



Original

Cross-cultural validation of the Yale Food Addiction Scale for Children (YFAS-c) into the Spanish language to assess food addiction in the pediatric population



Néstor Benítez Brito^{a,b,*}, Berta Pinto Robayna^c, Yolanda Ramallo Fariña^{d,e},
Francisco Moreno Redondo^c, Beatriz León Salas^d, Carlos Díaz Romero^c

^a Dirección General de Salud Pública, Servicio Canario de la Salud, Santa Cruz de Tenerife, Spain

^b Facultad de Ciencias de la Salud, Universidad Isabel I, Burgos, Spain

^c Área de Nutrición y Bromatología, Departamento de Ingeniería Química y Tecnología Farmacéutica, Facultad de Farmacia, Universidad de La Laguna, San Cristóbal de la Laguna, Santa Cruz de Tenerife, Spain

^d Fundación Canaria Instituto de Investigación Sanitaria de Canarias (FIISC), Servicio de Evaluación del Servicio Canario de la Salud (SESCS), Las Palmas de Gran Canaria, Spain

^e Red de Investigación en Servicios de Salud en Enfermedades Crónicas (REDISSEC), Spain

ARTICLE INFO

Article history:

Received 10 May 2021

Accepted 4 November 2021

Available online 17 November 2021

Keywords:

Food addiction

Food addiction assessment

Yale Food Addiction Scale

YFAS

Eating disorders

Psychometric properties

ABSTRACT

Introduction: The scale The Yale Food Addiction Scale Children (YFAS-c) is the first measure designed to evaluate food addiction in children. However, this tool is not adapted to the Spanish language.

Material and methods: A translation, adaptation and methodological validation of the YFAS-c tool into the Spanish language is carried out. Initially, the scale is translated and adapted through blinded and independent translators, estimating their adaptability and agreement (Cohen's Kappa). Subsequently, the questionnaire is submitted to a committee of experts to evaluate the cultural suitability, representativeness and face and content validity using the content validity ratio (CVR), its version modified by Tristán (CVR') and the Content Validity Index (CVI). Finally, linguistic comprehension is evaluated in a target sample using the Chi-square test.

Results: Difficulty in cross-cultural adaptability of the questionnaire among translators was low (mean: 1.96, DE: 1.40; Kappa agreement: 0.32, $P = .01$). The evaluation of the tool by the expert committee obtained high indices: clarity ($n = 0.83$), precision ($n = 0.83$), comprehension ($n = 0.84$) and content relevance ($n = 0.83$). Of the total of 25 items, only one item presented difficulties in understanding by age groups ($P = .02$).

Conclusions: A validated version, translated and adapted to the Spanish language (S-YFAS-c) has been obtained that will be able to evaluate food addiction in Spanish-speaking children.

© 2021 Sociedad Española de Psiquiatría y Salud Mental (SEPSM). Published by Elsevier España, S.L.U. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

In recent years, the overconsumption of processed foods has proliferated, especially in the most industrialised countries.¹ Ease of access, lower costs, and the high palatability of certain food products have led to a significant increase in their consumption.²

Parallel to this increase in consumption, overweight has practically become a worldwide problem, and overweight and obesity have become a priority public health problem, given their clinical

repercussions.³ In this context, the scientific community continues to conduct research to curb this epidemic.

The new hypotheses being put forward contain the premise that certain ultra-processed foods (or ingredients present in these foods) have the potential to induce addictive behaviours in individuals.⁴

The term “food addiction” refers to an eating behaviour that involves overconsumption of certain foods in an apparently uncontrollable way.⁵ The scientific community started to use the concept in the last century, although it was not until the middle of the 20th century that certain studies began to appear that focused on validating and analysing this term. However, it is a concept that has not been included in any version of the Diagnostic and Statistical Manual of Mental Disorders (DSM),⁶ nor in the latest International

* Corresponding author.

E-mail address: nestorgi@hotmail.com (N. Benítez Brito).

Classification of Diseases (ICD-11),⁷ as the debate on whether it is due to maladaptive eating behaviour in isolation or associated with addictive food products⁸ has not been resolved.⁸

However, there is now evidence that early exposure to addictive substances implies an increased risk of problematic substance use in the future.⁹ In this regard, addictive behaviours in minors are related to a greater risk for eating disorders,¹⁰ although there is still no consistent evidence on a potential relationship of food addiction with childhood obesity.¹¹

Specific scales or tools have begun to be used to detect this behaviour and attempt to measure this problem. One example is the Yale Food Addiction Scale (YFAS),¹² which is presented as the only measurement tool designed to assess food addiction. It aims to operationalise the concept of food addiction, translating diagnostic criteria for substance-related disorders outlined in the DSM-5 to be applied to eating behaviour.

