, in line with the procedure followed in the original FCI study. This led to nine items being eliminated from the original list. In both samples the best solution for the principal axis analysis of the final 28 items of the FCI-SP revealed three factors (simple sugars/*trans* fats, complex carbohydrates/proteins, and saturated fats/high calorie content (fast food). These three components explained 51.78% of the total variance in the patient group and 48.31% in the student group.

Table I shows the rotated factor loadings, the explained variance and the accumulated variance for both groups.

The first factor, which explained 21.17% and 20.13% of the total variance in the group of patients and students, respectively, comprised thirteen items that refer to foods which can be classified as high in simple sugars and *trans* fats. The second factor explained 20.38% and 18.19% of the total variance (in the group of patients and students, respectively) and consisted of nine items which refer to foods that are high in complex carbohydrates or proteins. The third factor, formed by six items, explained 10.23% and 9.99% of the total variance (patients and students, respectively) and refers to foods which are high in calories and saturated fats; some of these foods are commonly referred to as fast food.

The analysis of the internal consistency of the FCI-SP and its three subscales was determined by means of Cronbach's alpha coefficients. The factor 'simple sugars/*trans* fats' gave a = 0.926 in the group of patients and a = 0.901 in the group of students. The factor 'complex carbohydrates/proteins' gave a = 0.894 for patients and a = 0.820 for students. Finally, the factor 'saturated fats/high calorie content' (fast food) gave a = 0.811 in the patient group and a = 0.781 in the student group. The FCI-SP as a whole yielded an a = 0.951 for the group of patients and a = 0.910 for students.

Correlation between the FCI-SP and age

Given the age difference between the patient and student groups we calculated the correlation between age and total scores on the FCI-SP, as well as that between age and scores on each of the three factors obtained. This was done in order to control for the possible influence of age on the remaining analyses. There was a negative and significant correlation ($r = -0.24$; $p < 0.01$) between age and scores on the third factor (saturated fats/high calorie content). The correlations between age and total FCI-SP scores and scores on the other two factors were also negative, but without reaching statistical significance.

Table I
Factor structure (principal axes with varimax rotation) and explained variance of the FCI-SP in the patient group and the student group

	Patients			*Students*		
Ítem	*Factor 1*	*Factor 2*	*Factor 3*	*Factor 1*	*Factor 2*	*Factor 3*
Cake	**0.816**	0.317	0.082	**0.664**	0.092	0.225
Pizza	0.261	0.287	**0.493**	0.337	0.242	**0.546**
Fried Chicken	0.213	**0.581**	0.192	0.183	**0.547**	0.217
Sausage	0.151	0.123	**0.493**	0.249	0.400	**0.488**
French Fries	0.379	**0.603**	0.342	0.243	**0.495**	0.234
Rice	0.189	**0.741**	0.169	0.107	**0.697**	0.050
Hot dog	0.260	0.229	**0.681**	0.123	0.050	**0.718**
Hazelnut spread	**0.608**	0.054	0.301	**0.454**	0.021	0.394
Hamburger	0.687	0.412	**0.766**	0.122	0.186	**0.694**
Biscuits	**0.549**	0.092	0.482	**0.481**	0.228	0.233
Ice cream	**0.585**	0.461	0.181	**0.660**	0.154	0.154
Pasta	0.209	**0.635**	0.297	0.111	**0.534**	0.167
Fried fish	0.207	**0.719**	0.175	0.268	**0.468**	0.181
Cookies	**0.634**	0.216	0.201	**0.551**	0.292	0.156
Chocolate	**0.741**	0.141	0.167	**0.641**	0.101	0.140
Pancakes	**0.510**	0.186	0.105	**0.625**	0.179	0.101
Rolls	0.364	**0.515**	0.276	0.229	**0.484**	0.179
Donuts	**0.648**	0.309	0.227	**0.580**	0.119	0.234
Candies	**0.509**	0.382	0.107	**0.456**	0.298	0.147
Brownies	**0.606**	0.178	0.248	**0.696**	0.073	0.149
Bacon	0.289	0.088	**0.485**	0.245	0.217	**0.467**
Croissant	**0.450**	0.202	0.149	**0.644**	0.195	0.174
Steak	0.103	**0.692**	0.217	0.084	**0.720**	0.278
Pie	**0.685**	0.249	0.066	**0.667**	0.177	0.122
Baked potatoes	0.122	**0.629**	0.011	0.038	**0.504**	0.128
Barbecued foods	0.150	0.046	**0.554**	0.176	0.017	**0,510**
Mashed potatoes	0.437	**0.579**	0.193	0.003	**0.458**	0.138
Bagel	**0.562**	0.318	0.466	**0.455**	0.144	0.337
Explained variance	21.17	20.38	10.23	20.13	18.19	9.99
Accumulated variance	21.17	41.55	51.78	20.13	38.32	48.31

