The SCOFF - c : psychometric properties of the Catalan version in a Spanish adolescent sample.

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Running head: Psychometric properties of SCOFF-c.

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Abstract

Objective: To validate the Catalan version of the SCOFF with a community sample of adolescents. **Method:** A community sample of 954 participants (475 girls and 479 boys), aged between 10.9 and 17.3 years old, from the city of Barcelona, and a risk group of 78 participants (35 men and 43 women), derived from the community sample, that have exceeded percentile ≥ 95 in at least two of these three scales of EDI-2: Drive for thinness, Bulimia and Body dissatisfaction. **Results:** There were significant differences in total SCOFF scores across gender and school grades. The SCOFF best cut-off point was 2 (sensitivity of 73.08% and specificity of 77.74%). Concurrent validity with the EDI-2 varied between low and medium. Reliability of the SCOFF was medium. Exploratory factor analysis of the SCOFF showed a two-factor structure for the total sample and for girls and one factor for boys. **Conclusion:** The best cut-off point for this community sample is 2. The data suggests that the SCOFF could be a useful screening questionnaire enabling to detect possible at-risk groups for eating disorders among adolescent Spanish community samples.

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Introduction

Eating disorders (ED) are severe health problems of multifactor aetiology and one of the most common disorders among adolescents. Spanish ED's prevalence rates range from 3.4% (1) to 5.89% (2) in adolescents and youths aged between 12 and 21 years old.

The high prevalence of ED among adolescents highlights the importance of early detection. Questionnaires such as Eating Attitudes Test: EAT-26 (3), Eating Disorders Inventory-2: EDI-2 (4) and Eating Disorder Examination-Self-report Questionnaire version, EDE-Q (5) have been used to detect individuals at risk of ED.

Some authors have developed different screening tests which are shorter and easier to use in Primary care. Slade and Dewey (6) developed the Setting Conditions for Anorexia Nervosa Scale (SCANS), which includes forty items distributed in five scales. Morgan, Reid, and Lacey (7) devised the SCOFF, a questionnaire comprising five dichotomous items which assesses loss of control over eating, purging and body dissatisfaction. The SCOFF has been adopted as a standard screening instrument in the United Kingdom. It is a reliable and valid screening tool which has been translated into Italian and Spanish (8, 9, 10). Even though the cut-off point is the same, sensitivity and specificity values are different in these studies. Probably, cultural influence, sample age and recruitment could explain these differences. Anstine and Grinenko (11) proposed five questions for assessing dieting, body dissatisfaction and purging among American university students. Waaddegaard, Thoning and Peterson (12) developed the RiBED-8 (Risk Behaviour Related to Eating Disorders—8 items) to estimate risk of ED in the Danish population.

The aim of this study was to validate the Catalan version of the SCOFF with a community sample of adolescents. Catalan is Spain's second most widely spoken language, spoken by 12 million people who live in Spain (Catalonia, Valencia, and Balearic Islands), Andorra and some parts of France.

Methods

Participants

The initial sample included 1157 participants (51.22% males and 48.8% females) with an age range of 10.9 to 17.3 years (mean 13.6 years; standard deviation 1.31) from compulsory primary and secondary education (grades 6th to 10th). Eighteen schools in the city of Barcelona (both state and private) were randomly selected and twelve agreed to participate in the study. Questionnaires of 203 participants (17.55%) were incomplete and therefore eliminated, thus leaving a final sample of 954 participants (50.21% males and 49.79% females; mean age 13.5 years, standard deviation 1.33). Participants of this study were not remunerated, and none refused to answer the questionnaires. Recruiting phase was from May of 2003 until February of 2004. The socioeconomic status of the sample was in the medium range (13).

The non risk group comprised 876 participants (444 boys and 432 girls); the risk group comprised 78 participants (35 boys and 43 girls), accounting for 4.51% of the females and 3.67% of males from the final sample. The at-risk group was selected according to the scores of EDI-2. Participants who had a percentile ≥ 95 in, at least, two of three scales of EDI-2: Drive for thinness, Bulimia and Body dissatisfaction were considered at-risk group. This percentile was calculated separately for boys and girls. Garner, Olmstead and Polivy (14) argued that these scales are the best for assessing symptomatology related to ED. Figure 1 shows the community and risk sample distribution.

INSERT HERE FIGURE 1

Measures

The SCOFF (7) includes five items designed to detect at-risk populations for ED. With the permission of the authors the SCOFF was translated into Catalan; both forward and back translations were carried out by two psychologists who were fluent in both English and Catalan. Final version was drawn up after linguistic and conceptual appraisal of the meaning of the items and was then presented to the authors, who agreed with the Catalan version (see appendix).