The YFAS scale has several versions aimed at the adult population,¹³ one version for young people (Yale Food Addiction Scale for Children 2.0 [YFAS 2.0]),¹⁴ and a single version for the paediatric population (Yale Food Addiction Scale for Children [YFAS-C]).¹⁵ There are current validations and adaptations of the adult version in Spanish,^{16,17} but there is no validation in Spanish of the paediatric version. This, added to the potential vulnerability of children to developing pathological relationships with food, make this work necessary, which aims to translate, adapt, and validate this scale into Spanish.

Material and methods

A study was conducted with the aim of translating, culturally adapting, and examining the face and content validity of the YFAS-C instrument to obtain a Spanish version (S-YFAS-C), with the prior permission of the original authors of the scale.

Measures

The Yale Food Addiction Scale for Children (YFAS-C) is a measure developed to identify addictive eating behaviours in children and adolescents. Its original version was validated with a sample of 75 children with a mean age of 8 years (SD: 2.78; range: 4–16 years).¹⁵ This questionnaire consists of 25 items and explores eating behaviour over the last 12 months based on 7 criteria for the diagnosis of substance dependence according to DSM-IV-TR¹⁸:

1. The substance is taken in larger amounts or over a longer period than was intended (questions 1–3).
2. Persistent desire or unsuccessful efforts to cut down or control substance use (questions 4, 17, 18, and 25).
3. Time spent to obtain substance, use substance, or recover from its effects (questions 5 to 7).
4. Social, occupational, or recreational activities are given up or reduced because of substance use (questions 8–11).
5. Substance use is continued despite knowledge of adverse consequences (for example, failure to meet obligations or continue to use it even when physically dangerous) (question 21).
6. Tolerance (questions 22 and 23).
7. Characteristic withdrawal symptoms, substance use to alleviate withdrawal (questions 12–14).

The scale also includes two additional questions that assess impairment or distress in a clinically meaningful way (questions 15 and 16).

Of the 25 questions, 18 are Likert-scored (never, rarely, sometimes, often, and always) and 7 offer dichotomous scoring (yes/no). Three questions are not scored, acting as controls (questions 19, 20, and 24).

The scores provide an assessment of food addiction in two different ways. On the one hand, the “symptom count”, which offers a score version reflecting the number of dependence symptoms based on the 7 criteria described without considering the clinical significance in the score (minimum 0, maximum 7 points). And, on the other hand, the “diagnosis of addiction”, which assesses whether or not a diagnosis of food addiction can be established, and is confirmed when three or more symptoms are present and clinically significant distress or impairment is present (questions 15 and 16).

Translation, cross-cultural adaptation, and validation of the questionnaire

We used the guidelines for the cross-cultural adaptation of self-report measures as developed by Beaton et al.¹⁹ to obtain the scale in Spanish:

1. Two bilingual translators, competent in English and Spanish, independently translated the questionnaire and its instructions from English to Spanish. Each of the translators documented the process and indicated words and/or phrases that were difficult to translate and/or understand using a Likert scale from 1 to 10 (1 minimum difficulty encountered and 10 maximum difficulty). Based on these scores, the items, or questions where there could be a problem in cross-cultural adaptation (score above 5) were identified and classified according to their degree of equivalence (without adaptation problems, with problems in certain words, or need for adaptation for use in our environment, without cultural equivalence).
2. The translators agreed on the translation of words, phrases, and items, and established a first common version from the two initial translations.
3. Cultural appropriateness, representativeness, and content validity were assessed in collaboration with a committee of experts with experience in the clinical, research, and teaching fields. The committee comprised 21 professionals: 2 dietitians-nutritionists, 4 psychiatrists, 1 preventive doctor, 1 paediatrician, 1 nurse, 9 psychologists, 1 sociologist, and 2 chemists. They were each sent a letter by email of request for collaboration with the objectives of the study, the questionnaire, the instructions, and a data collection base. The committee analysed face validity by means of clarity (clear or unclear), precision (precise or not precise), and comprehension (understood or not understood). The content validity (relevant, not very relevant, or not relevant) of each item was also assessed.
4. To ensure that the meaning accurately reflected the English original, the Spanish version was back-translated into English by two other translators independently blinded to the first.
5. The study research team in Spain (NBB, YRF, and BPR) compared the back-translation with the original instrument and, after some minor changes, a version of the instrument (S-YFAS-C) was considered for assessment by a sample of school children drawn from the target population.
6. A sample of 197 children between the ages of 9 and 16 were asked to rate their understanding of each item. Items that were reported as “not understood” by more than 20% of the pupils were reviewed by the study team and the wording was improved. In addition, comprehension levels were analysed by age subgroup.