Correlation between the FCI-SP and the eating-related subscales on the EDI-2

In both the patient and student groups there were positive and significant correlations ($p < 0.01$) between scores on the FCI-SP and the three EDI-2 subscales considered: Drive for Thinness (DT), Bulimia (B) and Body Dissatisfaction (BD). Positive and significant correlations ($p < 0.01$) were also found between scores for each of the three FCI-SP factors and the three EDI-2 subscales (see table II).

Correlation between the FCI-SP and other psychopathological variables

Significant correlations between FCI-SP scores and some of the variables analyzed were only found in the group of patients. These correlations were positive and significant ($p < 0.05$) between the FCI-SP and both the PSQ-G ($r = 0.15$) and PSQ-R ($r = 0.16$) indices on the SCL-90-R. A positive and even more significant correlation ($p < 0.0001$) was found between the FCI-SP and the PST score on the SCL-90-R ($r = 0.26$). By contrast, there was a negative and significant correlation ($r = -0.25$; $p < 0.001$) between the FCI-SP and self-esteem, as measured by the SES. The remaining correlations did not reach statistical significance. In this case, age was not correlated with the psychopathological variables analyzed, so the study of correlations was not conducted after controlling for this factor.

Gender differences on the FCI-SP

The multivariate analysis of variance, comparing scores on the three factors for men and women, revealed a significant difference on the first factor (simple sugars/*trans* fats), with women scoring higher than men ($M = 27.34 \pm 11.14$ *vs*. $M = 23.88 \pm 8.76$; $F = 9.21$; $p < 0.01$). On the second factor (complex carbohydrates/proteins) no significant differences were observed (women: $M = 20.64 \pm 7.07$; men: $M = 20.26 \pm 7.46$). Finally, the third factor (saturated fats/high calorie content [fast food]) again revealed significant differences, but this time with men scoring higher than women ($M = 12.06 \pm 4.69$ *vs*. $M = 10.83 \pm 4.28$; $F = 6.22$; $p < 0.05$). Overall

Table II
Correlations between the FCI-SP, and its three factors, and the eating-related subscales of the EDI-2. The results are shown for two conditions; controlling and not controlling for age

Students	*Bivariate correlations*			*Partial correlations*		
	DT	*B*	*BD*	*DT*	*B*	*BD*
FCI	0.35	0.51	0.31	0.34	0.51	0.30
FCI-1	0.36	0.57	0.33	0.36	0.57	0.32
FCI-2	0.27	0.32	0.23	0.26	0.33	0.22
FCI-3	0.23	0.40	0.22	0.24	0.40	0.23
Patients	*Bivariate correlations*			*Partial correlations*		
	DT	*B*	*BD*	*DT*	*B*	*BD*
FCI	0.27	0.30	0.22	0.20	0.26	0.20
FCI-1	0.25	0.28	0.18	0.21	0.22	0.17
FCI-2	0.25	0.18	0.19	0.23	0.17	0.16
FCI-3	0.24	0.27	0.27	0.23	0.28	0.29

All correlations are significant ($p < 0.01$).
DT = drive for thinness; B = bulimia; BD = body dissatisfaction.
FCI = Food Craving Inventory; FCI-1, FCI-2, and FCI-3: factors of the FCI.
EDI-2 = Eating Disorders Inventory-2.

scores on the FCI-SP were also significantly different between women (M = 58.81 ± 19.93) and men (M = 56.20 ± 17.95) ($F = 6.09$; $p < 0.05$). The age variable did not produce any significant differences for any of the factors, or as regards total FCI-SP scores. Likewise, the gender/age interaction effect was also non-significant. However, some significant differences were observed for specific foods, and these are shown in table III.

