Emotional Eating Scale for Children and Adolescents: Psychometric Characteristics in a Spanish Sample

Conxa Perpiñá
Departamento de Personalidad, Evaluación y Tratamientos Psicológicos, Universidad de Valencia and CIBEROBN, Instituto Salud Carlos III, Spain

Ausiàs Cebolla and Cristina Botella
Departamento de Psicología Básica, Clínica y Psicobiología, Universitat Jaume I (Spain) and CIBEROBN, Instituto Salud Carlos III, Spain

Empar Lurbe and María-Isabel Torró
Child & Adolescent Cardiovascular Risk Unit, University General Hospital, Valencia and CIBEROBN, Instituto Salud Carlos III, Spain

The aims of this study were to validate the Emotional Eating Scale version for children (EES-C) in a Spanish population and study the differences in emotional eating among children with binge eating (BE), overeating (OE), and no episodes of disordered eating (NED). The questionnaire was completed by 199 children aged 9 to 16 years. Confirmatory factor analysis revealed five scales: eating in response to anger, anxiety, restlessness, helplessness, and depression. The EES-C showed good internal consistency and test–retest reliability, and it showed moderate relationships with measures of disordered eating [Children's Eating Attitudes Test-26 (ChEAT-26), Questionnaire of Eating and Weight Patterns–Adolescent Version (QEWP-A)] and psychopathology (State-Trait Anxiety Inventory for Children, Children's Depression Inventory, Child Behavior Checklist). There were significant differences between the BE/NED groups (with the OE group in the middle position) in desire to eat when Anger (the girls in BE group, and the oldest children in OE group obtaining higher scores) or Helplessness were present. Eating due to Depression was higher in the older groups. Multiple regression analysis conducted showed that anxiety-trait was the best predictor of emotional eating. Results support the potential utility of the EES-C in the study of emotional eating in children and its validity in the Spanish population.

Emotional eating has been defined by Faith, Allison, and Geliebter (1997) as eating in response to a range of negative emotions, such as anxiety, depression, anger, and loneliness, to cope with negative affect. It has been outlined as a coping style related to diffuse negative emotions, but positive emotions are also reported (Van Strien, Herman, & Verheijden, 2009). Eating in response to negative emotions is reportedly common among children (Tanofsky-Kraff et al., 2007), especially those who are obese (Shapiro et al., 2007), and it has been linked to loss of control eating (Shapiro et al., 2007; Tanofsky-Kraff et al., 2007). There is growing evidence that binge eating and overeating frequently occur in the absence of other eating disorder diagnoses, and they can best be contemplated as lying along a continuum from normal to disordered eating (Blackburn, Johnston, Blampied, Popp, & Kallen, 2006).
Problems with emotion management and regulation are associated with psychopathologies, and they are assumed to play an important role in the initiation and maintenance of binge eating. Moreover, children with symptoms of binge eating engage in eating in response to negative affect (Czaja, Rief, & Hilbert, 2009). The Binge Eating Diagnosis, as defined in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2000), includes recurrent episodes of binge eating during which subjective sense of loss of control (LOC) episodes occur that are often reported as triggered by dysphoric moods, such as depression and anxiety. Furthermore, impulsive behaviors appear to be a transdiagnostic characteristic in eating disorder (ED) patients, not being uncommon among other ED clinical subtypes (Favaro et al., 2005). Although the relationships among disordered eating, impulsivity, and difficulties in emotional regulation have been extensively studied in adults, it is still unclear whether binge eating in children is associated with deficits in emotion regulation and which emotion regulation strategies are problematic. Therefore, instruments that evaluate the vulnerability and risk factors of overeating and binge eating, such as emotional eating, are quite useful.