Data analysis

Continuous variables were summarised by mean, median, and standard deviation, and discrete variables by count and percentage. Cohen's kappa coefficient was used to estimate agreement

between translators, categorised according to Landis and Koch²⁰ in 1977 as: values < .20, slight agreement; .21–.40, fair agreement; .41–.60, moderate agreement; .61–.80, substantial agreement; .81–1, almost perfect agreement. The Content Validity Ratio (CVR),²¹ its modified version by Tristán (CVR'), and the Content Validity Index (CVI)²² were used for the quantitative verification of each of the items, as well as the total questionnaire. According to this methodology, values above .58 must be produced for the instrument to have validity, or each specific item. The χ^2 test was used to compare the comprehension level of the items in the sample by age group. Analyses were performed with IBM SPSS (Statistical Package for the Social Sciences), version 22.0 (IBM Corp. Armonk, NY, USA). A p value of < .05 (two-tailed) was considered significant).

Ethical considerations

The study was approved by the ethics committee for research with medicines of the Complejo Hospitalario Universitario de Canarias (code CHUNSC.2020.55). It also complies with the requirements of the Declaration of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine, the UNESCO Universal Declaration on Bioethics and Human Rights and Personal Data Protection, Law 14/2007, of 3 July, on Biomedical Research, and the requirements of Spanish legislation. Informed consent was signed by the parents or legal guardians of the students for authorisation and inclusion in the study.

Results

Considering the 25 items of the questionnaire, the mean difficulty in the cross-cultural adaptability of the questionnaire reported by the translators was low, with a mean of 1.96 (SD: 1.40) and a median of 1 for translator A, and a mean of 1.92 (SD: 1.22) and median of 2 for translator B. The kappa level of agreement was .32 (p = .01). The items with the greatest adaptation difficulties were item 23 (mean of 5.5) and items 3 and 14, with means of 4.5 (Table 1); in all three items the difficulties were identified as problems with certain words for use in our setting, but the rest of the items did not present adaptation problems.

In relation to the process of face validity undertaken by the committee of experts, a validity index of n = .83 was obtained over the total of the questionnaire for clarity. With respect to precision, an overall index of n = .83 was obtained, and with respect to comprehension, an index of n = .84 was obtained. The total validity index of the scale can be observed in Tables 2, 3, and 4, as well as that of each item for clarity, precision, and comprehension. The relevance of the content of the questionnaire is shown in Table 5 (n = .83).

The assessment of the level of comprehension of each of the items was analysed in a community sample of 197 male and female school children (28 aged between 9 and 11 years, 127 between 12 and 13 years, and 42 between 14 and 16 years). The pupils (54% female) belong to a grant-aided school in the province of Santa Cruz de Tenerife. Items 9, 15, 16, and 23 had a percentage of more than 20% of boys and girls who reported not understanding the question (22.8%, 24.4%, 25.9% and 23.9%, respectively). Only item 18 showed statistically significant differences (p = .02) in the level of comprehension by age group, and the group of children aged 9 to 11 years had the greatest difficulty (21.4%), compared to the group aged 12 to 13 years (3.9%) and the group aged 14 to 16 years (4.8%).

Discussion

The original YFAS-C questionnaire has been proficiently translated, adapted, and methodologically validated to a Spanish version (S-YFAS-C) through the modified CVR and CVI approach proposed

Table 1
Degree of adaptability among professional translators.

