Nutrición Hospitalaria

Nutr Hosp. 2011;26(6):1313-1321
ISSN 0212-1611 • CODEN NUHOEQ
S.V.R. 318

Original

What motivates the consumer's food choice?

I. Jáuregui-Lobera[1,2] and P. Bolaños Ríos[2]

[1]*Department of Bromatology and Nutrition. Pablo de Olavide University. Seville. Spain.* [2]*Behavioral Sciences Institute. Seville. Spain.*

Abstract

Objective: **The aim of the study was to analyse the psychometric properties of the Food Choice Questionnaire (FCQ) in Spanish population (FCQ-SP), its factor structure and internal consistency. In addition, the relationships between the FCQ-SP and the General Health Questionnaire (GHQ), the Irrational Food Beliefs Scale (IFBS), and the Eating Disorders Inventory-3 (EDI-3) were analysed in order to explore the validity of the FCQ-SP. Possible gender differences in the food choice pattern were analysed.**

Methods: **The sample comprised 255 women and 50 men, ranged from 25 to 64 years. In order to get a better interpretation of the results associated with changes based on the age, the participants were grouped in four age intervals (25-34, 35-44, 45-54, and 55-64). All the participants were relatives of secondary and high school students in three schools of Seville and Cordoba.**

Results: **The factor analysis yields the seven following factors: mood, health and natural content, sensory appeal, weight control, convenience, familiarity, and price. The internal consistency was determined by means of the Cronbach's α coefficients, which ranged from 0.70 to 0.83 for the different components. With regards to the food choice profile, sensory appeal was the most motivating factor to choose food, followed by price and weight control. With respect to gender differences, women showed higher scores than men in all components except in the case of price.**

Discussion: **The FCQ-SP has adequate psychometric properties to be applied to Spanish population, and it is useful to explore the consumers' motivation with regards to food choice.**

(*Nutr Hosp.* 2011;26:1313-1321)

DOI:10.3305/nh.2011.26.6.5243

Key words:*Food choice. Food beliefs. Eating behaviour. Motivation. Gender differences.*

¿QUÉ MOTIVA LA ELECCIÓN DE LOS ALIMENTOS EN LOS CONSUMIDORES?

Resumen

Objetivo: **Analizar las propiedades psicométricas del Cuestionario de Elección de Alimentos (FCQ) en población española, su estructura factorial y consistencia interna, además de las relaciones entre el FCQ y el Cuestionario de Salud General (GHQ), la Escala de Creencias Irracionales sobre los Alimentos (IFBS) y el Inventario de Trastornos Alimentarios-3 (EDI-3), con el fin de explorar la validez del FCQ. También se analizaron las posibles diferencias de género en el patrón de elección de los alimentos.**

Métodos: **La muestra estuvo formada por 255 mujeres y 50 hombres, con edades entre de 25 a 64 años. Para interpretar los resultados asociados a cambios en función de la edad, se establecieron cuatro intervalos de edad (25-34, 35-44, 45-54 y 55-64). Todos los participantes eran familiares de estudiantes de secundaria y bachillerato en tres escuelas de Sevilla y Córdoba.**

Resultados: **El análisis factorial reveló siete factores: estado de ánimo, salud y contenido natural de los alimentos, atractivo sensorial, control del peso, comodidad, familiaridad y precio. La consistencia interna se determinó mediante los coeficientes α de Cronbach, que variaron desde 0,70 hasta 0,83 para los distintos componentes. El atractivo sensorial fue el factor más motivador para elegir los alimentos, seguido por el precio y el control del peso. Las mujeres mostraron puntuaciones más altas que los hombres en todos los componentes excepto en el caso del precio.**

Discusión: **El FCQ tiene adecuadas propiedades psicométricas para ser aplicado en población española, siendo útil para explorar la motivación de los consumidores en la elección de alimentos.**

(*Nutr Hosp.* 2011;26:1313-1321)

DOI:10.3305/nh.2011.26.6.5243

Palabras clave: *Elección de alimentos. Creencias sobre los alimentos. Conducta alimentaria. Motivación. Diferencias de género.*

Correspondence: I. Jáuregui-Lobera.
Virgen del Monte, 31.
41011 Seville. Spain.
E-mail: igjl@upo.es / ijl@tcasevilla.com

Recibido: 8-III-2011.
Aceptado: 9-III-2011.

Abbreviations

B: Subscale of Bulimia (EDI-3).
BD: Subscale of Body Dissatisfaction (EDI-3).
BMI: Body Mass Index.
CGHQ: Chronic-General Health Questionnaire of Goldberg
DT: Subscale of Drive for Thinness (EDI-3).
EDI-3: Eating Disorders Inventory-3.
FCQ: Food Choice Questionnaire.
FCQ-SP: Food Choice Questionnaire-Spanish version.
GHQ: General Health Questionnaire of Goldberg.
IFBS: Irrational Food Beliefs Scale.
KMO: Kaiser-Meyer-Olkin index.
Rho: Spearman correlation.
U: Mann-Whitney test.
χ^2: Chi-squared test.