The Dutch Eating Behavior Questionnaire (Van Strien, Frijters, Bergers, & Defares, 1986) assesses restrained and external, but emotional, eating. However, it does not differentiate between various types of emotions. To facilitate investigation of the relationship between specific negative emotional states and overeating, Arnow, Kenardy, and Agras (1995) designed the Emotional Eating Scale (EES), a 25-item self-report measure used to assess the urge to cope with negative affect by eating, and it generates three subscales: Depression, Anger/Anxiety/Frustration, and Feeling Unsettled. Respondents rate their desire to eat in response to each emotion on a 5-point scale (no desire, some desire, moderate desire, strong desire, and very strong desire to eat). Higher scores indicate a greater reported desire to eat in response to negative mood states. The EES-C subscales have demonstrated very good internal consistency (α = .83–.95), convergent validity, and adequate temporal stability (Tanofsky-Kraff et al., 2007).

The main goals of the current study were to adapt the EES for children and adolescents (EES-C; Tanofsky-Kraff et al., 2007) to the Spanish population and obtain evidence about its psychometric properties, such as its reliability (i.e., internal consistency and test–retest) and validity (i.e., criterion, convergent, convergent, and divergent) of the inventory with regard to other eating psychopathology measures and the influence of the presence of episodes of disordered eating. Other objectives were to analyze the differences in emotional eating according to gender, age, weight, and LOC and to study which variables predict the emotional eating in preadolescent participants.

**METHOD**

**Participants**

Children and adolescents 9 to 16 years of age were recruited. The clinical group consisted of 71 participants seeking weight loss treatment in the Pediatric Unit at the General Hospital (Valencia, Spain). The nonclinical group (n = 128) was recruited from two elementary schools in the city of Valencia. The children provided written assent, and the parents gave written consent for participation in the protocol. These studies were approved by the Ethical Committee from the General Hospital and by the respective local school boards.

**Measures**

**Obesity.** Children’s heights were measured by a calibrated electronic stadiometer TANITA BC 418 MA (Holton, Crymych, Wales), and their weights were measured to the nearest 0.1 kg by a calibrated digital scale (Scale-Tronix, Wheaton, IL). Body Mass Index standard deviation scores (BMI-Z) were calculated. Obesity was calculated with a z score adjusted for sex and age. The participants were classified as obese (over 95th percentile) or overweight (between 85th and 95th percentiles) with a z score above 2.0 and as normal weight with a z score of less than 1.0 (Weiss et al., 2004). Given that this classification is based on North American data, the normative data for the Spanish population were used as the correction factor (Sobradillo et al., 1988).

**Emotional eating.** As mentioned previously, the EES-C (Tanofsky-Kraff et al., 2007), designed for use with 8- to 17-year-old children, is a 25-item self-report
questionnaire scored on a 5-point Likert scale (no desire to eat to very strong desire to eat) used to assess the urge to eat in order to cope with negative affect. The psychometric properties of this English-language instrument are previously described. To adapt and validate the Spanish version, the EES-C was translated by the first author (forward translation) and then revised by a bilingual psychologist from the United States (backward translation). The discrepancies between the two translations were resolved by a professional English translator.

**Behavioral and emotional adjustment.** Level of depression was assessed using the Children’s Depression Inventory (CDI; Kovacs, 1985). It consists of 27 Likert-type items ranging 0 (absence of symptoms), 1 (mild symptoms), and 2 (definite symptoms), which assess depressive symptomatology in children. A score of 19 or greater is the criterion score for identifying clinical depression. The Spanish adaptation was used in this study (Del Barrio & Carrasco, 2004). The questionnaire has relatively high levels of internal consistency (.75–.94), test–retest reliability and predictive, convergent, discriminant, and construct validity (Craighead, Smucker, Craighead, & Ilardi, 1998). The internal consistency of the CDI in the current sample was $\alpha = .82$ for the one-factor solution, for self-esteem $\alpha = .67$, and for dysphoria $\alpha = .80$.

Levels of anxiety were assessed using the State-Trait Anxiety Inventory for Children (STAI-C; Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973). For the analyses in the present study, we used only the trait scale, composed of 20 items, with a 3-point scale ranging from 1 (almost never) to 3 (often). The scale was validated in a Spanish sample from children from 9 to 15 years of age (Seisdedos, 1990). In the present study, the internal consistency of the STAIC was $\alpha = .88$.