Specific food cravings

As in the original validation study, we sought to determine whether some people had a specific craving for certain foods. The criterion applied was the same as in the original study: a score above the mean on one factor and lower than the mean on the other two. The analysis revealed 16 people (4.47%) with a specific craving related to the first factor (simple sugars/ *trans* fats), 33 people (9.21%) with a specific craving associated with the second factor (complex carbohydrates/proteins), and 12 people (3.37%) with a specific craving for foods included in factor three (saturated fats/high calorie content [fast food]). Therefore, a total of 61 people (17.03%) could be classified as specific cravers. Differences in the proportions of men and women were only significant with respect to the first factor, where the majority of specific cravers were women ($\chi^2 = 6.125$; $p < 0.05$).

Discussion

With respect to the initial aim of the study, i.e. the adaptation and validation of the FCI for a Spanish setting (specifically as regards the subjective measure of craving), the present results differ somewhat from those of the original report.[16] Firstly, the items eliminated from the final Spanish version of the FCI (items with a factor loading < 0.45) were not exactly the same as those removed from the original inventory. Here the items eliminated referred to gravy, sandwich bread, chips (crisps), pudding, full-fat milk, corn bread, butter/margarine, cereals, and cinnamon rolls. It is clear that in our setting these foods are not usually the object of strong cravings, except when they are combined with other foods (for example, sandwich bread and hazelnut spread cereals with honey and/or chocolate, etc.). It is also important to note that the original item 'peanut butter' was replaced by 'hazelnut spread', given that the former is a very unfamiliar product in our context, whereas the latter is a relatively common object of craving.

Regarding the factors finally obtained, the present study again differs from the original report. The factor structure derived here was less well defined than the original one, which enabled foods to be grouped into four factors (high-fat foods, sweets, carbohydrates/ starches, and fast-food fats). In the present study, however, foods such as sausages, bacon or hot dog were grouped together with barbecued foods and hamburger in a single factor, whereas they loaded on different factors in the original study. Furthermore, the factor loadings obtained here do not enable a distinction to be made between high-fat foods and carbohydrates/ starches. The 'sweet foods' factor was the one which showed the greatest similarity across the two studies.

In general, the validation study of the Spanish version of the FCI shows that the instrument (the FCI-SP) meets the requirements for measuring the construct 'food craving'. The analysis of reliability revealed adequate internal consistency for both the total inventory and each of the three factors obtained.

As regards the correlations between food craving and disturbed eating behavior it should not be assumed that craving is inevitably associated with such disturbances, since the phenomenon has been observed in people with and without eating problems.[24] The correlation analysis showed that food craving is correlated with the Bulimia subscale of the EDI-2, which evaluates the tendency to have thoughts about or engage in uncontrollable bingeing. This finding is consistent with the fact that food craving precedes episodes of overeating in bulimia nervosa, obesity, premenstrual syndrome, seasonal affective disorder, and binge disorder.[25-27] However, not everybody with a food craving ends up overeating.[28] The correlations obtained also show an association between food craving and aspects such as the drive for thinness, which on the corresponding EDI-2 subscale (DT) includes an excessive concern with dieting, a preoccupation with weight, and the fear of weight gain. Finally, there is also a correlation with body dissatisfaction, which is a central aspect of eating disorders and their associated behaviors. It seems clear, therefore, that food craving refers to more than just hunger or simple disinhibition, since it is also related to motivational and affective elements linked to weight concerns and dieting. At all events, the three factors obtained