Introduction

The concern about a proper food choice, mainly in relation to health, is widespread in western countries and some recommendations on the need to restrict salt intake and fats, and to increase complex carbohydrate and fibre are widely distributed for years.[1,2] An effective dietary modification starts with the choice of food, which may be due not only to health reasons but to many others.[3] Among these other reasons, those with a cultural base are well known, and lead not only to food selection, but also to certain traditions in the cooking style. In addition, these cultural reasons usually cause certain restrictions and/or exclusions of certain foods.[4] Taking into account these cultural factors, it is noteworthy that some food choices are based on the prestige of certain foods in order to denote a high social status as well as choices based on flavours, aromas and textures. In other cases, the design of healthy diets is based not on health reasons but basically on the personal appearance. In the latter case, the choice of food for weight control is one of the key determinants, currently more aesthetic than health. Finally, the food selection on the basis of their natural ingredients is another notable element usual in recent years, as well as the food choices based on some emotional states (stress, depression, etc.).[5-8]

Summarizing, food choices may be based on the sensory appeal of foods, some expectations and attitudes, health-related issues, price, ethical concerns or mood.[9] In addition to these socio-cultural elements, there are some individual aspects such as acquired psychological and physiological preferences or the degree of information-knowledge, which also will influence, together with the influences of peers and family, the food choices.[10]

Several studies have focused on describing the factors involved in food choices.[10,11] For this purpose different instruments have been designed. One of the most widely used is the Food Choice Questionnaire (FCQ),[12-15] an instrument that has been adapted and used in different countries such as Canada, USA, Finland and Ukraine among others, in addition to some Spanish speaking countries as Uruguay.[16-20]

The Food Choice Questionnaire (FCQ), in its original version,[13] is a 36-item questionnaire, comprising different food attributes (intrinsic and extrinsic), which may motivate consumers in choosing foods.

Previous studies based on this questionnaire have shown that, for example, in the United Kingdom sensory appeal or elements such as health, convenience and price are key motivating factors in choosing food.[13] In other countries, the role of ethical concerns and the different perception about the quality of food depending on the foods' country of origin have been more specifically studied.[18,21] Finally there are some transnational studies comparing the reasons for choosing among different countries.[9,22]

The aim of this study was to analyse the psychometric properties of the Food Choice Questionnaire (FCQ) in Spanish population (FCQ-SP), its factor structure and the internal consistency. Also, the relationships between the FCQ and the Goldberg General Health Questionnaire (GHQ), the Irrational Food Beliefs Scale (IFBS) and the Eating Disorders Inventory (EDI-3)[23-25] were analysed in order to explore its validity. The characteristics of the instruments used permit to analyse both the discriminant and convergent validity, as there are aspects both convergent and differential in these questionnaires, which are related to food choices. The analysis of the factor structure and the study of validity are tests on the construct validity of the FCQ, as this includes any evidence of validity.

Method

Participants

The initial number of participants was 317 and after rejecting some incomplete protocols, 305 were accepted, of which 255 were women and 50 men, aged between 25 and 64 years (M = 42.56; SD = 7.18). All of them were relatives of secondary and high school students in two public schools (Seville and Cordoba) and a private one (Seville) randomly selected.

In order to facilitate an easier interpretation of those results related to the course of these variables, the participants were grouped into four age ranges: 25-34 years, 35-44 years, 45-54 years and 55-64 years.

Measures

In a questionnaire, which accompanied the instruments used, demographic variables such as age, sex, current weight and height, and desired weight were included. The body mass index (BMI) and the desired body mass index (D-BMI) were obtained. Some anthropometric data,

obtained by means of interviews and self-reported questionnaires, which have been reported in epidemiological studies, are usually well correlated (r = 0.96-0.97) with their corresponding objective measures.[26,27]

Instruments

Food Choice Questionnaire (FCQ)

The original version of this instrument comprises 36 items that represent food attributes, intrinsic and extrinsic, which may motivate consumers in choosing foods. Each item permit to grade the relevance of the food choice on any given day, through a 4-point scale (1 = not important, 2 = little important, 3 = moderately important, 4 = very important). The questionnaire measures nine motivational dimensions, each of which includes three to six items. These dimensions are: Health, Mood, Convenience, Sensory appeal, Natural content, Price, Weight control, Familiarity, and Ethical Concerns.

The questionnaire has shown adequate internal consistency with Cronbach's coefficients ranging from 0.72 and 0.86 for the various factors identified, and adequate validity. The final version of the Food Choice Questionnaire-Spanish version (FCQ-SP), is shown in Appendix.

General Health Questionnaire (GHQ-28)

For this study we used the Spanish version of this screening instrument of general psychopathology, which taking into account a cut-off point of 6-7 shows a sensitivity of 76.9% and a specificity of 90.2%. With a cut-off point of 5-6 the questionnaire shows a sensitivity of 84.6% and a specificity of 82%. Anyhow, it shows an adequate discriminative power (psychiatric case-no case) and it is easy to be administered. The questionnaire was designed to detect the presence of psychiatric cases in community and non-psychiatric clinical settings and comprises four 7-item scales: somatic symptoms, anxiety and insomnia, social dysfunction and depression. By means of a scale of 0,0,1,1, the results are utilised to identify psychiatric cases. A higher final score indicates a greater psychopathology. Since there have been handled different cut-off points, only the total score has been considered in the present study. The GHQ has been suggested as a tool for identifying emerging problems as well as to identify chronic problems (C-GHQ), scoring in the latter case depending on the scale 0,1,1,1. For this study we used both forms GHQ and C-GHQ.

Irrational Food Beliefs Scale (IFBS)

This instrument was developed for the purpose of analysing the cognitive distortions and inappropriate attitudes and beliefs towards foods. The instrument has shown adequate psychometric properties and it comprises two subscales (with 41 and 16 items of irrational beliefs —IFBS-I— and rational beliefs —IFBS-R—, respectively). The Spanish version of the scale was used in this study, which has also shown adequate psychometric properties with Cronbach's α coefficients of 0.88 and 0.78 for the irrational and rational subscales respectively, and a Cronbach's α coefficient of 0.86 for the whole scale.