Emotional and behavioral adjustment was assessed using the Child Behavior Checklist for ages 4–18 (CBCL; Achenbach, 1991). The CBCL, generally accepted as an objective tool for screening symptoms of psychopathology, is a parent-reported measure of child competency and functioning in a range of behavioral domains. This 138-item rating scale yields scores for total behavior problems, internalizing and externalizing behaviors, and three scores for competence (activity, social competence, school competence). Parents rate their child on how true each item is now or within the past 6 months using the following scale: 0 = not true (as far as you know); 1 = somewhat or sometimes true; 2 = very true or often true. The CBCL generates eight clinical subscales grouped in two scales, the Internalizing scale (Withdrawn, Somatic Complaints, and Anxious/Depressed Mood) and the Externalizing scale (Disruptive and Aggressive Behavior). The Spanish validated version (Albores et al., 2007) was used, with an internal consistency in the current sample ranging from .90 to .97.

**Disordered eating attitudes.** The Children’s Eating Attitudes Test (CheAT; Maloney, McGuire, & Daniels, 1988) is a self-report questionnaire used to assess disordered eating attitudes among children. Each item is rated on a Likert scale from 1 (always) to 6 (never). This scale is a children’s version of the Eating Attitude Test (Garner, Olmsted, Bohr, & Garfinkel, 1982). In this study, the Spanish adaptation containing 20 items (Sancho, Asorey, Aria, & Canals, 2005) was used. This version of the CheAT generates four factors—fear of and preoccupation with getting fat, social pressure to eat, food preoccupation, and food restriction—and it showed a Cronbach’s alpha of .73. The internal consistency of the CheAT in the current sample was $\alpha = .79$. With regard to each factor, for fear of and preoccupation with getting fat, $\alpha = .71$; for social pressure to eat, $\alpha = .71$; for food preoccupation, $\alpha = .53$; and for food restriction, $\alpha = .65$.

**Self-report of eating behavior.** The Questionnaire of Eating and Weight Patterns–Adolescent Version (QEWP-A; Johnson, Grieve, Adams, & Sandy, 1999; Johnson, Kirk, & Reed, 2001) was used to classify children and adolescents in three categories. The first category included those reporting overeating (OE). The second category included those reporting binge eating behavior (BE), that is, overeating experiencing LOC. The third category included those reporting no episodes of disordered eating (NED) within the past 6 months. The QEWP-A appears to have adequate concurrent validity when correlated with measures of abnormal eating attitudes and depression (Johnson et al., 1999).

**Procedure**

The clinical group completed all measures during an outpatient clinic visit to the hospital. The nonclinical group filled out the questionnaires during their normal school day. For all the children, in cases where they had difficulty reading or understanding the questions, trained research assistants read the questions aloud and provided simple alternative definitions for words and statements that were not understood. To study the temporal stability, the EES-C was administered to 40% of the original sample 1 to 2 months later.

**Data Analyses**

Confirmatory factor analyses were conducted using the EQS 6.1 program (Bentler, 1995). Maximum Likelihood estimates with robust corrections were obtained to deal with violations of the normal distribution assumption. Assessment of model fit was performed using the goodness-of-fit (GFI) chi-square test statistic. Another index used to assess the adequacy of each model was
the comparative fit index (CFI), which compares the fit of the model to a null model and establishes the absence of relationships among the variables. Other indexes used were the GFI and adjusted GFI (AGFI) fit indexes, which measure the proportion of variance-covariance accounted for by the proposed model. The standardized root mean square residual (SRMS) and the root mean square error of approximation (RMSEA) penalize the models that are not parsimonious, and they are sensitive to misspecified factor covariance.

Confirmatory factor analyses were first conducted using the original models previously established by Tanofsky-Kraff et al. (2007) and Arnow et al. (1995). However, none of these models showed reasonable fit indices. Thus, an exploratory factor analysis was performed to observe whether there was another factorial model with a better fit. A principal components factor analysis with a Promax rotation (with Kaiser criterion) was performed to verify whether the instrument was composed of different domains, as obtained by Tanofsky-Kraff et al. (2007). Items with factor loadings of .40 or greater were retained for inclusion in each factor. An item was considered to load onto more than one factor if it exceeded this score on more than one factor and if the difference between the factor loadings was less than .10. When the difference was greater than .10, it was considered to load on the factor with the highest loading. The scree test was used to decide the number of factors to retain.