Table III
Craving for specific foods: differences by gender

	Men (M ± SD)	*Women (M ± SD)*	*p*
Cake	2.20 (1.07)	2.64 (1.27)	< 0.01
Pizza	2.31 (1.08)	2.10 (1.08)	NS
Fried Chicken	2.16 (1.09)	1.90 (1.07)	< 0.05
Sausage	1.93 (1.03)	1.73 (0.93)	NS
French Fries	2.82 (1.27)	2.70 (1.19)	NS
Rice	2.43 (1.21)	2.48 (1.22)	NS
Hot dog	1.76 (1.01)	1.55 (0.92)	< 0.05
Hazelnut cream	1.51 (0.95)	1.57 (1.04)	NS
Hamburger	2.28 (1.21)	1.93 (1.04)	< 0.01
Biscuits	1.54 (0.90)	1.74 (1.05)	NS
Ice cream	2.47 (1.24)	2.76 (1.33)	< 0.05
Pasta	2.63 (1.25)	2.70 (1.12)	NS
Fried fish	2.44 (1.16)	2.30 (1.18)	NS
Cookies	1.83 (0.99)	2.24 (1.27)	< 0.01
Chocolate	2.45 (1.20)	2.93 (1.36)	< 0.01
Pancakes	1.57 (0.88)	1.73 (1.07)	NS
Rolls	1.71 (0.92)	2.00 (1.18)	< 0.05
Donuts	1.95 (1.11)	2.08 (1.19)	NS
Candies	1.78 (1.05)	1.98 (1.19)	NS
Brownies	1.70 (1.07)	2.12 (1.32)	< 0.01
Bacon	1.88 (1.05)	1.48 (0.86)	< 0.001
Croissant	1.55 (0.84)	1.88 (1.12)	< 0.01
Steak	2.80 (1.26)	2.37 (1.27)	< 0.01
Pie	1.88 (1.13)	2.11 (1.26)	NS
Baked potatoes	2.02 (1.13)	2.12 (1.15)	NS
Barbecued foods	2.27 (1.31)	1.88 (1.16)	< 0.01
Mashed potatoes	1.69 (1.01)	1.75 (1.09)	NS
Bagel	1.56 (0.86)	1.73 (1.09)	NS

NS = No significativo.

are individually correlated with the abovementioned constructs, thereby suggesting the presence of a general element (food craving) which has certain specific features. In this regard, and in line with the original study,[16] the present analysis identified a small proportion of people who could be classified as specific cravers.

The correlations found between the FCI-SP and specific subscales of the EDI-2, as well as with self-esteem, are consistent with previous findings relating food craving and overeating with restrictive diets and a lack of assertiveness.[28] However, it should be noted that the data regarding the relationship between food craving and restrictive diets are contradictory: some authors have failed to confirm this relationship,[29,30] while others report increased food craving alongside a reduced calorie intake or hunger.[31]

As regards self-esteem, the relationship between lower self-esteem, increased stress levels and the presence of food craving has been previously reported in obese people.[32]

Although there was a low negative correlation between food craving and age this does not seem to be a determining factor in terms of the observed gender differences. These differences continue to be present across the age range, although the presence of craving does decrease somewhat. The higher scores obtained by women on the first factor (simple sugars/*trans* fats) is consistent with the finding that women show a stronger craving for foods such as chocolate.[28,33] Similarly, the higher scores of men on the third factor (saturated fats/high calorie content [fast food]) are in line with previous research findings regarding the foods that make up this factor here.[34] Finally, studies with obese people have also reported a stronger preference for protein-based fats (meat) among men, and a stronger preference for carbohydrate fats (cookies, cake, etc.) among women.[35]

The present study has a number of limitations. As regards the foods included in the FCI, and despite having eliminated certain items, the FCI-SP continues to contain certain foods that are not usually the object of craving in our setting (i.e. pancakes or waffles). However, although these foods are not common in our setting their factor loading was such that they merited inclusion in the list of the FCI-SP. By contrast, there are other foods, such as cured meats, which are not specifically listed but covered by the category 'barbecued foods'. Future revisions of the FCI-SP might consider referring specifically to these foods, even though they are not usually the object of intense food cravings and/or binge episodes.

