Abstract

Objective: To explore the psychometric properties of the Cross-Cultural Questionnaire (CCQ), a new self-report tool for assessing factors of risk and maintenance for eating disorders (ED). Method: Data was collected during a multi-centre case-control study. The sample included 854 ED patients and 784 healthy participants from the UK, Spain, Austria, Slovenia and Italy. Exploratory factor analyses examined the factor structure of each section of the CCQ, and Cronbach's alpha coef- fi cients valued the internal consistency of each derived scale score. Logistic regression and receiver operating characteristic (ROC) curve procedure assessed the screening accuracy and predictive validity of the empirical factors. Results: Based on a total of 127 items, nine dimensions emerged, with satisfactory internal consistency and high congruence between countries. CCQ scores demonstrated satisfactory accuracy for discrimi- nating between ED cases and controls (area under the ROC curve = 0.88). Most of the items achieved discriminative accuracy. Conclusions: This study offers preliminary evidence that the CCQ, available in fi ve languages, is a useful and valid tool to assess factors of risk and maintenance for EDs.

## INTRODUCTION

There has been a considerable amount of research into identifying risk factors for developing psychiatric distur- bances in general, and for eating disorders (ED) in particu- lar (see, e.g., Karwautz, 2003; Stice, 2002). Some of the putative risk factors identifi ed for ED are shared with other psychiatric disorders (Wilson, 2010), whereas other factors seem to be specifi c for dieting (Calado, Lameiras, Sepulveda, Rodríguez & Carrera, 2010; Fairburn, Cooper, Doll, & Welch, 1999; Fairburn, Welch, Doll, Davies, & O'Connor, 1997; Fairburn et al., 1998; Micali & Treasure, 2009). However, the differentiation of the putative risk factors between the three eating disorder syndromes (anorexia nervosa [AN], bulimia nervosa [BN] and eating disorders not otherwise specifi ed [EDNOS]) is unclear (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004). The aim of the present study is to provide a self-report questionnaire, suitable for the identifi cation of factors of risk and mainte- nance for the several subtypes of EDs.

### Individual and Family Eating Patterns and Family Style

Previous research suggests that the family context plays an important role in the development and maintenance of EDs (Bean & Weltzin, 2001; Senra, Sánchez-Cao, Seoane, & Leung, 2007) and that family attitudes towards food also have a major infl uence on the aetiology of eating problems (Taylor et al., 2006; Webster & Palmer, 2000). Specifi c early eating patterns during childhood (skipping breakfast, excessively consuming sweets, confl icts and diffi culties around meals, problematic eating, not having regular meal patterns or using food as a reward) seem to be related to a later ED, and maladaptive paternal atti- tudes towards food are also associated with the develop- ment of BN (Fernández-Aranda et al., 2007a; Krug et al., 2008; Micali et al., 2007). In addition, other studies show that parental rejection and overprotection are predictive of eating psychopathology (Jones, Leung, & Harris, 2006), and that patients with AN perceive less autonomy towards their parents than their healthy sisters do (Karwautz et al., 2003). Therefore, early environmental and family eating patterns, attitudes towards food and parental style may be included as part of the ED assessment.

### Social Ideals of Thinness and Body Shape Dissatisfaction

The infl uence of peers, parents and the media, including teasing and concerns about weight and dieting, may predispose young women to develop body image disturbances and eating dysfunctions (Haines & Neumark-Sztainer, 2006; Keery, van den Berg, & Thompson, 2004). The desire to be thinner during child-hood appears to be more prone in young girls, for whom media and peer infl uences seem to be very relevant (Clark & Tiggemann, 2006). Likewise, since the DSM-IV-TR (APA, 2000a) includes body shape dissatisfaction as a criterion for the diagnosis of AN and BN, it is essential to assess this ED component appropriately. Some question- naires, for example, the well-known 'Body Shape Questionnaire' (Cooper,

Taylor, Cooper, & Fairburn, 1987) and the 'Body Image Satisfaction Questionnaire' (Berscheid, Walster, & Bohrnstedt, 1973) have proven especially useful for exploring the role of extreme body dissatisfaction in the development and maintenance of EDs. However, most of these tools are limited to the assessment of one's own current body perceptions, and do not include the own perceptions of relatives or body satisfaction during childhood.

### Common ED Instruments

Clinicians and researchers commonly employ the 'Eating Attitudes Test' (EAT; Garner, Olmsted, Bohr, & Garfinkel, 1982) and the 'Eating Disorders Inventory-2' (Garner, 1991) to assess eating disturbances as well as specific cognitive and emotional components of EDs. In addition, many non-specific ED self-report questionnaires are also available to measure other important factors related to ED, such as personality ('Temperament and Character Inventory-Revised' (Cloninger, 1999)), self-esteem (the 'Rosenberg Self-Esteem Scale' (Rosenberg, 1965)), depres- sion (the 'Beck Depression Inventory' (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961)) or anxiety (the 'State-Trait Anxiety Inventory' (Spielberger, Gorsuch, & Lushene, 1970)). But most of these measurements provide current information, but not childhood or adolescence information.

### Environmental Risk Assessment of Eds

The assessment of the complete environment and history of eating problems is usually conducted through struc- tured interviews, which requires more effort in terms of cost, staff and time than self-administered questionnaires. The availability of a comprehensive self-report question- naire would allow the assessment of factors related to EDs in a wide range of contexts, including those in which it is not feasible to administer an extensive interview by clini- cians. In this scenario, we developed the Cross-Cultural Questionnaire (CCQ), a self-reported questionnaire designed in the context of a multi-centre European project, for the assessment of factors related to the development and maintenance of EDs. Therefore, studying its psycho- metric properties in ED patients would meet the American Psychological Association's recommendation to provide empirical evidence of psychometric properties in the par- ticular setting in which the test is to be used (AERA, APA, & NCME, 1999).