Eating Disorders Inventory-3 (EDI-3)

This inventory assesses three risk variables related to eating disorders (in addition to nine psychological variables), and it is applicable in non-clinical samples from ten years on, both individually and collectively. For the present study there were taken those items related to specific food variables (i.e., drive for thinness —DT—, bulimia —B—, and body dissatisfaction —BD—). The Spanish version of these scales has adequate internal consistency (Cronbach's α coefficients between 0.87 and 0.95). Besides the three mentioned scales, some other items of the questionnaire were used, which refer to the individual's over life highest weight, the individual's over life minimum weight, the desired weight, the presence of binge eating, the presence of vomits in order to loose weight, use of laxatives for the same purpose, practise of exercise for weight control, and a weight loss of nine or more kilos in the last six months. Finally the total score on the last five mentioned items was obtained.

Procedure

The Spanish version of the FCQ (FCQ-SP) was obtained by means of a process of translation and back translation carried out by two different translators. In order to confirm that there was no difficulty in reading and understanding the items, a preliminary sample of 30 participants (representing all ages of the final sample) was chosen. After administering the questionnaire, all the interpretations, suggestions and comments of these participants were taken into account in order to develop the final questionnaire with its instructions for completion.

In order to designate the specific person, who would be responsible for completing the questionnaire, the followed criteria was that the person would be the one in each household who was responsible for choosing and purchasing foods.

The participants' informed consent was obtained, and there was not any refusal to participate in the study.

After having obtained the permission of the students' parents association, the school counsellor of each school met the participants in order to obtain the informed consent and provide instructions about com-

pletion as well as the deadline for delivery of the questionnaire.

With regards to the sample size, since the traditional criteria based on a certain size depending on the number of items do not have a solid base,[28] the point of view of Ferrando and Anguiano-Carrasco[29] was followed, which refers to a minimum of 200 observations, even under ideal conditions of high communalities and well-defined factors.

Statistical analysis

Gender differences were studied by means of the Mann-Whitney test. In order to study the weights of each factor on the food choice of the different groups of age, the differences among proportions were analysed by applying the χ^2-test. The associations among variables were studied by means of Spearman's correlation coefficient. The factor analysis was based on the principal components approach with varimax rotation, while Cronbach's α coefficient was used to determine the internal consistency of the FCQ-SP.

Results

Factor structure and internal consistency

A factor analysis was performed following the extraction method of principal components with varimax rotation. Some indicators related to the high degree of interrelation between the variables, confirmed the analysis. Thus, the Bartlett test of sphericity obtaining a $\chi^2 = 3737.57$ ($p < 0.0001$) and the Kaiser-Meyer-Olkin index (KMO), on adequacy of the sample, being 0.834 (which is adequate if > 0.80; Kaiser, 1970) were appropriated. To determine the number of factors, eigenvalues over 1 were considered, and the result of the scree test was taken into account. Items with factor loadings ≥ 0.40 and present in only one factor were retained, as it was done in the original study. Thus, two items were deleted from the original questionnaire. The best solution for the analysis of the 34 final items of the FCQ-SP revealed seven factors (in contrast to the nine found in the original study): Mood, Health and related elements, Sensory appeal, Weight control, Convenience, Familiarity and Price. These seven components account for 64.02% of the total variance in the sample.

Table I shows the rotated factor loadings, variance explained and cumulative variance.

With regards to the content of the factors and internal consistency (as measured by Cronbach's α coefficient), the first factor, grouped 6 items concerning stress, coping and mood, and it was consequently labelled Mood ($\alpha = 0.83$). The second factor, comprised 9 items, including 6 related to health-related statements and 3 items related to the use of additives and natural ingredients, and it was labelled Health and natural content ($\alpha = 0.82$). A third factor, comprising 4 items, consisted of four statements related to appearance, smell and taste, and could be regarded as indexing Sensory appeal ($\alpha = 0.70$). The fourth factor, with 3 items, was related to consumption of low calorie food and it was labelled as Weight control ($\alpha = 0.74$). The fifth factor, labelled Convenience, grouped 5 items and concerned ease of food purchase and preparation ($\alpha = 0.73$). A sixth factor, referred to the Familiarity, comprised 4 items ($\alpha = 0.70$), one more than in the original questionnaire (*Has the country of origin clearly marked).* The seventh factor, Price, referred to 3 items associated with the cost of foods ($\alpha = 0.73$). Overall, the FCQ-SP showed a Cronbach's α coefficient = 0.90.

Pattern of food choices and gender differences

Figure 1 shows the average values with regards to the relevance of each factor in the choice of food, representing the profile of the choices.

Regarding the differences between men and women at the time of the election, women showed higher scores in all factors except the price (mood: $U = 3.91$; $p < 0.01$; health and natural content: $U = 4.00$; $p < 0.01$; sensory appeal: $U = 4.25$; $p < 0.05$; weight control: $U = 5.17$; $p < 0.01$; convenience: $U = 4.17$; $p < 0.01$; familiarity: $U = 4.47$; $p < 0.05$).