Internal consistency (Cronbach's alphas), and the interclass correlation coefficient were calculated to establish the reliability. Convergent and divergent validity analyses were conducted by computing Pearson’s correlations. To assess group differences, chi-square tests, and analyses of variance (ANOVAs) were computed using F or Brown-Forsythe, depending on the homogeneity of the samples. Tukey or Games-Howell post hoc statistics were applied to examine the source of-between-groups differences. Finally, multiple regression analyses (stepwise) were used to examine relationships between the EES-C subscales, taking into account each emotion independently as the dependent variable and the rest of the relevant variables (sex, age, weight, and psychopathology measures) as independent variables. Stepwise regression was used given the number of predictors and the sample size available (Tabachnick & Fidell, 2007). Associations and differences were considered significant when p values were .05 or less. All analyses were conducted using SPSS for Windows, 15.0 (SPSS, Inc., Chicago, IL).

RESULTS

Descriptive Analyses

A total of 199 children (clinical and nonclinical samples; M age = 12.7 ± 2.0 years, range = 8–17; 50.2% girls) participated in this study (Table 1). The entire clinical group (n = 71) was obese/overweight (BMI-Z > 85th–95th percentile). The nonclinical sample was composed of 84 normal weight (BMI-Z < 85th percentile) and 44 overweight/obese children (BMI-Z > 85th–95th percentile). Thus, 115 (57.7%) were overweight/obese. Parents provided data about economic status. Table 1 shows the socio-demographic data of the participants.

Of the 26 items listed on the EES-C, the children most commonly endorsed eating in response to feeling “bored” (66%), whereas feeling “excited” (53.3%) and “worn out” (51.8%) were the second and third most common emotions reported, respectively. Based on mean emotion scores, the two most comment emotions leading to the eating response were also “bored” followed by “excited,” although there was a large amount of response variability. Finally, taking into account the frequency of days per week, the emotion that most frequently led to eating was “happy,” followed by “bored” and “lonely.” In contrast, the highest percentage of sample participants who never had the desire to eat were acting in response to feeling “resentful” (82.1%), followed by “disobedient” (81.0%) and “furious” (77.9%).

Exploratory Analysis

The results of the exploratory factor analysis showed that the EES-C structure was composed of five factors that explained 49.1% of the total variance. Factor 1 was called Anxiety; it consisted of seven items and explained 26.2% of the variance. Factor 2 was called Depression; it was comprised of four items and explained 49.1% of the total variance. Factor 1 explained 49.1% of the total variance. Factor 3 was called Anger; it consisted of seven items and explained 6.7% of the variance. Factor 4 was called Excitement; it was comprised of six items and explained 5.9% of the variance. Factor 5 was called Loneliness; it was comprised of four items and explained 26.2% of the variance. Factor 1 was called Anxiety; it consisted of seven items and explained 26.2% of the variance. Factor 2 was called Depression; it was comprised of four items and explained 6.7% of the variance. Factor 3 was called Anger; it consisted of seven items and explained 5.9% of the variance.
Factor 4 was called Restlessness; it included five items and explained 5.3% of the variance. Finally, Factor 5, called Helplessness, was composed of three factors and explained 4.8% of the variance.

**Confirmatory Analysis**

Four models of the EES (excluding the adjective “happy” for these analyses) were selected to be compared on adequacy fit. Table 2 shows the items for each model. Model 1 tested a single-factor model composed of only one factor structure that included all the EES-C items. This model was used as a baseline model against which to test alternative factorial structures. Model 2 corresponds to the original factorization by Arnow et al. (1995) of the EES. The first factor in Arnow’s model consists of emotions related to anger, the second to anxiety, and the third to depression. The third model is a structure of three factors (anxiety, depression, and unspecified factor) developed in the original children’s version of the EES created by Tanofsky-Kraff et al. (2007). The fourth model is the result of a previous exploratory factor analysis that yielded a five-factor model consisting of Anger, Anxiety, Depression, Restlessness, and Helplessness. In this analysis, the emotion “happy” was excluded.