### Aims of the Study

The purpose of this study is to test whether the CCQ can be used with psychometric guarantees to identify factors of risk and maintenance for EDs. Thus, the specific objectives are threefold: (a) to evaluate the internal structure of the CCQ; (b) to determine the internal consistency of the derived scales; and (c) to assess the accuracy of the derived scores to discriminate between ED patients and healthy controls.

METHOD

### Participants

The design corresponds to a case-control study, with the collaboration of six mental-health centres from five European countries: the Eating Disorders Research Unit (Institute of Psychiatry, London, UK), the Eating Disorders Unit (Department of Psychiatry, University Hospital of Bellvitge/Barcelona, Spain), the Eating Disorders Unit of the Department of Child and Adolescent Psychiatry (Medical University of Vienna), the Department of Neurology and Psychiatric Services (University of Florence, Italy), the Department of Psychiatry (Fondazione Centro del Monte Tabor, Milan, Italy) and the University Psychiatric Hospital (University of Ljubljana, Slovenia). Enrolment into the study was between March 2001 and September 2002. The initial sample consisted of 1694 par- ticipants, 903 ED patients and 791 controls, with a mean age of 25.8 years (standard deviation [SD] = 8.8). The majority of the participants (93%) were females.

Case cohort group was recruited from clinical sites, spe- cific therapeutic institutions for ED, self-help groups, ED conferences and announcements in the mass media. All cases fulfilled diagnostic and statistical manual of mental disorders, 4th edition, text revision (DSM-IV-TR) (APA, 2000a) criteria for AN, BN or EDNOS. ED diagnoses for cases were based on the structured clinical interview for DSM IV Axis I disorders (SCID-I) (First, Gibbon, Spitzer, & Williams, 1996), or the Lifetime Diagnostic Interview

(EATATE) (Anderluh, Tchanturia, Rabe-Hesketh, Collier, & Treasure, 2009; Anderluh, Tchanturia, Rabe-Hesketh, & Treasure, 2003) interviews. ED diagnoses were based on a 2-hour structured interview and were consensually derived among members of the clinical team who had participated in the assessment. Disposition decisions were made by psychologists or psychiatrists who completed the anamne- sis together with the treatment team according to pub- lished treatment guidelines (APA, 2000b).

The exclusion criteria for the ED patients group were inability to complete ED assessment because of lack of response to any DSM-IV-TR criterion (18 participants were excluded), cognitive impairment (mental retarda- tion and/or serious medical condition; 2 excluded individuals), current psychotic disorder (2 excluded par- ticipants) and an age younger than 14 years-old (2 exclu- sions). The fi nal case sample included 879 ED patients: 319 from the UK, 262 from Spain, 143 from Italy, 94 from Austria and 61 from Slovenia. 22.1 % had AN-Restrictive (AN-R), 20.1 % AN-Binge-Purging (AN-BP), 32.2% BN and 25.6% EDNOS. The distribution of the ED subtypes across countries was, respectively: UK: 22.4%, 24.1%, 13.7% and 39.8%; Spain: 16.6%, 16.6%, 46.9% and 19.9%; Italy: 30.4%, 23.9%, 41.3% and 4.3%; Austria: 27.8%, 10.1%, 40.5% and 21.5% (data from Slovenia not available). The mean age of onset of the ED was 18.9 years (SD = 5.1), with a minimum age of onset of 12 years old, and the mean duration of the ED was 7.0 years (SD = 5.5). The median of previous treatments was 1 (ranging from 0 to 5). The mean body mass index (BMI) at assessment was 15.71 (SD = 2.14) for AN-R, 16.75 (SD = 2.95) for AN-BP, 22.30 (SD = 5.29) for BN and 20.90 (SD = 4.03) for EDNOS. Participants with AN-BP, BN and EDNOS reported a weekly average of 4.0 (SD = 5.6) binge-eating episodes and 6.0 (SD = 8.4) vomiting episodes.

Healthy controls were recruited from individuals visit- ing the hospital for routine blood tests and were asked to volunteer in a study on factors infl uencing the develop- ment of ED. All controls were from the same catchment areas as index patients. Prior to assessment, healthy con- trols were asked about lifetime or current presence of an ED. If not, SCID-I interview (First et al., 1996) was admin- istered, and the lifetime history of health or mental ill- nesses profi le was based on the general health question naire (GHQ)-28 (Goldberg, 1981), and the EAT-26 (Garner et al., 1982; total score <20) questionnaires.

The exclusion criteria for the control group were being younger than 14 years old, cognitive impairment (mental retardation and/or serious medical condition) or having a lifetime history of serious mental illnesses (psychotic disorder) or eating disorders (6 were excluded for this reason). The fi nal control sample included 785 healthy participants: 231 from Slovenia, 184 from the UK, 160 from Spain, 151 from Italy and 59 from Austria. The mean BMI at assessment was 21.17 (SD = 2.93).