	Translator A	Translator B	Mean difficulty
Item 1	2	1	1.5
Item 2	1	1	1.0
Item 3	4	5	4.5
Item 4	1	1	1.0
Item 5	1	2	1.5
Item 6	1	1	1.0
Item 7	3	2	2.5
Item 8	2	1	1.5
Item 9	1	1	1.0
Item 10	1	2	1.5
Item 11	1	2	1.5
Item 12	2	2	2.0
Item 13	2	2	2.0
Item 14	5	4	4.5
Item 15	2	2	2.0
Item 16	2	2	2.0
Item 17	1	1	1.0
Item 18	1	1	1.0
Item 19	1	1	1.0
Item 20	1	1	1.0
Item 21	2	3	2.5
Item 22	4	3	3.5
Item 23	6	5	5.5
Item 24	1	1	1.0
Item 25	1	1	1.0
Mean (SD)	1.96 (1.40)	1.92 (1.22)	1.94 (1.30)
Median	1	2	1.5

by Lawshe.^{21,22} According to this methodology the quality of a test can be guaranteed when values above .58 points are produced. In addition, the degree of comprehension of each item in the sample used was high.

Adaptations, translations, and validations of questionnaires are necessary for these instruments to be used in populations other than the original ones.^{23,24} In this aspect, despite the fact that these are elementary translations, a methodological verification of the procedure needs to be established for their practical application in the population under study.

The translation procedure followed the validation scale of Beaton et al.,¹⁹ like other translation and validation studies, for example, the translation and validation of this same scale in its Hungarian version.²⁵ Likewise, the model used by the authors for the translation of the Spanish version of the YFAS 2.0 scale for the adult population¹⁶ was followed, since two bilingual translators were consulted to translate the original version from English into Spanish and, then perform the back-translation with two native translators so as to achieve a consensus between the two translations and obtain a more accurate scale.

The initial translation of the questionnaire into Spanish did not result in too many discrepancies between the translators, as shown in Table 1. In fact, there being no items or words that did not have cultural equivalence facilitated the work. Only initial problems were encountered, which were solved in a coordinated manner among the translators. Questions 3, 14, and 23 presented problems in certain words or the need for adaptation for use in the Spanish environment; nevertheless, an agreement was reached between translators, thus rectifying this initial problem, and corroborating it later in the back-translation.

Once the questionnaire had been obtained, the panel of experts was asked to study the face and content validity of the instrument. There is no consensus in the literature on the number of participants needed to make up a committee of experts, but in general, it is estimated that there should be more than 10 people, because then the possibility of random agreement decreases.²⁶ In this case, being a construct with a psychiatric, psychological and nutritional health perspective, 21 specialists were involved, including psychiatrists,

Table 2

Face validity (clarity) of the YFAS-C questionnaire in Spanish.

Expert N°	CLARITY (0 = not clear; 1 = clear)																					Total	CVR	CVR'
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	N° of relevant consensuses		
Item 1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 3	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 4	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	16	.524	.762 ^b
Item 5	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	18	.714	.857 ^b
Item 6	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	19	.810	.905 ^b
Item 7	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	18	.714	.857 ^b
Item 8	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	19	.810	.905 ^b
Item 9	1	1	1	1	0	1	1	1	1	1	0	0	1	1	1	1	1	1	1	1	1	18	.714	.857 ^b
Item 10	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	18	.714	.857 ^b
Item 11	1	0	1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	1	1	1	1	17	.619	.810 ^b
Item 12	1	1	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	16	.524	.762 ^b
Item 13	1	1	1	1	0	0	1	1	1	1	1	0	1	0	0	1	1	1	1	1	0	15	.429	.714 ^b
Item 14	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0	17	.619	.810 ^b
Item 15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	20	.905	.952 ^b
Item 16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 17	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	18	.714	.857 ^b
Item 18	1	1	1	1	0	0	1	1	1	1	0	1	1	0	0	1	1	1	1	0	0	14	.333	.667 ^b
Item 19	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	19	.810	.905 ^b
Item 20	1	1	1	1	1	0	1	1	1	0	1	0	1	0	0	1	1	1	1	0	1	15	.429	.714 ^b
Item 21	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 22	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 23	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 24	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	19	.810	.905 ^b
Item 25	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	17	.619	.810 ^b
Content Validity Index (CVI) clarity																							.733	.867
Content Validity Index (CVI) (acceptable only)																							1.000	.832

CVR: Content Validity Ratio = $(N^{\circ} \text{ of relevant consensuses} - (N^{\circ} \text{ experts} / 2)) / (N^{\circ} \text{ experts} / 2)$.CVR': Content Validity Ratio modified by Tristán = $N^{\circ} \text{ of relevant consensuses} / n. \text{ experts}$.CVI: Content Validity Index = $\sum CVR / \text{Total items}$.CVI: Content Validity Index (acceptable only) = $\sum CVRi / \text{Total acceptable items}$.