The four models were compared with regard to their adequacy of fit using Hu and Bentler’s (1995, 1999) recommended approach to fit criteria; a small chi-square of a model means better fit to the data. The other criteria indices for goodness of fit used were CFI > .90, GFI and AGFI > .90, SRMS < .08, and RMSEA < .05 (Bentler & Bonet, 1980). Table 3 summarizes the fit indices for the four models. The baseline single-factor model fit the data poorly in comparison with all the fit criteria. The fit of Model 2 (three factors based on Arnow’s, 1995, factorization) was poor relative to the observed data, with a CFI less than .90, although the SRMR was less than .05. Model 3 (three factors based on the Tanofsky-Kraff et al., 2007, factorization) also had a relatively poor fit to the data.

According to the fit indices, the five-factor model solution, which included Anger, Anxiety, Restlessness, Helplessness, and Depression, was the model that best represented the observed data. The five-factor model was the one with the smallest chi-square, whereas, on the other hand, the CFI, GFI, and AGFI indexes for this model were greater than .80, and the SRMR and RMSEA were less than .07. Table 4 shows the factor loadings of the items on their respective factors.

**Reliability**

All five subscales demonstrated good internal consistency. Cronbach’s alphas were as follows: for ESS-C Anger, 0.74; for ESS-C Anxiety, 0.75; for ESS-C Depression, 0.64; for ESS-C Restlessness, 0.67; and for ESS-C Helplessness, 0.60. With regard to temporal stability (1–2 months; n = 78 participants from the original sample), the interclass correlation coefficient was calculated. The correlations were as follows: for ESS-C Anger, 0.79 (0.71–0.85); for ESS-C Anxiety, 0.84 (0.79–0.89); for ESS-C Depression, 0.69 (0.57–0.79); for ESS-C Restlessness, 0.82 (0.76–0.88); and for ESS-C Helplessness, 0.77 (0.67–0.84).

**Convergent and Divergent Validity Analyses**

The convergent and divergent validity of the EES-C (Table 5) was tested using Pearson’s product-moment correlations with other relevant measures of eating, mood, and behavior problems, such as ChEAT, CDI, STAI, and Externalization/Internalization CBCL factors. With the exception of the Restlessness factors,

---

**Table 2**

Items That Compose the Four Models Compared for Their Adequacy of Fit

| Model 1: One-Factor Model | Model 2: Three-Factor Model (Arnow et al., 1995) | Model 3: Three-Factor Model (Tanofsky-Kraff et al., 2007) | Model 4: Five-Factor Model |
|---------------------------|-----------------------------------------------|----------------------------------------------------------|---------------------------|
| Factor 1                  | All items                                     | Anger, anxiety and frustration: 11, 12, 13, 15, 17, 21, 22, 24 | Anger: 13, 14, 15, 17, 18, 21 |
| Factor 2                  | —                                             | Depression: 4, 7, 8, 9, 14, 16, 23                        | Anxiety: 3, 6, 9, 11, 16, 20, 25 |
| Factor 3                  | —                                             | Unsettled: 1, 2, 6, 7                                    | Depression: 1, 2, 8, 10    |
| Factor 4                  | —                                             |                                                          | Restlessness: 4, 7, 12, 19, 23 |
| Factor 5                  | —                                             |                                                          | Helplessness: 5, 22, 24    |

---

**Table 3**

Goodness-of-Fit Indices of the Four Factor Models

|          | CFI | GFI | AGFI | SRMR | RMSEA | $\chi^2$ | gl  | p   |
|----------|-----|-----|------|------|-------|----------|-----|-----|
| Model 1  | .842| .800| .763 | .074 | .083  | 371.1987 | 275 | .0005 |
| Model 2  | .859| .813| .777 | .074 | .041  | 357.8464 | 272 | .0005 |
| Model 3  | .856| .815| .775 | .076 | .084  | 306.3654 | 227 | .0005 |
| Model 4  | .935| .850| .816 | .066 | .067  | 304.9110 | 265 | .05   |

*Note:* CFI = comparative fit index; GFI = goodness-of-fit index; AGFI = adjusted GFI; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation.
the rest of the factors on the EES-C presented small to medium positive correlations with mood measures (CDI, STAI) and the externalizing and internalizing scales from the CBCL. However, eating psychopathology only presented correlations with Anger and Anxiety from the EES-C, mainly food preoccupation from the ChEAT.