Pattern of food choices and age

Four age groups were established (25-34, 35-44, 45-54 and 55-64), analysing the differences in the different factors involved in food choices. A statistically significant difference was found in the mood factor, this being a decisive criterion for the choice of food in the 55-64 years group compared with the other age groups ($\chi^2 = 2.10$; $p < 0.01$). The items of this factor in which there were found the differences, between the 55-64 years group and the rest, were *helps me cope with stress* ($\chi^2 = 21.86$; $p < 0.001$), *helps me face life* ($\chi^2 = 10.96$; $p < 0.05$) and *helps me relax* ($\chi^2 = 12.04$; $p < 0.01$).

Although other significant differences were not found in the other factors when comparing age groups, also the 55-64 years group showed higher scores, statistically significant, in the following items of the FCQ-SP: *It is low in calories* ($\chi^2 = 8.80$; $p < 0.05$), *it contains natural ingredients* ($\chi^2 = 9.05$; $p < 0.05$) and *it helps me to control weight* ($\chi^2 = 11.00$; $p < 0.05$).

Correlations between the factors of the FCQ-SP and other variables

Mood factor showed a significant correlation ($p < 0.05$) with age (*Rho* = 0.12), bulimia subscale (*Rho* = 0.12), and binge subscale (Part B of the EDI-3) (*Rho* = 0.16), all in women. In case of men, there was a signifi-

Table I
Factor structure (principal components with varimax rotation) and explained variance

Items	*Price*	*Mood*	*Health and natural content*	*Sensorial appeal*	*Weight control*	*Convenience*	*Familiarity*
FCQ1	-0.015	0.093	0.102	-0.007	0.096	**0.836**	0.145
FCQ2	-0.119	0.079	**0.491**	-0.040	0.425	0.392	0.126
FCQ3	0.037	0.216	0.164	-0.110	**0.768**	0.103	-0.041
FCQ4	0.061	-0.023	0.224	**0.611**	-0.054	0.113	-0.108
FCQ5	0 .097	-0.105	**0.700**	0.194	0.263	0.124	0.189
FCQ6	**0.728**	0.062	0.088	0.140	0.333	0.203	0.030
FCQ7	0.292	-0.013	0.203	0.015	**0.720**	0.021	-0.038
FCQ8	0.191	-0.077	0.190	0.252	0.262	-0.026	**0.661**
FCQ9	0.103	0.055	**0.525**	0.227	0.405	-0.049	0.264
FCQ10	0.005	-0.052	**0.538**	0.410	0.261	-0.036	0.227
FCQ11	0.117	0.067	0.067	0.165	0.063	**0.713**	0.123
FCQ12	**0.500**	0.122	0.208	0.178	0.028	0.062	-0.003
FCQ13	0.088	**0.532**	-0.076	0.128	0.151	0.070	0.023
FCQ14	0.105	0.156	0.004	**0.660**	-0.072	0.035	-0.060
FCQ15	0.275	0.134	-0.122	0.198	0.092	**0.657**	0.042
FCQ16	0.108	**0.705**	-0.002	0.153	0.285	0.245	0.027
FCQ17	0.167	0.374	0.008	0.074	**0.625**	0.138	-0.003
FCQ18	-0.046	0.143	0.044	**0.700**	0.050	0.017	0.226
FCQ19	0.032	0.392	0.207	0.191	-0.110	0.099	**0.559**
FCQ20	0.107	0.239	**0.724**	0.223	0.047	-0.052	0.073
FCQ21	-0.076	0.159	**0.591**	-0.014	0.177	-0.034	0.049
FCQ22	-0.005	**0.701**	0.087	-0.066	0.010	0.081	0.266
FCQ23	0.115	0.309	0.195	**0.519**	-0.239	0.067	-0.070
FCQ24	0.087	**0.785**	0.126	0.100	0.086	0.149	0.097
FCQ25	0.153	0.432	**0.541**	0.213	-0.001	-0.122	0.002
FCQ26	0.258	0.238	-0.036	-0.010	-0.025	**0.736**	0.015
FCQ27	0.187	-0.008	**0.574**	0.062	0.092	0.010	-0.054
FCQ28	0.028	0.109	**0.710**	0.075	0.130	0.048	0.126
FCQ29	-0.040	**0.760**	0.048	0.105	0.086	0.101	0.157
FCQ30	0.014	0.244	0.156	-0.081	0.114	-0.006	**0.576**
FCQ31	0.127	0.095	0.023	0.109	0.000	0.128	**0.731**
FCQ32	0.033	**0.567**	0.068	0.091	0.127	0.110	0.455
FCQ33	0.319	0.194	0.077	0.107	0.059	**0.452**	0.317
FCQ34	**0.768**	0.134	0.081	0.065	0.097	0.204	0.174
Explained variance	11.41	10.62	9.51	9.11	7.90	7.74	7.73
Accumulated variance	11.41	22.03	31.54	40.65	48.55	56.29	64.02

cant correlation ($p < 0.01$) with weight loss (part B of the EDI-3) (*Rho* = 0.35). Finally, in both men and women, mood factor correlated positively with the irrational beliefs subscale of the IFBS (*Rho* = 0.32 in case of men, and *Rho* = 0.23 for women).

Health and natural factor content correlated positively with the rational subscale of the IFBS (*Rho* = 0.14; $p < 0.05$) and negatively with the GHQ total score (*Rho* = -0.16; $p < 0.05$), and with the score on use of de laxatives of the Part B of the EDI-3 (*Rho* = -0.15; $p < 0.05$), all in the case of women. A significant and negative correlation ($p < 0.01$) between that factor and C-GHQ scores was found among men and women (*Rho* = -0.41 in men, and *Rho* = -0.21 in women).