*Measurements*

The *Cross-Cultural Questionnaire* is a self-report question- naire that assesses a wide range of factors related to the development and maintenance of ED (see below). The development of the items was based on two aspects. First, as a starting point two major interviews in the fi eld of EDs were considered: the Oxford Risk Factor Interview (Fairburn et al., 1997, 1998) and the McKnight Risk Factor Interview (Shisslak et al., 1999). Second, the items of the CCQ were developed from focus groups of ED patients from the UK and Spain, who were asked about their early eating behaviours (before the age of 12), and from a con- sensus meeting of a group of expert clinicians from the UK, Spain, Italy, Austria, Finland, Slovenia and France (Healthy Eating Consortium), who had previously carried out a systematic review of the literature on the most important instruments of risk factors for EDs. The com- ponents of this group were psychologists and psychia- trists with extensive clinical and epidemiological experience in this area. After considering content validity of the proposed item, the fi rst version was written in English and then professional translators, in collaboration with clinicians that regularly write in both their native language and English, translated the test from English into Spanish, German, Italian and Slovenian, and then back-translated into English to ensure that the items were valid and coherent. Prior to the fi nal administration of the CCQ, it was tested in a pilot study which included patients from all countries, and amended in the interest of clarity and coherence. During the pilot study, respondents were asked about item content, such as its relevance, adequacy, comprehension and satisfaction.

The whole CCQ consists of the following six sections (a copy of the questionnaire can be requested from the cor- responding author):

Section 1. Demographical information: it includes several questions about the participant and his/her family, such as age, gender, level of education and employment.

Section 2. Eating and weight concerns: it includes 13 items, which assess lifetime problems related to food and weight, in a fi ve-point Likert-type scale.

Section 3. Individual and family eating patterns: it con- tains 29 items about food used such as individualiza- tion, control and rules about food, food used as social glue, healthy eating and food deprivation. The response format of the items varies, depending on the content of each question.

Section 4. Family style, expectations, independence: it is composed of three areas. (a) the fi rst set (section 4A) includes 16 items, which ask about lifetime family style before 12 years of age; (b) the second set (section 4B) has 60 items (labelled 'Satisfaction'), which value the signifi cance to the respondent, friends and parents of 15 aspects (intelligence, professional success, indepen- dence, education, self-discipline, governing own actions, being wife/husband, being mother/father, being homemaker, meeting others' needs, conformity, physical attractiveness, slimness, popularity and physi- cal fi tness), answering with the level of importance that each of the questions has for feeling satisfi ed with life; and (c) the third set (section 4C) includes 30 items (labelled 'Success and confl ict'), which explore the level of success and confl ict with parents in achieving one's own goals, as regards the same 15 aspects (intelligence etc). All these items are assessed through a fi ve-point Likert-type scale, except two dichotomous items in section 4A.

Section 5. Social ideals of thinness: it consists of eight questions, seven items rating one's current body shape (in a 1–10 scale) and one item about lifetime body shape satisfaction (fi ve-point Likert-type scale).

Section 6. Substance use: it contains 13 items about both lifetime and current substance use. The response format of the items varies, depending on the content of each question.

In the current study, all sections were included, except section 3 (individual and family eating patterns), which is analysed and described in detail elsewhere (Fernández- Aranda et al., 2007a; Krug et al., 2009) and section 6 (sub- stance use), which is a very brief screening of current and past use of alcohol and other drugs (not exclusive of ED), also described elsewhere (Krug et al., 2008). In addition, both sections (3 and 6) contain items with a different response format. Thus, 127 items (13 from section 2, 106 from section 4 and 8 from section 5, in addition to demo- graphic information of section 1) were initially considered for the present study.

### Procedure

Entry into the study was voluntary and participants were told they were free to withdraw from the research at any time. After obtaining written consent, cases and controls were assessed by board certifi ed psychologists and psy- chiatrists who had previously been trained in the admin- istration of the assessment tools.

Once recruited, an information sheet at the start of the questionnaires reminded the purpose of the study and the confi dentiality of the data. Ethical approval for the study was obtained from the relevant committees at each site.

## Statistical Analysis

SPSS system 15 for Windows (SPSS Inc., 2006) was used. First, logistic regression models examined the discrimina- tive accuracy of each of the CCQ items to discriminate between cases and controls. Second, exploratory factor analyses were carried out for the whole European clinical sample (case cohort, $n = 879$). Prior to factorization, we explored the frequency distribution of each item in order to exclude those questions with endorsement below 0.05 or above 0.95 (Streiner & Norman, 2003) since they could hinder the factorial adjustment. Each of the sets of items of the CCQ described earlier was then analysed separately, using Principal Components Analysis (PCA), with direct Oblimin-Oblique rotation for more than one dimension. Listwise deletion was applied. For each of the five analyses performed, solutions based on 1 to 4 factors were considered final candidates. Only components with an eigenvalue higher than 1 were retained and the Cattell's scree test for the number of factors was applied (Cattell, 1966). A minimum of 30% of the explained variance was required to select a final model, which should also explain a relevant percentage of variance in comparison with the rejected ones. Furthermore, according to the criterion of parsimony, those solutions that described data in the sim- plest way were prioritized. Finally, only those dimensions with a clear clinical interpretation were considered. We examined the factor congruence of the final selected models across the five countries using Tucker's c coeffi - cient of congruence (Tucker, 1951). Cronbach's alpha evaluated internal consistency of the resulting scales.