The five items are rated on a dichotomous point scale (No = 0; Yes = 1). Total raw score ranging between 0 and 5. A total score higher than or equal to 2 identifies the participant as belonging to an at-risk group for ED.

Studies from America and Europe report reliability coefficients ranging between .43 (8) and .47 (9). Test-retest reliability, measured after a ten- or fifteen-day interval, showed most coefficients above .97 (10).

The SCOFF presented 100% sensitivity and 87.5% specificity in detecting the likelihood of anorexia nervosa (AN) and bulimia nervosa (BN) for a score higher than or equal to 2 with clinical samples. Other studies showed sensitivity between 78% and 97.7%, and specificity coefficients between 21% and 94.4%, for a score higher than or equal to 2. Rueda et al. (8) found sensitivity of 81.9% and specificity of 78.7% in a community sample of Colombian adolescents. Siervo et al. (9) presented sensitivity and specificity coefficients for two different cut-off points: for a score equal to or higher than 2 (sensitivity = 94%; specificity = 21%), and for a score equal to or higher than 3 (sensitivity = 77%; specificity = 50%). See Table 1.

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Siervo et al. (9) reported concurrent validity data for SCOFF, Three Factor Eating Questionnaire: TFEQ (15) and Eating Attitudes Test: EAT 26 (3). Significant correlations between SCOFF, EAT-26 and TFEQ scores were found, with values of .31 (*Disinhibition* and *Hunger* scales of TFEQ), .36 (TFEQ Total score) and .34 (Dieting, Food Preoccupation, and Total Score of the EAT-26).

The Eating Disorder Inventory-2: EDI-2 (4) is a widely used self-report instrument for measuring attitudes and behaviours related to anorexia and bulimia nervosa. Comprises eleven scales: *Drive for Thinness*, *Body Dissatisfaction*, *Perfectionism*, *Ineffectiveness*, *Interpersonal Distrust*, *Interoceptive Awareness*, *Maturity Fears*, *Asceticism*, *Impulse Regulation*, and *Social Insecurity*.

The reliability of EDI-2 scales using raw scores ranges between .42 and .94 for females, and between .39 and .87 for males (16, 17, 18). The EDI-2 has been found to be a valid and reliable instrument in a wide range of different settings and has been translated into many different languages including Dutch, Spanish, Japanese, Hebrew and Russian (17, 4, 18, 19, 20, 21). Spanish version of EDI-2 was used because Catalan version is not still validated.

Procedure

Participants were asked to complete EDI-2 and SCOFF. Two trained psychologists administered the questionnaires during tutorial classes. Questionnaires were anonymous; the only personal information participants were asked to provide was gender, date of birth and parents' level of education and jobs. The assessment process was approved by the principal and the school staff. A formal letter, signed by the principal of the school, and one of the authors of this study (PM), was also sent to all parents where the procedure of study was explained; participants were also requested to assent to participate in the study. School psychologist was informed about the at-risk group and clinic derivation was recommended if it was necessary.

Data analysis

Sensitivity and specificity index were calculated for all possible SCOFF cut-off points. A Receiver Operating Characteristics (ROC) was calculated to estimate the discriminant capacity. Sensitivity refers to the proportion of risk group members who are detected by the SCOFF (true positive rate). Specificity refers to the proportion of community participants (no-risk) who are identified by the SCOFF as normal community participants (true negative rate). Positive predictive value is the proportion of positive SCOFF results that are true positives. Negative predictive value is the proportion of negative test results that are true negatives.

Concurrent validity of SCOFF and EDI-2 was analysed using Pearson correlations. Exploratory factor analysis (EFA) was performed using principal component factoring (PCF) and oblique rotation as the factors were assumed to be related (22).

Results

Descriptive data

There was significant gender differences in total SCOFF score: (z = -5.969, p < .001); girls presented higher mean rank than boys (girls = 553.83, boys = 452.49). There was also a significant school grade effect (χ^2 = 17.788, p = .001); differences are shown between 7th and 6th grade, and between 6th and 9th grade (Mean rank 6th grade = 458.48; 7th grade = 535.49; 9th = 522.36). There were also significant differences between 7th and 10th grade, between 8th and 10th grade, and between 9th and 10th (Mean rank 7th grade = 535.49, 8th grade = 509.45; 9th grade = 522.36, 10th grade = 440.15). See Table 2.