Weight control factor correlated significantly ($p < 0.05$) and positively with body dissatisfaction factor of the EDI-3 (*Rho* = 0.14) and the weight loss subscale (part B of the EDI-3) (*Rho* = 0.15) in women. This factor also correlated with age in the case of men (*Rho* = 0.35; $p < 0.01$). In both men and women, this factor correlated significantly ($p < 0.01$) with drive for thinness (*Rho* = 0.31 in men, *Rho* = 0.22 in women).

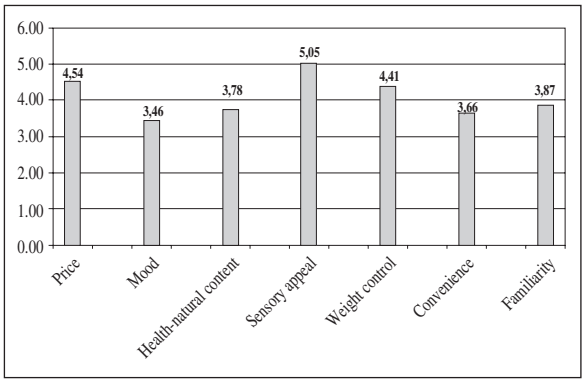

Fig. 1.—Motives for food choice.

With respect to the convenience factor, it was positively correlated with the irrational subscale of the IFBS (*Rho* = 0.14; $p < 0.05$), and with the binge subscale (Part B of the EDI-3) (*Rho* = 0.15; $p < 0.05$) in the case of women.

Finally, the familiarity factor correlated with the irrational subscale of the IFBS (*Rho* = 0.15; $p < 0.05$) and with the score on C-GHQ (*Rho* = -0.15; $p < 0.05$), also in case of women. In case of men, familiarity was correlated with the rational subscale of the IFBS (*Rho* = 0.29; $p < 0.05$)

Price and sensory appeal did not show significant correlations with the rest of the variables.

Discussion

Unlike the original study,[13] in the Spanish version of the questionnaire (FCQ-SP), the best factor solution revealed seven factors instead of nine and it was necessary to remove two items with low factor loadings. These two items *(Is packaged in an environmentally friendly way and Comes from countries I approve of politically)* are included in the ethical concern factor in the original version. Nevertheless, this factor is not obtained in the Spanish version, since the other item of this factor in the original version *(Has the country of origin clearly marked)* is included in the familiarity factor of the FCQ-SP. In view of the results, the ethical aspects, understood as the above-mentioned items, are not relevant to the choice of food in the Spanish sample. On the other hand, in the original study, health and natural factors appeared as independent of each other, forming in the Spanish version a unique factor. The elements related to the presence of additives, natural ingredients and no artificial ingredients are comparable to the concept of health in the Spanish sample.

In general, the validation study of the FCQ-SP covers the requirements for evaluating the motivation of consumers in choosing foods based on specific attributes, both intrinsic and extrinsic.

The food choice pattern obtained shows relevant similarities with some other studies. For example, in the United Kingdom, as in the Spanish sample, the sensory appeal and price are decisive in the choice,[12-14] but health and convenience factors are not as relevant in the Spanish sample as in the British study. As noted above, the ethical aspects, which are not relevant in the Spanish election, seem to be important in the election in other countries, as shown in some studies. Nevertheless, in some cases, vegetarian diets based items have been used.[18] The interpretation of the idea of familiarity, as one that can cover the fact that food comes from the home country or another, is not decisive in the Spanish sample unlike it has been shown in another study.[21] In a cross-national study comparing the reasons for choosing among different countries, it has been shown, for example in Malaysia and Taiwan, that weight control is an important motivational factor of choice, as it is in the Spanish sample. On the other hand, price seems to be a determinant of choice in Japan, and sensory appeal, as in the Spanish sample, is relevant for the choices in New Zealand. In these countries, as in the present study, ethical issues are not particularly relevant.[9] In this comparative line of study, it seems, as in the present Spanish study, that the original factor structure cannot remain the same across different countries, since the items may have different interpretations and connotations in those countries. This also has been shown comparing samples from Canada, Belgium and Italy, with the corresponding translations of the questionnaire.[22]

The fact that women have higher scores than men in most factors confirms the results of previous studies,[13] although in the Spanish sample price is the only factor that did not show gender differences. The differences in the rest of factors are particularly significant for mood, health and natural content, weight control and convenience, which is also partially coincident with the aforementioned work.[13] The absence of differences between men and women with regards to price factor differs from that found previously in the United Kingdom, a country in which price is a factor significantly more relevant among women. The same work[13] states that, traditionally, women are usually in charge of purchasing foods in the United Kingdom, and this could explain their greater concern for the price. Also in the current work, women are mostly in charge of the purchase, without showing gender differences with regards to the price as a motivational factor.

In terms of age, the original study of Steptoe showed some correlations that are not obtained in the Spanish sample, although the age range of the current study (17-89 years) and the mean age (32.3 years) do not permit to compare the two studies, because the original one differs significantly from the current study in terms of the age (range 25-64, mean 42.56). The significant and positive correlation between the weight control factor and age in case of the men (Rho = 0.35) is interesting. This was also noted in the aforementioned work of Steptoe (r = 0.25) in 1995. With regards to the established age groups, the correlations observed in the older group may be indicating a greater concern for the emotional well-being through the food intake and concerns about health issues such as overweight / obesity and cardiovascular risk.