After selecting the best factor models, scale scores for each dimension were obtained, calculated through the average of the correspondent items. Mean imputation was performed at the scale-level. Next, ANOVA proce- dures adjusted by age, gender and education level com- pared ED patients and controls. In order to control for Type I error due to the multiple statistical comparisons the Bonferroni–Holm correction (Holm, 1979) was applied, through SPSS macros (Domènech, 2008). This correction has shown to be less conservative than the clas- sical Bonferroni's procedure and is therefore especially useful for individual tests. Additionally, the area under the ROC Curve (AUC) was computed to assess the dis- criminative accuracy of the CCQ on the presence of an ED, through a binary logistic regression model adjusted by age, gender and education level. Predictors were the CCQ measurements and criterion was the presence or absence of an ED (dummy coded: control group = 0; ED group = 1). The predictive validity of the model was based on Nagelkerke's $R2$ coefficient.

RESULTS

## Section 1: Demographic Information

As regards the sample (879 ED patients and 785 healthy controls), participants with more than 10% missing responses in the whole CCQ were excluded from the sta- tistical analyses (one control from the UK, 20 cases from the UK and 5 cases from Slovenia). Therefore, the final sample contained 854 ED patients and 784 controls (Table 1). Mean age differed signifi cantly between the ED cohort (M = 27.3 years, SD = 8.9) and controls (M = 24.2 years, SD = 8.1). In comparison to the control group, signifi cantly more ED patients than controls were employed (57% versus 39%), and conversely signifi cantly less ED patients than controls were currently studying (48% versus 75%). Both cohorts also differed in gender, with the ED group having signifi cantly more females than the controls (96% versus 90%). As for education level, more ED cases had secondary school studies (49.9% versus. 25.6%), and fewer ED cases had primary school studies (8.3% versus 24.8%) than healthy controls, but no differences were found in university studies (45.7%). Stratifying by country, results were fairly similar, except for age (means did not differ between ED and controls except in Slovenia), and gender (equal ratio of males-females in the UK, Austria and Italy).

### *Accuracy of Each Item for Discriminating between Cases and Controls*

One hundred and seven items (84.3%) signifi cantly dif- ferentiated between ED patients and controls in the logistic regression analyses (0.05 level), confi rming the discriminative validity of most of the individual CCQ questions. For discriminative items, differences were in the expected direction. Most non- discriminative items were concentrated in section 4 (17 items about satisfac- tion), and valued characteristics like importance of intel- ligence or importance of conformity.

### *Internal Structure of CCQ: Factor Analyses*

Median (in absolute value) of skewness and kurtosis of the 127 items was 0.5 and 0.7, respectively. As regards the endorsement criterion (Streiner & Norman, 2003), only four items from section 4 (asking about satisfaction) did not reach the usual threshold. Thus, we can assume that PCA performs quite well with slightly non-normal data as ours. For the selected solutions, Tables 2–4 show the rotated factor loadings for the pattern matrix when more than one factor was retained. In addition, when items were removed because of low factor loadings (as we will detail later), we provide both solutions, the initial (including all the items) and the fi nal solution (after exclusion).

### *Section 2: Eating and Weight Concerns*

The 1-factor solution explained 35.11% of the variance, and all the 13 items about problems related to food and weight achieved loadings above 0.38. Internal consistency reliability was good ($\alpha = 0.84$).

### *Section 3: Individual and Family Eating Pattern*

The factor structure of this section is described in Fernández-Aranda et al. (2007a) and Krug et al. (2009), using categorical principal components analysis, due to the different response format of the items.

### *Section 4: Family Style, Expectations, Independence*

Looking at the fi rst set of 16 items (section 4A), two items were considered individually and not included in factor analysis, because they were dichotomous questions (lifetime abusive relationships and lifetime unwanted sexual experiences). From the remaining 14 items, two items did not show acceptable factor loadings (below 0.20) and were removed. The 1-factor solution of the 12 items explained 34.39% of the variance and all the items about family style showed acceptable factor loadings (above 0.33 in absolute value). Considering the 60 items of 'Satisfaction' (section 4B), the 3-factor solution accounted for 32.39% of the variance, with moderate cor- relations between dimensions ($r$ values from 0.16 to 0.29): (a) 24 items with higher loadings in factor 1 were related to attitudes towards education and self-achievement; (b) 20 items with higher loadings in factor 2 assessed atti- tudes to social needs (considered as traditional roles at home, such us being wife/husband, mother/father or homemaker, meeting others' needs and conformity); and (c) 16 items with higher loadings in factor 3 factor were related to attitudes towards physical appearance. However, three items showed slightly higher loadings on an unexpected factor: two items which asked about the importance of physical fi tness (respondent and friends) also loaded on F1 (attitudes to education and self-achieve- ment) and one item about the importance of self-disci- pline to friends loaded on F2 (attitudes to social needs). Finally, items of 'Success and confl ict' (section 4C) were described by a 2-factor solution (factors clearly uncorrelated, $r = 0.09$) that explained 35.63% of the variance: factor 1 collected items valuing confl ict with parents in achieving one's own goals and factor 2 the level of success in achieving one's own goals. Internal consistency relia- bility was satisfactory ($\alpha$ between 0.81 and 0.89).

### *Section 5: Social Ideals of Thinness*

The item asking about lifetime body shape satisfaction was treated individually and not included in factor analy- sis, because the response format was different to the other items of this section. The 2-factor model of the remaining 7 items explained 47.66% of the variance. Factor 1 included higher loadings for 3 items related to the ideal of thinness and body shape. Factor 2 consisted of 4 items which asked about the current body shape of the respondent/parents, obesity and satisfaction with one's own body shape. The correlation between the two factors was low ($r = 0.13$). Cronbach's alpha values were acceptable ($\alpha = 0.61$ for factor 1) or moderate ($\alpha = 0.44$ for factor 2), considering the short length of each scale (3 and 4 items,

respectively), since mean inter-item correlations were 0.34 and 0.16, respectively (Nunnally & Bernstein, 1994).