Differences Among Groups in ESS-C

To assess group differences in each emotion related to eating behavior, the participants were divided according to their responses on the QEWP-A. In other words, depending on their LOC pattern, several ANOVAs were conducted. Children were categorized into three eating behavior groups for analysis: those reporting at least one eating episode with OE in the past 6 months \( (n = 26) \), one BE episode \( (n = 28) \), or NED \( (n = 138) \). Table 6 shows the means (standard deviations) for emotional eating in each group. First, ANOVAs were performed to assess group differences. In addition, taking into account the possibility that gender, age (9–12-year-old and 13–16-year-old

TABLE 4
Saturations Table of the Five-Factor Model of the EES-C. Correlations Among Factors

| Factor 1: Anger | Factor 2: Anxiety | Factor 3: Depression | Factor 4: Restlessness | Factor 5: Helplessness |
|-----------------|-------------------|-----------------------|------------------------|------------------------|
| 1. Resentful (Resentido/a) | 1.00 * | 0.440 |
| 2. Discouraged (Desanimado/a) | 0.22** | 0.656 |
| 3. Shaky (Tembloroso/a) | 0.36** | 0.429 |
| 4. Worn out (Rendido/a) | 0.18* | 0.29** | 0.444 |
| 5. Not doing enough (No haciendo lo suficiente) | 0.07 | 0.09 | 0.25** |
| 6. Excited (Ansioso/a) | 0.16 | 0.13 |
| 7. Disobedient (Desobediente) | 0.12 | 0.05 |
| 8. Down (Decaído/a) | 0.11 | 0.03 |
| 9. Stressed out (Inquieta) | 0.11 | 0.03 |
| 10. Sad (Triste) | 0.10 | 0.02 |
| 11. Uneasy (Estresado/a) | 0.10 | 0.02 |
| 12. Irritated (Irritado/a) | 0.10 | 0.02 |
| 13. Jealous (Celoso/a) | 0.10 | 0.02 |
| 14. Worried (Preocupado/a) | 0.10 | 0.02 |
| 15. Frustrated (Frustrado/a) | 0.10 | 0.02 |
| 16. Lonely (Solo/a) | 0.10 | 0.02 |
| 17. Furious (Furioso/a) | 0.10 | 0.02 |
| 18. On edge (Al Limite) | 0.10 | 0.02 |
| 19. Confused (Confuso/a) | 0.10 | 0.02 |
| 20. Nervous (Nervioso/a) | 0.10 | 0.02 |
| 21. Angry (Enfadado/a) | 0.10 | 0.02 |
| 22. Guilty (Culpable) | 0.10 | 0.02 |
| 23. Bored (Aburrido/a) | 0.10 | 0.02 |
| 24. Helpless (Impotente) | 0.10 | 0.02 |
| 25. Upset (Alterado/a) | 0.10 | 0.02 |

F2. Anxiety .503**
F3. Depression .438** .439**
F4. Restlessness .455** .572** .361**
F5. Helplessness .438** .439** .435** .361**

* *p < .001.

TABLE 5
Pearson's Product-Moment Correlations Among EES-C Factors and Psychopathology Measures