A further limitation of the present study is that the sample did not include participants with specific eating disorders, although this is currently being addressed in a new study being conducted as a follow-up to the present adaptation and validation of the instrument.

FOOD CRAVING INVENTORY

Food craving is defined as an intense desire to consume a particular food (or food type) that is difficult to resist.

Directions: For each of the foods listed below (Items 1-28), please circle the appropriate letter using the following scale.

Over the past month, how often have you experienced a craving for the food?

A = Never
B = Rarely (once or twice)
C = Sometimes
D = Often
E = Always/almost every day

List of foods:

Cake	A	B	C	D	E
Pizza	A	B	C	D	E
Fried Chicken	A	B	C	D	E
Sausages	A	B	C	D	E
French Fries	A	B	C	D	E
Rice	A	B	C	D	E
Hot Dogs	A	B	C	D	E
Hazelnut Spread	A	B	C	D	E
Hamburger	A	B	C	D	E
Biscuits	A	B	C	D	E
Ice Cream	A	B	C	D	E
Pasta	A	B	C	D	E
Fried Fish	A	B	C	D	E
Cookies	A	B	C	D	E
Chocolate	A	B	C	D	E
Pancakes	A	B	C	D	E
Rolls	A	B	C	D	E
Donuts	A	B	C	D	E
Candies	A	B	C	D	E
Brownies	A	B	C	D	E
Bacon	A	B	C	D	E
Croissant	A	B	C	D	E
Steak	A	B	C	D	E
Pie	A	B	C	D	E
Baked Potatoes	A	B	C	D	E
Barbecued Foods	A	B	C	D	E
Mashed Potatoes	A	B	C	D	E
Bagel	A	B	C	D	E

FOOD CRAVING INVENTORY-SP

(Spanish version)

(White, Whisenhunt, Williamson, Greenway, and Netemeyer, 2001. Adaptation and validation by Jáuregui, Bolaños, Valero, and Carbonero, 2010)

El "food craving" se define como un intenso deseo de consumir un alimento concreto (o un tipo de alimento), que resulta difícil de resistir.

Instrucciones: Para cada alimento que figura en la lista rodee con un círculo la letra apropiada usando la siguiente escala.

A lo largo del pasado mes, ¿con qué frecuencia ha experimentado "craving" por el alimento?

A = Nunca
B = Rara vez (una o dos veces)
C = Algunas veces
D = A menudo
E = Siempre, casi todos los días

Lista de alimentos:

Pastel	A	B	C	D	E
Pizza	A	B	C	D	E
Pollo frito	A	B	C	D	E
Salchichas	A	B	C	D	E
Patatas fritas	A	B	C	D	E
Arroz	A	B	C	D	E
Perritos calientes	A	B	C	D	E
Crema con avellanas	A	B	C	D	E
Hamburguesas	A	B	C	D	E
Biscuits	A	B	C	D	E
Helado	A	B	C	D	E
Pasta	A	B	C	D	E
Pescado frito	A	B	C	D	E
Galletas, cookies	A	B	C	D	E
Chocolate	A	B	C	D	E
Tortitas, barquillos	A	B	C	D	E
Panecillos	A	B	C	D	E
Donuts	A	B	C	D	E
Caramelos	A	B	C	D	E
Pastelito de chocolate (tipo Brownie)	A	B	C	D	E
Bacon/Panceta	A	B	C	D	E
Croissant	A	B	C	D	E
Filete	A	B	C	D	E
Tarta	A	B	C	D	E
Patatas cocidas	A	B	C	D	E
Alimentos de barbacoa (Costillas, chuletas)	A	B	C	D	E
Puré de patatas	A	B	C	D	E
Rosquillas	A	B	C	D	E

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