CVRi: Content Validity Ratio of acceptable items.

^a Acceptable items for CVR (≥ 1).^b Acceptable items for CVR' ($> .58$).

Table 3

Face validity (precision) of the YFAS-C questionnaire in Spanish.

Expert N°	PRECISION (0 = not precise; 1 = precise)																				Total	CVR	CVR'	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			N° of relevant consensuses
Item 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	19	.810	.905 ^b
Item 4	1	0	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	1	17	.619	.810 ^b
Item 5	1	1	1	1	0	0	1	1	1	0	1	0	1	1	1	1	1	0	1	1	1	16	.524	.762 ^b
Item 6	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	18	.714	.857 ^b
Item 7	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	18	.714	.857 ^b
Item 8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 9	1	1	1	1	0	1	1	1	1	1	0	0	1	1	0	1	1	1	1	1	1	17	.619	.810 ^b
Item 10	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	0	1	18	.714	.857 ^b
Item 11	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	1	17	.619	.810 ^b
Item 12	1	0	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	16	.524	.762 ^b
Item 13	1	0	1	1	0	0	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	15	.429	.714 ^b
Item 14	1	1	1	1	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0	16	.524	.762 ^b
Item 15	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 17	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	19	.810	.905 ^b
Item 18	1	0	1	1	0	0	1	1	1	1	0	1	1	0	0	1	1	1	1	0	0	13	.238	.619 ^b
Item 19	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	18	.714	.857 ^b
Item 20	1	0	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1	1	1	0	1	16	.524	.762 ^b
Item 21	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 22	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	19	.810	.905 ^b
Item 23	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 24	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 25	1	0	1	1	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	16	.524	.762 ^b
Content Validity Index (CVI) precision																						.726	.863	
Content Validity Index (CVI) (acceptable only)																						1.000	.832	

CVR: Content Validity Ratio = $(N^{\circ} \text{ of relevant consensuses} - (N^{\circ} \text{ experts} / 2)) / (N^{\circ} \text{ experts} / 2)$.CVR': Content Validity Ratio modified by Tristán = $N^{\circ} \text{ of relevant consensuses} / N^{\circ} \text{ experts}$.CVI: Content Validity Index = $\sum \text{CVR} / \text{Total items}$.CVI: Content Validity Index (acceptable only) = $\sum \text{CVRi} / \text{Total acceptable items}$.

CVRi: Content Validity Ratio of acceptable items.

^a Items acceptable for CVR (≥ 1).^b Items acceptable for CVR' ($> .58$).

Table 4

Face validity (comprehension) of YFAS-C questionnaire in Spanish.

Expert N°	Comprehension (0 = not understood; 1 = understood)																					Total	CVR	CVR'
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	N° relevant consensuses		
Item 1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	19	.810	.905 ^b
Item 4	1	0	1	1	0	1	1	1	1	0	1	1	1	0	1	1	1	1	1	0	0	15	.429	.714 ^b
Item 5	1	1	1	1	0	0	1	1	1	1	1	0	1	1	0	1	1	1	1	0	1	16	.524	.762 ^b
Item 6	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 7	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	18	.714	.857 ^b
Item 8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 9	1	1	1	1	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	19	.810	.905 ^b
Item 10	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 11	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	18	.714	.857 ^b
Item 12	1	0	1	1	0	0	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	15	.429	.714 ^b
Item 13	1	0	1	1	0	0	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	15	.429	.714 ^b
Item 14	1	0	1	1	0	1	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0	15	.429	.714 ^b
Item 15	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	.714	.857 ^b
Item 16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	21	1.000 ^a	1.000 ^b
Item 17	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	19	.810	.905 ^b
Item 18	1	1	1	1	0	0	1	1	1	1	0	1	1	0	1	1	1	1	1	0	0	15	.429	.714 ^b
Item 19	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	18	.714	.857 ^b
Item 20	1	1	1	1	1	0	1	1	1	0	1	0	1	0	1	1	1	1	1	0	1	16	.524	.762 ^b
Item 21	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 22	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 23	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 24	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	.905	.952 ^b
Item 25	1	1	1	1	0	0	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	17	.619	.810 ^b
Content Validity Index (CVI) precision																							.741	.870
Content Validity Index (CVI) (acceptable only)																							1.000	.840

CVR: Content Validity Ratio = $(N^{\circ} \text{ of relevant consensuses} - (N^{\circ} \text{ experts} / 2)) / (N^{\circ} \text{ experts} / 2)$.CVR': Content Validity Ratio modified by Tristán = $N^{\circ} \text{ of relevant consensuses} / N^{\circ} \text{ experts}$.CVI: Content Validity Index = $\sum CVR / \text{Total items}$.CVI: Content Validity Index (acceptable only) = $\sum CVR_i / \text{Total acceptable items}$.