Table II
Correlations among FCQ-SP factors and other variables

	Price	*Mood*	*Health and natural content*	*Sensorial appeal*	*Weight control*	*Convenience*	*Familiarity*
Age	♂ = 0.12 ♀ = 0.09	♂ = 0.16 ♀ = 0.12*	♂ = 0.11 ♀ = 0.08	♂ = -0.05 ♀ = 0.02	♂ = 0.35** ♀ = 0.08	♂ = 0.09 ♀ = 0.08	♂ = 0.03 ♀ = 0.03
GHQ	♂ = -0.14 ♀ = -0.03	♂ = 0.02 ♀ = 0.03	♂ = -0.17 ♀ = -0.16*	♂ = -0.20 ♀ = -0.08	♂ = -0.10 ♀ = -0.08	♂ = -0.05 ♀ = -0.01	♂ = -0.01 ♀ = -0.10
CGHQ	♂ = -0.10 ♀ = -0.01	♂ = -0.16 ♀ = 0.04	♂ = 0.41** ♀ = -0.21**	♂ = -0.14 ♀ = -0.13*	♂ = -0.16 ♀ = -0.08	♂ = -0.09 ♀ = -0.01	♂ = -0.09 ♀ = -0.15*
IFBS-R	♂ = 0.11 ♀ = 0.02	♂ = 0.11 ♀ = 0.03	♂ = 0.27 ♀ = 0.14*	♂ = 0.12 ♀ = 0.01	♂ = 0.26 ♀ = 0.01	♂ = 0.19 ♀ = 0.03	♂ = 0.29* ♀ = 0.04
IFBS-I	♂ = -0.15 ♀ = 0.07	♂ = 0.32* ♀ = 0.23**	♂ = -0.09 ♀ = -0.08	♂ = -0.11 ♀ = 0.03	♂ = -0.05 ♀ = -0.08	♂ = 0.08 ♀ = 0.14*	♂ = 0.14 ♀ = 0.15*
EDI-DT	♂ = 0.19 ♀ = 0.07	♂ = 0.27 ♀ = 0.05	♂ = 0.25 ♀ = -0.01	♂ = 0.11 ♀ = 0.01	♂ = 0.31** ♀ = 0.22**	♂ = 0.22 ♀ = 0.04	♂ = 0.09 ♀ = -0.03
EDI-B	♂ = -0.02 ♀ = 0.06	♂ = -0.02 ♀ = 0.12*	♂ = -0.26 ♀ = -0.06	♂ = -0.14 ♀ = 0.06	♂ = -0.17 ♀ = 0.06	♂ = -0.11 ♀ = 0.11	♂ = -0.23 ♀ = 0.11
EDI-BD	♂ = 0.10 ♀ = 0.13*	♂ = 0.05 ♀ = 0.08	♂ = 0.02 ♀ = -0.02	♂ = 0.01 ♀ = 0.04	♂ = 0.07 ♀ = 0.14*	♂ = 0.06 ♀ = 0.12	♂ = -0.06 ♀ = 0.05
Bingeing	♂ = -0.14 ♀ = 0.08	♂ = 0.18 ♀ = 0.16*	♂ = -0.02 ♀ = 0.01	♂ = -0.17 ♀ = 0.08	♂ = -0.01 ♀ = 0.04	♂ = 0.10 ♀ = 0.15*	♂ = 0.05 ♀ = 0.07
Laxatives	♂ = -0.04 ♀ = -0.06	♂ = 0.01 ♀ = 0.03	♂ = 0.11 ♀ = -0.15*	♂ = -0.01 ♀ = -0.10	♂ = 0.07 ♀ = -0.07	♂ = 0.13 ♀ = -0.05	♂ = 0.06 ♀ = -0.10
Weight loss	♂ = 0.17 ♀ = 0.04	♂ = 0.35** ♀ = 0.08	♂ = 0.14 ♀ = -0.02	♂ = 0.02 ♀ = -0.01	♂ = 0.18 ♀ = 0.15*	♂ = 0.21 ♀ = 0.01	♂ = 0.22 ♀ = 0.02

GHQ: General Health Questionnaire; CGHQ: General Health Questionnaire (Chronicity); IFBS: Irrational Food Beliefs Scale (I = Irrational; R = Rational); EDI-DT, EDI-B and EDI-BD: Drive for Thinness, Bulimia, and Body Dissatisfaction subscales of the Eating Disorders Inventory.
* $p < 0.05$; ** $p < 0.01$.

It is long known[30] that mood and stress not only affect the amount of foods eaten but also the selection of these foods as the correlations between mood and subscales of bulimia and binge eating in the case of men, and between that factor and the irrational subscale of the IFBS, in both males and females, seem to indicate, in the same line of previous studies.[13,31]

A worse psychopathology appears to be associated with a lower relevance of the health and natural content factor when choosing foods and greater presence of irrational ideas about food, as it is shown by the correlations of this factor with IFBS, and the scores on GHQ and C-GHQ, especially in women. The fact that, usually, women pay more attention to this factor in their choice of foods,[32] suggests, in view of the results, to what extent this trend is affected in terms of a worse psychopathology.

Weight control factor shows, once again, the tendency to dietary restriction and the tendency to a lean body. This data is no longer surprising in the case of men, as it has been highlighted in other recent studies about the influence of these elements, not only in women but also in men.[33] Regarding the positive correlation between this factor and age, in case of men (*Rho* = 0.35), it seems, looking at the set of correlations among age and the items of the FCQ-SP, that other elements (non aesthetic), more related to health, could explain the correlation.