*Section 6: Substance Use*

The results of this section are described in Krug et al. (2008).

### Screening Accuracy of the CCQ Scale Scores

This paragraph is based on the 122 items from the fi nal factor solutions. Due to the low percentage of missing data (5.7%), scale scores for the nine dimensions derived from factor analyses were calculated if at least 50% of the data was available (Schafer & Graham, 2002; Ware, Snow, Kosinski, & Gandek, 1993), after inverse ones had been recoded. In addition to these nine scale scores, responses to the three items treated individually were also taken into account (sections 4A and 5). Table 5 contains the mean and standard deviation of scores for each cohort group and the results of each comparison adjusted by age, gender and education level. The 12 CCQ measurements signifi cantly discriminated between cases and controls (AUC = 0.88; $R2$ = 0.53).

### Comparison of Results between Countries

Detailed data for specifi c countries are available from the authors. Stratifying by countries (when possible due to sample size), PCA solutions were fairly similar. The factor 'problems related to food and weight' (section 2) showed a very high congruence across countries (Tucker's coef- fi cient of congruence $c$ between 0.98 and 1.0). The factor 'positive family style during childhood' (section 4A) was also successfully retrieved across the samples of the fi ve countries ($c \geq 0.93$). However, items about parental over- protection showed factor loadings between 0.13 and 0.26 in UK (mother), Austria (both parents) and Slovenia (both parents), and in Italy the two items about parental criti- cism showed factor loadings below 0.20.

For section 4B (importance for feeling satisfi ed), the main differences emerged in the Italian sample: the items about the importance to friends of education and self- achievement loaded higher on the factor of 'attitudes to social needs' ($c$ = 0.77). The rest of analogous factor pairs showed an excellent congruence ($c \geq 0.87$), although some items showed cross-loadings: items about the importance of physical fi tness (UK) and importance of meeting others' needs (Spain) loaded higher on the factor 'attitudes toward educational and self-achievement'. Coeffi cients of congruence for non-analogous factor pairs were also sat- isfactory ($c \leq 0.28$).

The factorial congruence across country solutions for section 4C (success and confl ict with parents in achieving own goals) was also high ($c \geq 0.94$) and the only noticeable difference was found in the Austrian sample: items about success of being a wife/husband, being a mother/father and being a homemaker did not load in the expected factor, although the congruence coeffi cient was satisfac- tory (c = 0.88). Coeffi cients of congruence for non-analo- gous factor pairs were also satisfactory ($c \leq 0.15$).

Finally, factorial congruence for section 5 (social ideal of thinness) was satisfactory for Spanish, Austrian and Italian samples (c for analogous factor pairs above 0.90; c for non-analogous factor pairs below 0.15). In the UK and Slovenia, the item rating obese body shape (expected factor 'current body shape and satisfaction') showed cross-loadings on the other factor ('ideal of thinness and body shape'): c for analogous factor pairs ranged from 0.65 to 0.91; c for non-analogous factor pairs was between 0.19 and 0.35.

Cronbach's alpha values for the derived scale scores from section 2, 4A, 4B and 4C ranged from 0.76 to 0.92 across the fi ve samples. For section 5, internal consistency coeffi cients for each country were similar to those obtained with the whole sample (α between 0.60 and 0.73 for the 3-item factor 'ideal of thinness and body shape' and α between 0.32 and 0.57 for the 4-item factor 'current body shape and satisfaction').

As regards the comparisons of scores between ED patients and controls in each country, differences were in the same direction as for the whole sample, although some of the comparison did not reach the significance level of 0.05 (probably due the smaller sample size). Values of screening efficiency were slightly smaller in Austria and Slovenia.

DISCUSSION

This study supports the internal structure and internal consistency of the European adaptation of the CCQ across the five countries considered. Exploratory factor analyses showed that the 122 analysed items can be summarized with adequate internal consistency into the following nine dimensions: problems related to food and weight, positive family style during childhood, attitudes toward education and self-achievement, social needs and physical appearance, success in achieving own goals, conflict with parents in achieving own goals, ideal of thinness and body shape and current body shape and satisfaction. These nine scale scores, together with three individual items (lifetime abusive relationships, lifetime unwanted sexual experiences and lifetime body shape satisfaction) discriminated between ED patients and controls. Furthermore, most of the individual CCQ items achieved adequate discriminative accuracy for differentiating between ED patients and healthy controls.

The factorial congruence across countries was very high, showing the validity of most of the questions included in the CCQ for each European country sample. The few differences observed could be related to differences in socio-cultural norms, since cultural diversity is evidenced in food patterns and nutritional/physical well-being (Dowler, 2001). A recent ecological study found that important changes have occurred over the last 40 years in food patterns throughout the continent, with the greatest changes being concentrated in the Mediterranean area (Balanza et al., 2007).

However, the results of this study must be interpreted within the context of some methodological limitations. First, our study has the typical limitations of exploratory factor analyses, and therefore, confirmatory factor analyses could be carried out with new data, in order to cross-validate our empirical scales. Second, the CCQ does not include the assessment of other symptoms in Axis I and II of the DSM-IV-TR, which have been shown to be associated with the onset and maintenance of EDs (Fernández-Aranda et al., 2008; Treasure, 2006). This involves the need for other tools to obtain a complete clinical profile. Third, many items in the CCQ are assessed retrospectively, and consequently, it is important to confirm the relevance of the emerged dimensions in prospective designs (Karwautz, 2003). Fourth, without the inclusion of a clinical control group, we can not determine whether the CCQ measurements are specific factors of risk and maintenance for EDs or whether some of the putative risk factors are associated with other psychiatric disorders (Álvarez-Moya et al., 2009; Fairburn et al., 1997, 1998, 1999; Fernández-Aranda et al., 2007b).