CVRi: Content Validity Ratio of acceptable items.

^a Items acceptable for CVR (≥ 1).^b Items acceptable for CVR' ($> .58$).

Table 5

Validity of the content of the YFAS-C questionnaire in Spanish.

Expert N°	Content validity (0 = nor relevant; 1 = not very relevant; 2 = relevant)																					Total	CVR	CVR'
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	N° of relevant consensuses		
Item 1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	21	1.000 ^a	1.000 ^b
Item 2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	2	2	2	2	1	18	.714	.857 ^b
Item 3	1	2	2	2	2	2	1	2	2	2	2	2	2	2	1	2	1	2	2	2	1	16	.524	.762 ^b
Item 4	1	0	2	1	1	2	2	2	2	1	2	2	2	0	0	2	2	2	2	2	0	13	.238	.619 ^b
Item 5	1	0	2	1	1	2	2	1	2	1	2	1	1	1	1	2	2	1	2	1	0	8	-.238	.381
Item 6	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	19	.810	.905 ^b
Item 7	0	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	1	2	1	17	.619	.810 ^b
Item 8	1	2	2	2	2	2	2	2	2	2	2	1	2	2	0	2	1	2	1	2	1	15	.429	.714 ^b
Item 9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	20	.905	.952 ^b
Item 10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	20	.905	.952 ^b
Item 11	1	0	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2	1	2	1	16	.524	.762 ^b
Item 12	1	1	2	1	1	2	2	2	2	1	2	1	2	2	2	2	2	1	2	2	1	13	.238	.619 ^b
Item 13	1	1	2	1	1	2	2	2	2	2	2	2	2	0	2	2	2	2	2	1	1	14	.333	.667 ^b
Item 14	2	1	2	2	2	2	1	2	2	1	2	1	2	2	1	2	2	2	1	1	1	13	.238	.619 ^b
Item 15	2	1	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	19	.810	.905 ^b
Item 16	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	21	1.000 ^a	1.000 ^b
Item 17	2	1	2	2	2	2	1	2	2	2	2	2	2	2	1	2	2	2	2	2	2	18	.714	.857 ^b
Item 18	2	1	2	2	2	2	1	2	2	2	2	2	2	0	0	2	2	2	2	1	1	15	.429	.714 ^b
Item 19	2	2	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20	.905	.952 ^b
Item 20	2	2	2	2	2	2	2	2	2	1	2	2	1	1	1	2	2	2	1	2	2	16	.524	.762 ^b
Item 21	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	20	.905	.952 ^b
Item 22	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	20	.905	.952 ^b
Item 23	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	18	.714	.857 ^b
Item 24	2	1	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2	2	2	2	19	.810	.905 ^b
Item 25	2	2	2	2	2	2	2	2	2	2	2	2	2	1	0	2	2	2	2	2	2	19	.810	.905 ^b
Content Validity Index (CVI)																							.630	.815
Content Validity Index (CVI) (acceptable only)																							1.000	.833

CVR: Content Validity Ratio = $(N^{\circ} \text{ of relevant consensuses} - (N^{\circ} \text{ experts} / 2)) / (N^{\circ} \text{ experts} / 2)$.CVR': Content Validity Ratio modified by Tristán = $N^{\circ} \text{ of relevant consensuses} / N^{\circ} \text{ experts}$.CVI: Content Validity Index = $\sum \text{CVR} / \text{Total items}$.CVI: Content Validity Index (acceptable only) = $\sum \text{CVRi} / \text{Total acceptable items}$.

CVRi: Content Validity Ration of acceptable items.

^a Items acceptable for CVR (≥ 1).^b Items acceptable for CVR' ($> .58$).

psychologists, dieticians-nutritionists, doctors, nurses, paediatricians, and sociologists.