The observed correlations between convenience and familiarity and the irrational beliefs subscale of the IFBS, in case of women, suggest that the worst knowledge about foods lead to choices more based on ease and comfort than on other criteria (price, weight, health status, mood, sensory appeal, etc.). That has also been found in a previous study.[34] Nevertheless, with regards to familiarity, the opposite has been found among men. In this case, familiarity is correlated with the rational subscale of the IFBS, so that it could be said that the more rational the beliefs about foods are, the higher is the relevance of the familiarity in choosing foods.

The significant, but weak correlation found between BD and price, only among women, is hardly interpretable with the results of the current study as well as with those of previous research.

In conclusion, the results of this study do not confirm the factor structure of the original FCQ based on 9 factors and 36 items, given the necessary, more rational

psychometric restructuring with respect to the data obtained. This confirms, once again, some differences among different countries, with regards to the weight of the motivational factors, which underlie the food choices. It could be said that the motivational type of election vary not only among countries but also in terms of regions and even regarding other characteristics of the population.

In fact, one of the limitations of this study is the absence of an analysis of results of the FCQ-SP, depending, for example, on the incomes, educational level, place of residence (rural/urban) or employment status of the family among other variables, as it has been done in some other studies.[13,15] In order to study the aforementioned motivational types of election, another limitation is not having included, in addition to the used psychopathological assessment instruments, the assessment of other parameters such as the perception of food safety, the marketing influence, some traits of personality of the potential buyer of food, or information-related issues (e.g., labelling), among other variables. This allows for open lines of future work.

Acknowledgement

We acknowledge the support of the EDUBSI (Eating Disorders Unit of the Behavioural Sciences Institute), which supported the preparation of this manuscript. Especially thanks to Sabine Bergmann for her technical support.

References

1. Cannon G. Food and Health: The Experts Agree. London: Consumers' Association; 1992.
2. Lands WEN, Hamazaki T, Yamazaki K, Okuyama H, Sakai K, Goto Y, et al. Changing dietary patterns. *Am J Clin Nutr* 1990; 51: 991-993.
3. Glanz K, Kristal A, Sorensen G, Palombo R, Heimendinger J, Probart C. Development and validation of measures of psychosocial factors influencing fat- and fibre-related dietary behavior. *Prev Med* 1993; 22: 373-387.
4. Lau D, Krondl M, Coleman P. Psychological factors affecting food selection. In: Galler J, editor. Nutrition and Behavior. New York: Plenum Press; 1984, pp. 397-415.
5. Sanjur D, editor. Social and Cultural Perspectives of Nutrition. Englewood Cliffs: Prentice Hall; 1982.
6. Drenowski A. Nutritional perspectives on biobehavioral models of dietary change. In: De Roos KK, editor. Promoting Dietary Change in Communities. Washington: Fred Hutchinson Cancer Research Center; 1992, pp. 96-112.
7. Cockerham WC, Kunz G, Lueschen G. On concern with appearance, Elath beliefs, and eating habits: a reappraisal comparing Americans and West Germans. *J Health Soc Behav* 1998; 29: 265-270.
8. McCann B, Warnick G, Knopp R. Changes in plasma lipids and dietary intake accompanying shifts in perceived workload and stress. *Psychosom Med* 1990; 52: 97-108.
9. Prescott J, Young O, O'Neil L, Yau NJN, Stevens R. Motives for food choice: a comparison of consumers from Japan, Taiwan, Malaysia and New Zealand. *Food Qual Prefer* 2020; 13: 489-495.
10. Eertmans A, Baeyens F, Van den Bergh O. Food likes and their relative importance in human eating behaviour: review and preliminary suggestions for health promotion. *Health Educ Res* 2001; 16: 443-456.
11. Frust T, Connors M, Bisogni CA, Sobal J, Winter Falk L. Food choice: a conceptual model of the process. *Appetite* 1996; 26: 247-266.
12. Pollard TM, Steptoe A, Wardle J. Motives underlying healthy eating: using the Food Choice Questionnaire to explain variation in dietary intake. *J Biosoc Sci* 1998; 30: 165-179.
13. Steptoe A, Polland TM, Wardle J. Development of a measure of the motives underlying the selection of food: the Food Choice Questionnaire. *Appetite* 1995; 25: 267-284.
14. Steptoe A, Wardle J. Motivational factors as mediators of socio-economic variation in dietary intake patterns. *Psychol Health* 1999; 14: 391-402.
15. Fotopoulos C, Krystallis A, Vassallo M, Pagiaslis A. Food Choice Questionnaire (FCQ) revisited. Suggestions for the development of an enhanced general food motivation model. *Appetite* 2009; 52: 199-208.
16. Martins Y, Pliner P. The development of the Food Motivation Scale. *Appetite* 1998; 30: 94.
17. Glanz K, Basil M, Maibach E, Goldberg J, Snyder D. Why Americans eat what they do: taste, nutrition, cost, convenience and weight control concerns as influences of food consumption. *J Am Diet Assoc* 1998; 98: 1118-1126.
18. Lindeman M, Väänänen M. Measurement of ethical food choice motives. *Appetite* 2000; 34: 55-59.
19. Biloukha OO, Utermohlen V. Correlates of food consumption and perceptions of food in an educated urban population in Ukraine. *Food Qual Prefer* 2000; 11: 475-485.
20. Ares G, Gambaro A. Influence of gender, age and motives underlying food choice on perceived healthiness and willingness to try functional foods. *Appetite* 2007; 49: 148-158.
21. Chryssohoidis G, Krystallis A, Perreas P. Ethnocentric beliefs and country-oforigin (COO)-effect: impact of country, product and product attributes on Greek consumers'evaluationof food-products. *EJOM* 2007; 41: 1518-1544.
22. Eertmans A, Victoir A, Notelaers G, Vansant G, Van den Bergh O. The Food Choice Questionnaire: factorial invariant over western urban populations? *Food Qual Prefer* 2006; 17: 344-352.
23. Lobo A, Pérez-Echeverría MJ, Artal J. Validity of the scaled version of the General Health Questionnaire (GHQ-28) in a Spanish population. *Psychol Med* 1986; 16: 135-140.
24. Jáuregui Lobera I, Bolaños Ríos P. Spanish version of the Irrational Food Beliefs Scale. *Nutr Hosp* 2010; 25: 852-9.
25. Elosua P, López-Jáuregui A. Sánchez-Sánchez F. Adaptación española del Eating Disorder Inventory-3. Normalización y validación. Madrid: TEA; 2010.
26. Rimm EB, Stampfer MJ, Colditz GA, Chute CG, Litin LB, Willett WC. Validity of self-reported waist and hip circumferences in men and women. *Epidemiology* 1990; 1: 466-73.
27. Weaver TW, Kushi LH, McGovern PG, Potter JD, Rich SS, King RA et al. Validation study of self-reported measures of fat distribution. *Int J Obes Relat Metab Disord* 1996; 20: 644-50.
28. Kline RB. Principles and practices of structural equation modelling. In: D. Kenny DA, editor. Methodology in the social sciences. New York: The Guilford Press; 1998.
29. Ferrando PJ, Anguiano-Carrasco C. El análisis factorial como técnica de investigación en psicología. *Papeles del Psicólogo* 2010; 31: 18-33.
30. Wardle J. Compulsive eating and dietary restraint. *Br J Clin Psychol* 1987; 26: 47-55.
31. Grunberg NE, Straub RO. The role of gender and taste class in the effects of stress on eating. *Health Psychol* 1992; 11: 97-100.
32. Wardle J, Steptoe A. The European Health and Behaviour Survey: rationale, methods and results from the United Kingdom. *Soc Sci Med* 1991; 33: 925-936.
33. Jáuregui Lobera I, Tomillo Cid S, Estébanez S, Santiago MJ, Bolaños Ríos P. Body shape model, physical activity and eating behaviour. *Nutr Hosp* 2011, in press.
34. Rappaport L, Peters G, Huff-Corzine L, Downey R. Reasons for eating: an exploratory cognitive analysis. *Ecol Food Nutr* 1992; 28, 171-189.