Nevertheless, this study is a pioneer in the field of validating comprehensive tools for evaluating factors of risk and maintenance for ED, in the context of a European multi-centre project with a large sample size. As regards the practical uses, it must be emphasized that the empirically defined factors demonstrated satisfactory psychometric properties in terms of internal structure and internal consistency. In addition, the CCQ showed acceptable discriminative accuracy between ED cases and controls, both at the item-level and considering the joint profile obtained through the various scores. This means that the CCQ can be used to obtain specific measurements through each item being considered individually, as well as to obtain dimensional indicators—corresponding to the scale scores—that summarize the amount of initial information, with no additional cost. As Rubio-Stipec, Walker, Murphy, and Fitzmaurice (2002) pointed out, clinicians and researchers may improve their knowledge of specific disorders by relating dimensional and categorical measurements of the same diagnostic entity.

In future research of the CCQ we propose the inclusion of a clinical control group, in order to determine specifi c and non-specifi c factors related to ED. In addition, it will be interesting to focus on differences across ED subtypes, with the aim of obtaining evidence on the predictive validity of the questionnaire, in terms of appearance and maintenance of AN, BN and EDNOS separately (Jacobi et al., 2004). Finally, convergent validity with existing mea- surements could be evaluated.

In conclusion, the limited number of tools available for the comprehensive assessment of factors of risk and main- tenance for EDs has resulted in a special interest in the adaptation of a self-report questionnaire such as the CCQ in a multi-centre study. This questionnaire constitutes a simple administration tool that can be used to assess a wide range of past and current problems related to food and weight, individual and family eating patterns or per- ception of one's own body's shape. In addition, the tool provides information about the importance that indivi- duals attribute to feeling satisfi ed, success and confl ict with parents in achieving one's own goals, and social ideals of thinness.

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Table 1. Socio-demographic characteristics of the total European sample.

| | Cases (n=854) | Controls (n=784) | TOTAL (n=1638) |
|---|---|---|---|
| Age; mean (SD) | 27.3 (8.9) | 24.2 (8.1) | 25.8 (8.7)* |
| Gender: female (%) | 95.8 | 89.8 | 92.9* |
| Education level: Primary (%) | 8.3 | 24.8 | 16.7* |
| Secondary (%) | 49.9 | 25.6 | 37.6* |
| University (%) | 41.8 | 49.6 | 45.7* |
| Employed status (%) | 56.3 | 39.2 | 47.7* |
| Students (%) | 47.8 | 75.4 | 61.3* |
| Area where brought up: urban (%) | 69.1 | 56.7 | 62.8* |
| Sister: yes (%) | 60.5 | 55.2 | 58.2 |

Table 2. Results obtained in the factorial analysis of the section 2 of CCQ

| Section 2: Problems related to food and weight | |
|---|---|
| N = 751; Explained variance = 35.11%; KMO=0.767 | F1 |
| Physical appearance influenced eating | 0.657 |
| Dissatisfaction with body shape influenced eating | 0.663 |
| Family weight/shape concerns influenced eating | 0.565 |
| Family relationships influenced eating | 0.443 |
| Relationships with friends influenced eating | 0.563 |
| Joint dieting with family member(s) influenced eating | 0.464 |
| Teasing about eating habits by family member(s) influenced eating | 0.707 |
| Teasing about eating habits by friends/others influenced eating | 0.680 |
| Teasing about weight/shape by family member(s) influenced eating | 0.693 |
| Teasing about weight/shape by friends influenced eating | 0.689 |
| Joint dieting with friends influenced eating | 0.388 |
| Mass media influenced eating | 0.560 |
| Current fashion styles influenced eating | 0.513 |
| Cronbach's alpha value (number of items) | 0.840 (13) |

Table 3. Results obtained in the factor analysis of section 4 of CCQ

| Section 4a: Positive family style during childhood | Initial solution | Final solution |
|---|---|---|
| Explained variance | 29.71% | 34.39% |
| N = 791; KMO=0.72 | F1 | F1 |
| Mother was affectionate | 0.703 | 0.707 |
| Mother was interested | 0.756 | 0.756 |
| Mother was overprotective | 0.338 | 0.329 |
| Mother was dependent | 0.006 | -- |
| *Mother was critical* | -0.446 | -0.465 |
| *Mother was verbally abusive* | -0.573 | -0.589 |
| *Mother was physically violent or abusive* | -0.402 | -0.409 |
| Father was affectionate | 0.748 | 0.741 |
| Father was interested | 0.776 | 0.769 |
| Father was dependent | 0.167 | -- |
| Father was overprotective | 0.238 | 0.441 |
| *Father was critical* | -0.400 | -0.410 |
| *Father was verbally abusive* | -0.613 | -0.620 |
| *Father was physically violent or abusive* | -0.564 | -0.575 |
| Abusive relationship with someone other than parents* | --- | --- |
| Unwanted sexual experiences in the past* | --- | --- |
| Cronbach's alpha value (number of items) | 0.76 (14) | 0.81 (12) |

Inverse items (in italics)
*items not included because of different format of response (dichotomous questions)