| EES-C: Anger | EES-C: Anxiety | EES-C: Depression | EES-C: Restlessness | EES-C: Helplessness |
|--------------|---------------|-------------------|---------------------|---------------------|
| CDI 0.16*   | 0.22** 0.18*   | 0.07 0.25**       | 0.07 0.25**         |
| CBCL 0.26*  | 0.37** 0.26*  | 0.09 0.25**       | 0.09 0.25**         |
| Externalization | 0.29** 0.33** 0.12 | −0.07 0.24*       | −0.07 0.24*         |
| CBCL 0.21** | 0.24** 0.18*   | 0.05 0.21**       | 0.05 0.21**         |
| STAI-C 0.16* | 0.12 0.11     | −0.02 0.06        | −0.02 0.06          |
| Fear of and Preoccupation | 0.08 0.11 0.05 | −0.08 0.01        | −0.08 0.01          |
| With Getting Fat Social Pressure | 0.07 0.09 0.12 | 0.09 0.05        | 0.09 0.05          |
| Food 0.22** | 0.15* 0.05    | −0.04 0.07        | −0.04 0.07          |
| Preoccupation Food Restriction | 0.12 0.06 0.08 | 0.00 0.04        | 0.00 0.04          |

Note: EES-C = Emotional Eating Scale version for children; CDI = Child Depression Inventory; CBCL = Child Behavior Checklist; STAI-C = State-Trait Anxiety Inventory for Children (only Trait); ChEAT = Child Eating Attitudes Test.
*p < .05. **p < .01.
significant, however, the main effect of LOC remained significant, \(F(2, 190) = 6.17, p < .003, \eta_p^2 = .06\). Post hoc comparison (Games-Howell) revealed significant differences between the BE and NED groups (\(p < .05\)). There were no differences among the three weight groups in eating due to Anger, and the LOC \(\times\) Gender interaction was not significant; however, the main effect of LOC remained significant, \(F(2, 183) = 5.83, p < .003, \eta_p^2 = .06\). Finally, there were no differences between the two age groups in eating due to Anger; however, the LOC \(\times\) Age interaction was significant, \(F(2, 187) = 3.24, p < .04, \eta_p^2 = .03\), and the main effect of LOC remained significant, \(F(2, 187) = 5.82, p < .004, \eta_p^2 = .05\). Post hoc comparison (Games-Howell) revealed significant differences between the BE and NED groups (\(p < .05\)), but the OE group followed a different pattern depending on their age, with only the older group being similar in eating due to anger.

Regarding eating related to Helplessness, significant differences were found in the LOC groups, \(F(2, 191) = 3.38, p < .04, \eta_p^2 = .03\). Post hoc comparison (Games-Howell) revealed significant differences between the BE and NED groups (\(p < .05\)). There were no differences between the age groups in eating due to Helplessness, the LOC \(\times\) Age interaction was not significant, and the main effect of LOC lost its statistical significance, \(F(2, 193) = 2.77, p < .06\). Moreover, there were no differences among the weight groups in eating due to Helplessness, and the LOC \(\times\) Weight interaction and the main effect of LOC were not significant. Finally, there were no differences in gender with regard to eating due to Helplessness, but the LOC \(\times\) Gender interaction was significant, \(F(2, 188) = 4.53, p < .01, \eta_p^2 = .05\), and the main effect of LOC remained significant, \(F(2, 188) = 4.12, p < .02, \eta_p^2 = .04\). Post hoc comparison (Games-Howell) revealed significant differences between the BE and NED groups (\(p < .05\)), but the girls in the BE group obtained higher scores than the rest of the groups.

There were no differences among the disordered eating groups with regard to LOC on Anxiety (\(p < .113\)) or on Restlessness (\(p < .06\)), although it was nearly significant, or on Depression (\(p < .02\)). The general factorial ANOVAs were also performed for these variables, and there were no significant differences, with the exception