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Discriminant validity of SCOFF raw scores was analysed to classify both the at-risk and non risk groups. Table 3 summarizes the sensitivity, specificity index, predictive positive value and negative predictive value for different SCOFF cut-off points. The best SCOFF cut-off point is 2, with a sensitivity of 73.08% and a specificity of 77.74%. The decision to choose this cut-off point is because it's the best one that combines sensitivity and specificity index. A 22.26% of the non risk group (14.41% boys and 30.32% girls) and a 73.08% of the at-risk group (57.14% boys and 86.05% girls), exceeded the cut-off of 2. Figure 2 shows ROC curve. The area under the curve was .818 (95% CI of Area: .771 to .865).

INSERT FIGURE 2

Table 4 shows the Pearson correlations between SCOFF total score and EDI-2 scale scores. Most of the correlations were low but significant. Medium and significant correlations were found between SCOFF total score and EDI-2 scales *Drive for Thinness* (.63) and *Body Dissatisfaction* (.53).

INSERT TABLES 3 and 4

Factor analysis

The EFA revealed a two-factor structure with eigenvalues greater than 1 which explained 55.57% of the variance. Table 5 shows item loading on each factor and the explained variance. Factor 1 (*Loss of control over food*) included items related to cognitive aspects as control over food and body image; factor 2 (*Purging behaviours*) included two items related to behaviour as to provoke vomiting and having eaten too much.

Due to the differential effect according to gender on SCOFF total raw score (Mann-Whitney U = -5.969; p < .001), and the differences in prevalence of eating disorders between boys and girls (23), a second EFA was carried out. Table 5 shows the factors for girls and boys. For girls, two factors with eigenvalues greater than 1 were obtained. Factor structure is the same as the total sample one. For boys, only one factor with an eigenvalue greater than 1 was obtained. Reliability coefficients for factors ranged between .24 and .59. Reliability of total SCOFF was .54.

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Discussion

This study presents discriminant and concurrent validity, internal consistency and factor structure of SCOFF for a community sample of Spanish adolescents.

SCOFF cut-off point, that best combines sensitivity and specificity values, is similar to those reported in other studies and is the same as the cut-off proposed by the authors of the SCOFF (24, 9, 10).

For the sample of adolescents in this study, sensitivity and specificity index are lower than in other studies (7, 8). This is likely to be explained by sample differences, particularly age and recruitment. Firstly, previous studies have been carried out on adult samples, whereas to our knowledge this is the first attempt to validate the SCOFF in a younger Spanish population. Secondly, the present study recruited from community participants rather than a clinical sample. Sampling from a clinical population is always susceptible to Berkson's Bias which accounts for over-estimation of co-morbidity, as participants with multiple pathologies are more likely to seek treatment than those with a single disorder.

Sensitivity and specificity index, for the cut-off of 2, and area under the curve are lower than Garcia Campayo et al (10) but similar to Rueda et al. (8). It is important to note

Concurrent validity of SCOFF and EDI-2 varies between low and medium. The highest correlations were between SCOFF total score and EDI-2 scales *Drive for thinness* and *Body dissatisfaction*. It is important to note that these two scales are the best to measure symptomatology related to ED and people in risk for ED.

Internal consistency of SCOFF was low but higher than in other studies (8, 9) and is higher for girls than boys. This coefficient shows that the SCOFF is assessing different aspects of ED and that each one makes a specific and significant contribution to the process of identifying ED symptoms.

As regards factor structure of SCOFF, two factors were obtained for both the total sample and the group of girls; only one factor was obtained for the group of boys. These results suggest that girls make a greater distinction between their food concerns and dietary habits associated with ED than do boys. However, given the differential prevalence of ED between males and females, further studies are required with both community and clinical samples in order to replicate these findings.

The use of short and easy-to-administer screening tests that do not require specialist interpretation save both time and energy, and enable more time to be dedicated to a subsequent, more specialized assessment stage. Data of this study suggests that SCOFF could be a useful questionnaire that would be quick and easy to administer in primary care settings, enabling the detection of possible at-risk groups for ED among community samples. As such, the Catalan SCOFF (SCOFF – c) could be adopted by non-specialists as a means of raising their index of suspicion of a likely case of bulimia

or anorexia nervosa. This is consistent with the findings of other authors in different contexts (25, 8). These issues are relevant to both the early detection of ED and for monitoring the course of treatment.

This is the first Catalan validation of this questionnaire in an adolescent community sample. Some of the limits of this study were that the SCOFF was designed for clinical sample but in this study it was used for community sample. Also, the sample of this study is from the city of Barcelona and the age of participants is lower than other studies. Care should be taking in extrapolating the results to Spanish population.

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