APPENDIX

FOOD CHOICE QUESTIONNAIRE-SPANISH VERSION (FCQ-SP)

Steptoe, Pollard and Wardle, 1995
Adaptation and validation by Jáuregui-Lobera and Bolaños-Ríos, 2011

Teniendo en cuenta la siguiente escala…

1. ''Nada importante''
2. ''No importante''
3. ''Ligeramente no importante''
4. ''Ni no importante ni importante"
5. ''Ligeramente importante''
6. ''Importante"
7. "Muy importante''

Es importante para mi que la comida que tomo un día normal…

1. Sea fácil de preparar	1	2	3	4	5	6	7
2. No contenga aditivos	1	2	3	4	5	6	7
3. Sea baja en calorías	1	2	3	4	5	6	7
4. Sepa bien	1	2	3	4	5	6	7
5. Contenga ingredientes naturales	1	2	3	4	5	6	7
6. No sea cara	1	2	3	4	5	6	7
7. Sea baja en grasa	1	2	3	4	5	6	7
8. Sea familiar	1	2	3	4	5	6	7
9. Sea rica en fibra	1	2	3	4	5	6	7
10. Sea nutritiva	1	2	3	4	5	6	7
11. Esté fácilmente disponible en tiendas y supermercados	1	2	3	4	5	6	7
12. Tenga buena relación calidad-precio	1	2	3	4	5	6	7
13. Me anime	1	2	3	4	5	6	7
14. Huela bien	1	2	3	4	5	6	7
15. Pueda cocinarse de forma sencilla	1	2	3	4	5	6	7
16. Me ayude a combatir el estrés	1	2	3	4	5	6	7
17. Me ayude a controlar el peso	1	2	3	4	5	6	7
18. Tenga una textura agradable	1	2	3	4	5	6	7
19. Sea similar a la comida que tomaba cuando era niño	1	2	3	4	5	6	7
20. Contenga muchas vitaminas y minerales	1	2	3	4	5	6	7
21. No tenga ingredientes artificiales	1	2	3	4	5	6	7
22. Me mantenga despierto, alerta	1	2	3	4	5	6	7
23. Parezca agradable	1	2	3	4	5	6	7
24. Me ayude a relajarme	1	2	3	4	5	6	7
25. Sea alta en proteínas	1	2	3	4	5	6	7
26. No me lleve tiempo prepararla	1	2	3	4	5	6	7
27. Me mantenga sano	1	2	3	4	5	6	7
28. Sea buena para mi piel, dientes, pelo, uñas, etc.	1	2	3	4	5	6	7
29. Me haga sentir bien	1	2	3	4	5	6	7
30. Tenga el país de origen claramente señalado	1	2	3	4	5	6	7
31. Sea lo que como habitualmente	1	2	3	4	5	6	7
32. Me ayude a enfrentarme con la vida	1	2	3	4	5	6	7
33. Pueda comprarse en tiendas cerca de la casa o el trabajo	1	2	3	4	5	6	7
34. Sea barata	1	2	3	4	5	6	7