The quantitative verification of relevance by judges resulted in a final version of the scale in Spanish. For this verification, the CVI and CVR, as defined by Lawshe,²¹ or his modified models (CVR')²² were used. The mean CVR of all acceptable items was then calculated to obtain the CVI of the whole test, which provided agreement between the capacity (skill, competence, knowledge, etc.) requested in a specific domain and the performance requested in the test that attempts to measure that domain.

Following this methodology, the data obtained from the CVR' for clarity, precision, and comprehension were acceptable for all items (>.58), as well as the CVI for the whole test, as shown in Tables 2, 3, and 4. The model modified by Tristán²² was selected to make the decision because, as reflected in the literature, the CVR' is constant, regardless of the number of experts on the committee.^{21,22}

In relation to content validity, following the above model, a CVI=.83 was obtained for the whole test, i.e., the overall test index is 83% and thus higher than $n=.58$, therefore, it follows that the test is acceptable as a whole, as can be seen in Table 5. These figures are similar to those obtained in the consistency analysis of Magyar et al.²⁵ for the translation and adaptation of the original questionnaire to the Hungarian version.

Despite its implications, the limitations of the study are worth bearing in mind. Although a panel of experts with a health profile and expertise in this field was used, their feedback may indicate a subjective perspective and, therefore, the study may be subject to bias among them (despite the methodology used). Furthermore, the sample used was selected from a community sample, and it is essential to continue towards validating the S-YFAS-C in a clinical sample of children diagnosed with obesity, binge eating disorder, as well as other pathologies which may involve this clinical condition, and thus assess comprehension according to the pathology. Likewise, it would also be useful to assess the socio-cultural and economic level of the families and school children, evaluating potential differences in comprehension in that context.

However, despite the aforementioned limitations, the linguistic comprehension obtained in the sample shows that the questionnaire is easy to understand and there are no major differences between ages when it comes to the target population's understanding of the questionnaire. To ascertain this, the authors considered that when more than 20% of the sample interpreted that the sentence of a particular item was not understandable, it should be revised. Thus, items 9, 15, 16, and 23 were identified as the only items where there could be difficulty in understanding, and they were therefore partially modified for better comprehension. On the other hand, item 18 was the only item that showed differences between age groups, and it was the youngest school children who presented this difficulty. Therefore, this question was again adjusted to ensure that younger pupils would obtain a better level of comprehension.

In short, with this study we have obtained a validated version, translated, and adapted to Spanish to assess food addiction in children (S-YFAS-C). Future studies will continue with a psychometric analysis of this validation, the scores of each item will be compared between groups according to their characteristics and, eventually it will be possible to evaluate the potential degree of food addiction presented by the Spanish-speaking paediatric population.

Funding

This study is part of the PRETA project funded by the Fundación Canaria Instituto de Investigación Sanitaria de Canarias (FIISC) during 2020, in relation to the granting of aid for the financing of

Research, Development, and Innovation Projects aimed at meeting health needs (project number: PIFIISC20/34). The funders were not involved in the design, analysis, interpretation of the results, or publication of the results.

Conflict of interests

The authors have no conflict of interests to declare.

Acknowledgements

The authors would like to thank Dr Gearhardt for her approval and authorisation to perform this translation and validation of the YFAS-C questionnaire in a Spanish-speaking paediatric population. We also thank the members of the expert committee for their collaboration, as well as the children who collaborated in this study.

Appendix. Additional material

Additional material to this article can be consulted in its electronic version available at <https://doi.org/10.1016/j.rpsm.2021.11.006>.