Table 3 (continued)

| Section 4b: Importance for feeling satisfied | | | | Section 4c: Success and conflict with parents in achieving own goals | | |
|---|---|---|---|---|---|---|
| N=623; Explained variance = 32.39% KMO=0.80 | F1* | F2* | F3* | N=538; Explained variance = KMO=0.84 | F1** | F2** |
| Importance to respondent | | | | Success in achieving own goals | | |
| intelligence | **.522** | -.159 | .090 | intelligence | -.139 | **.651** |
| professional success | **.450** | -.106 | .120 | professional success | -.108 | **.640** |
| independence | **.415** | -.007 | .095 | independence | -.072 | **.636** |
| education | **.555** | -.033 | -.097 | education | -.175 | **.608** |
| self discipline | **.255** | .209 | .047 | self discipline | -.049 | **.550** |
| governing own actions | **.336** | .107 | -.078 | governing own actions | -.097 | **.670** |
| being a wife/husband | -.173 | **.579** | .034 | being a wife/husband | .146 | **.441** |
| being a mother/father | -.169 | **.581** | -.054 | being a mother/father | .151 | **.420** |
| being a homemaker | -.152 | **.649** | .000 | being a homemaker | .214 | **.487** |
| meeting others' needs | .201 | **.323** | -.048 | meeting others' needs | .001 | **.571** |
| conformity | .159 | **.456** | -.034 | conformity | -.044 | **.388** |
| physical attractiveness | .147 | -.076 | **.312** | physical attractiveness | .003 | **.538** |
| slimness | .134 | -.060 | **.319** | slimness | -.007 | **.369** |
| popularity | .033 | .037 | **.510** | popularity | -.058 | **.523** |
| physical fitness | **.302** | .078 | .230 | physical fitness | .033 | **.621** |
| Importance to friends | | | | Conflict with parents | | |
| intelligence | **.419** | .030 | .092 | intelligence | **.693** | -.100 |
| professional success | **.373** | .092 | .123 | professional success | **.638** | -.135 |
| independence | **.395** | .138 | .117 | independence | **.690** | .039 |
| education | **.435** | .177 | -.066 | education | **.661** | -.078 |
| self discipline | .262 | **.307** | .097 | self discipline | **.733** | -.071 |
| governing own actions | **.368** | .186 | .020 | governing own actions | **.738** | -.031 |
| being a wife/husband | -.007 | **.509** | .198 | being a wife/husband | **.611** | .116 |
| being a mother/father | -.044 | **.602** | .134 | being a mother/father | **.632** | .138 |
| being a homemaker | -.102 | **.668** | .193 | being a homemaker | **.657** | .070 |
| meeting others' needs | .164 | **.392** | .004 | meeting others' needs | **.634** | -.027 |
| conformity | .162 | **.464** | .014 | conformity | **.638** | -.030 |
| physical attractiveness | .192 | -.012 | **.482** | physical attractiveness | **.455** | -.062 |
| slimness | .187 | .025 | **.494** | slimness | **.383** | -.058 |
| popularity | .089 | .100 | **.493** | popularity | **.558** | .030 |
| physical fitness | **.316** | .104 | .177 | physical fitness | **.529** | .053 |
| Importance to mother | | | | | | |
| intelligence | **.633** | -.116 | .153 | | | |
| professional success | **.522** | -.055 | .157 | | | |
| independence | **.503** | -.041 | .155 | | | |
| education | **.734** | -.088 | -.131 | | | |
| self discipline | **.511** | .186 | -.007 | | | |
| governing own actions | **.663** | .081 | -.164 | | | |
| being a wife/husband | -.078 | **.677** | .146 | | | |
| being a mother/father | -.043 | **.633** | .096 | | | |
| being a homemaker | -.019 | **.601** | -.008 | | | |
| meeting others' needs | .220 | **.360** | .017 | | | |
| conformity | .280 | **.435** | -.076 | | | |
| physical attractiveness | -.008 | -.015 | **.745** | | | |
| slimness | -.071 | .022 | **.734** | | | |
| popularity | -.132 | .149 | **.720** | | | |
| physical fitness | .254 | .067 | **.391** | | | |
| Importance to father | | | | | | |
| intelligence | **.606** | -.117 | .153 | | | |
| professional success | **.532** | -.050 | .187 | | | |
| independence | **.503** | -.017 | .155 | | | |
| education | **.677** | -.081 | -.126 | | | |
| self discipline | **.512** | .169 | -.033 | | | |
| governing own actions | **.634** | .122 | -.104 | | | |
| being a wife/husband | .002 | **.663** | .058 | | | |
| being a mother/father | .017 | **.641** | .014 | | | |
| being a homemaker | .056 | **.617** | -.100 | | | |
| meeting others' needs | .258 | **.410** | -.119 | | | |
| conformity | .301 | **.391** | -.116 | | | |
| physical attractiveness | -.090 | .007 | **.696** | | | |
| slimness | -.126 | .017 | **.692** | | | |
| popularity | -.073 | .112 | **.632** | | | |
| physical fitness | .224 | .087 | **.378** | | | |
| Cronbach's alpha value (number of items) | 0.89 (24) | 0.89 (20) | 0.85 (16) | | 0.88 (15) | 0.83 (15) |

In bold: items with high scores in the factor.
* Content of the factors are F1: Attitudes to education and self-achievement; F2: Attitudes to social needs ; F3: Attitudes to physical appearance;
** Content of the factors are F1: Conflict with parents in achieving own goals; F2: Success in achieving own goals

Table 4. Results obtained in the factor analysis of section 5 of CCQ

| Section 5: Social ideas about thinness | | |
|---|---|---|
| N = 702; Explained variance = 47.66%; KMO=0.622 | F1 | F2 |
| Current body shape | -0.129 | **0.664** |
| Mother's body shape | 0.062 | **0.666** |
| Father's body shape | 0.104 | **0.548** |
| Ideal body shape | **0.772** | 0.235 |
| Body shape preferred by opposite gender people | **0.784** | 0.051 |
| Obese body shape | -0.013 | **0.519** |
| Skinny body shape | **0.723** | -0.185 |
| Satisfaction with body shape as a child* | --- | --- |
| Cronbach's alpha value (number of items) | 0.61 (3) | 0.44 (4) |

In bold: items with high scores in the factor. Content of the factors are F1: Ideal of thinness and body shape; F2: Current body shape and satisfaction
*item not included because of different format of response

Table 5. Screening accuracy of the CCQ measures for valuing the ED diagnosis.

| Section and factor (minimum and maximum score) | Means (SD) | | [1]Screening efficiency: logistic regressions | | | |
|---|---|---|---|---|---|---|
| | Cases | Controls | $p$[2] | OR (CI 95%) | AUC | $R^2$ |
| Section 2 | | | | | | |
| Problems related to food and weight (1-5) | 2.5 (0.7) | 1.6 (0.6) | <.001 | 7.14 (5.69; 8.94) | .84 | .41 |
| Section 4a | | | | | | |
| Positive family style during childhood (1-5) | 3.7 (0.7) | 4.0 (0.5) | <.001 | 0.49 (0.40; 0.60) | .65 | .10 |
| Section 4b: satisfaction | | | | | | |
| F1: Attitudes to education and self-achievement (1-5) | 3.7 (0.6) | 3.8 (0.6) | .034 | 0.81 (0.66; 0.98) | .62 | .06 |
| F2: Attitudes to social needs (1-5) | 3.1 (0.7) | 3.3 (0.7) | <.001 | 0.65 (0.56; 0.77) | .63 | .08 |
| F3: Attitudes to physical appearance (1-5) | 2.8 (0.6) | 2.7 (0.6) | .001 | 1.37 (1.15; 1.63) | .63 | .06 |
| Section 4c: success-conflict | | | | | | |
| F1: Conflict with parents in achieving own goals (1-5) | 2.1 (0.8) | 1.7 (0.7) | <.001 | 2.14 (1.83; 2.52) | .69 | .14 |
| F2: Success in achieving own goals (1-5) | 2.7 (0.6) | 3.1 (0.5) | <.001 | 0.34 (0.28; 0.42) | .70 | .17 |
| Section 5 | | | | | | |
| F1: Ideal of thinness and body shape (1-10) | 2.2 (0.8) | 2.4 (0.8) | <.001 | 0.64 (0.55; 0.74) | .66 | .09 |
| F2: Current body shape and satisfaction (1-10) | 5.9 (1.3) | 5.4 (1.1) | <.001 | 1.31 (1.20; 1.44) | .65 | .09 |

[1]All values were adjusted by gender and age. AUC: Area Under the ROC Curve. $R^2$: Nagelkerke's coefficient.
[2]Bonferroni-Holm correction for multiple comparisons

ID _____

# Cross-Cultural Questionnaire (CCQ)

*22/01/2001 v.2.1*

*Section 1: Demographic information*_____

Name:_____ Date: ___/___/2000 Sex: ☐ Male ☐ Female

Date of Birth: __/__/____ Age:_____ Do you have a sister? ☐ Yes, Age:___ ☐ No

Country currently living in:_____ Country of your birth:_____

Country of parents' birth:_____ Country of grandparents' birth: _____

a) Which of the following best describes the area where you were brought up *(tick one)*:
☐ Rural ☐ Village ☐ Town ☐ City

b) Highest education level achieved *(tick one)*: 
☐ Primary school
☐ Secondary school
☐ University/equivalent
☐ Professional degree

c) Employment status *(tick one)*:
☐ Unemployed - have never been employed
☐ Unemployed - previously employed
☐ Employed part-time
☐ Employed full-time

d) Are you a student? ☐ Yes ☐ No

e) Are you receiving any benefits? ☐ Yes ☐ No

f) Father's age: _____

g) Mother's age: _____

h) Father's highest education level:
☐ Primary school
☐ Secondary school
☐ University/equivalent
☐ Professional degree

i) Mother's highest education level:
☐ Primary school
☐ Secondary school
☐ University/equivalent
☐ Professional degree

Parents' employment status: What was the employment status of your father and mother for the majority of the time when you were a child (before age 12) *(tick one)*?

j) Father
☐ Unemployed
☐ Employed part-time
☐ Employed full-time

k) Mother
☐ Unemployed
☐ Employed part-time
☐ Employed full-time

l) Your religion *(tick one)*:
☐ Protestant
☐ Catholic
☐ Other Christian
☐ Jewish
☐ Muslim
☐ Hindu
☐ Buddhist
☐ Other
☐ None

m) Your Father's religion:
☐ Protestant
☐ Catholic
☐ Other Christian
☐ Jewish
☐ Muslim
☐ Hindu
☐ Buddhist
☐ Other
☐ None

n) Your Mother's religion:
☐ Protestant
☐ Catholic
☐ Other Christian
☐ Jewish
☐ Muslim
☐ Hindu
☐ Buddhist
☐ Other
☐ None

The complete questionnaire available from the authors....