References

- Kelishadi R. Childhood overweight, obesity, and the metabolic syndrome in developing countries. *Epidemiol Rev*. 2007;29:62–76.
- Monteiro CA, Moubarac J-C, Cannon G, Ng SW, Popkin B. Ultra-processed products are becoming dominant in the global food system. *Obes Rev*. 2013;14(suppl 2):21–28.
- Weng SF, Redsell SA, Swift JA, Yang M, Glazebrook CP. Systematic review and meta-analyses of risk factors for childhood overweight identifiable during infancy. *Arch Dis Child*. 2012;97:1019–1026.
- Gordon EL, Ariel-Donges AH, Bauman V, Merlo LJ. What is the evidence for “food addiction”? A systematic review. *Nutrients*. 2018;10 [consulted 11 Apr 2021]. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5946262/>.
- Meule A, Hermann T, Kübler A. Food addiction in overweight and obese adolescents seeking weight-loss treatment. *Eur Eat Disord Rev*. 2015;23:193–198.
- American Psychiatric Association, American Psychiatric Association, DSM-5 Task Force. *Manual diagnóstico y estadístico de los trastornos mentales: DSM-5*. Buenos Aires: Editorial Médica Panamericana; 2020.
- CIE-11. World Health Organization. International classification of diseases for mortality and morbidity statistics (11th Revision). 2018. Available at: <https://icd.who.int/browse11/l-m/en>.
- Naish KR, MacKillop J, Balodis IM. The concept of food addiction: A review of the current evidence. *Curr Behav Neurosci Rep*. 2018;5:281–294.
- Richmond R, Roberto CA, Gearhardt A. The association of addictive-like eating with food intake in children. *Appetite*. 2017;117:82–11790.
- Imperatori C, Fabbriatore M, Vumbaca V, Innamorati M, Contardi A, Farina B. Food addiction: Definition, measurement and prevalence in healthy subjects and in patients with eating disorders. *Riv Psichiatr*. 2016;51:60–65.
- Yekaninejad MS, Badrooj N, Vosoughi F, Lin C-Y, Potenza MN, Pakpour AH. Prevalence of food addiction in children and adolescents: A systematic review and meta-analysis. *Obes Rev*. 2021;22. <http://dx.doi.org/10.1111/obr.13183>.
- Gearhardt AN, Corbin WR, Brownell KD. Preliminary validation of the Yale Food Addiction Scale. *Appetite*. 2009;52:430–436.
- Gearhardt AN, Corbin WR, Brownell KD. Development of the Yale Food Addiction Scale Version 2.0. *Psychol Addict Behav*. 2016;30:113–121.
- Schielt ET, Gearhardt AN. Preliminary validation of the Yale Food Addiction Scale for Children 2.0: A dimensional approach to scoring. *Eur Eat Disord Rev*. 2018;26:605–617.
- Gearhardt AN, Roberto CA, Seamans MJ, Corbin WR, Brownell KD. Preliminary validation of the Yale Food Addiction Scale for children. *Eat Behav*. 2013;14:508–512.
- Granero R, Jiménez-Murcia S, Gearhardt AN, et al. Validation of the Spanish version of the Yale Food Addiction Scale 2.0 (YFAS 2.0) and clinical correlates in a sample of eating disorder, gambling disorder, and healthy control participants. *Front Psychiatry*. 2018;9:208.
- Valdés-Moreno MI, Rodríguez-Márquez MC, Cervantes-Navarrete JJ, Camarena B, de Gortari P. Traducción al español de la escala de adicción a los alimentos de Yale (Yale Food Addiction Scale) y su evaluación en una muestra de población mexicana. *Análisis factorial. Salud Ment*. 2016;39:295–302.
- López-Ibor Aliño JJ, Valdés Miyar M, American Psychiatric Association. *Manual diagnóstico y estadístico de los trastornos mentales*. Barcelona: Masson; 2003.
- Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*. 2000;25:3186–3191.

20. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33:159–174.
21. Lawshe CH. A quantitative approach to content validity. *Pers Psychol*. 1975;28:563–575.
22. Tristán-López A. *Modificación al modelo de Lawshe para el dictamen cuantitativo de la validez de contenido de un instrumento objetivo*. 2008 [consulted 11 Apr 2021]. Available at: /paper/Modificaci%C3%B3n-al-modelo-de-Lawshe-para-el-dictamen-Trist%C3%A1n-L%C3%B3pez/401781bf691f0c15965fcf667e98a48e4899165.
23. Carvajal A, Centeno C, Watson R, Martínez M, Sanz Rubiales A. ¿Cómo validar un instrumento de medida de la salud? *An Sist Sanit Navar*. 2011;34:63–72.
24. Martín Arribas MC. Diseño y validación de cuestionarios. *Matronas Profesión*. 2004;5:23–529.
25. Magyar EE, Tényi D, Gearhardt A, et al. Adaptation and validation of the Hungarian version of the Yale Food Addiction Scale for Children. *J Behav Addict*. 2018;7:181–188, <http://dx.doi.org/10.1556/2006.7.2018.03>.
26. Ecurra LM. Cuantificación de la validez de contenido por criterio de jueces. *Rev Psicol*. 1988;6:103–111.