**TABLE 6**

Means (Standard Deviations) of EES-C Factors in Each Group

|                     | EES-C Anger | EES-C Anxiety | EES-C Depression | EES-C Restlessness | EES-C Helplessness |
|---------------------|-------------|---------------|------------------|-------------------|-------------------|
| **Gender**          |             |               |                  |                   |                   |
| Male<sup>a</sup>    | 2.83 (3.29) | 1.72 (2.22)   | 1.72 (2.22)      | 3.92 (3.60)       | 1.30 (1.72)       |
| Female<sup>b</sup>  | 3.44 (4.09) | 2.20 (2.38)   | 2.20 (2.38)      | 3.06 (2.86)       | 1.59 (2.15)       |
| **Age**             |             |               |                  |                   |                   |
| 9–12<sup>c</sup>   | 2.98 (3.62) | 1.56 (1.85)   | 1.56 (1.85)      | 3.27 (3.23)       | 1.21 (1.63)       |
| 13–16<sup>d</sup>   | 3.23 (3.77) | 2.26 (2.58)   | 2.26 (2.58)      | 3.71 (3.33)       | 1.62 (2.14)       |
| **Weight Status**   |             |               |                  |                   |                   |
| Normal Weight<sup>e</sup> | 3.13 (3.27) | 2 (1.88)      | 2 (1.88)         | 3.64 (3.05)       | 1.41 (1.64)       |
| Overweight<sup>f</sup> | 3.18 (4.01) | 1.8 (2.40)    | 1.8 (2.40)       | 3.55 (3.44)       | 1.70 (2.37)       |
| Obesity<sup>g</sup> | 3.05 (3.95) | 1.9 (2.89)    | 1.9 (2.89)       | 3.15 (3.53)       | 0.92 (1.38)       |
| **Disordered Eating** |           |               |                  |                   |                   |
| BE<sup>h</sup>      | 3.76 (4.07) | 2.07 (2.07)   | 2.07 (2.07)      | 4.38 (3.52)       | 1.34 (1.69)       |
| NED<sup>i</sup>     | 5.10 (5.38) | 2.75 (3.31)   | 2.75 (3.31)      | 4.39 (3.68)       | 2.32 (2.80)       |
|                    | 2.58 (3.70) | 1.76 (2.31)   | 1.76 (2.31)      | 3.15 (3.12)       | 1.29 (1.74)       |

**Note:** EES-C = Emotional Eating Scale version for children; OE = eating episode with overeating; BE = binge eating episode; NED = no episodes of disordered eating.

<sup>a</sup>n = 102.
<sup>b</sup>n = 92.
<sup>c</sup>n = 87.
<sup>d</sup>n = 108.
<sup>e</sup>n = 77.
<sup>f</sup>n = 77.
<sup>g</sup>n = 39.
<sup>h</sup>n = 26.
<sup>i</sup>n = 28.
<sup>j</sup>n = 139.
of Depression, where the main effect of age was significant, $F(1, 188) = 8.40, p < .004, \eta^2_p = .04$, with the older group scoring higher on eating related to depression.

Predictors of Emotional Eating

Multiple regression analysis were conducted using the STAI-C, CDI, CBCL, ChEAT, sex, age, BMI-Z, and LOC episodes as predictors of emotional eating the scores on (see Table 7). Stepwise regression analyses were performed separately for each emotion. These analyses showed that the desire to eat in the presence of Anger was predicted by the STAI-C, $R^2 = .22\%$, $F(1, 78) = 22.05, p < .001$. The desire to eat in the presence of feelings of Helplessness was predicted by the STAI-C and age, $R^2 = 23\%$, $F(1, 77) = 11.37, p < .001$. The urge to eat in the presence of Depression was predicted by the STAI-C and age, $R^2 = 15\%$, $F(1, 79) = 6.78, p < .002$. The urge to eat in the presence of Anxiety was predicted by the STAI-C, $R^2 = 9\%$, $F(1, 79) = 7.73, p < .007$, and the urge to eat in the presence of Restlessness was not predicted by anything.

Given that Anxiety appears in all the regression analysis models, we analyzed the stepwise regression analysis taking out the STAI-C (trait) measure. Regression analysis performed separately for each emotion shows that the urge to eat in the presence of Anger was predicted by the ChEAT scores, $R^2 = 14\%$, $F(1, 77) = 12.7, p = .001$. The urge to eat in the presence of feelings of Helplessness was predicted by the CDI scores, $R^2 = 17\%$, $F(1, 77) = 16.1, p < .001$. The desire to eat in the presence of Depression was predicted by a model comprised of CDI, age, and externalizing scores, $R^2 = 18\%$, $F(1, 77) = 5.35, p < .002$. The urge to eat in the presence of Anxiety was predicted by the externalizing scale of the CBCL, $R^2 = 9\%$, $F(1, 77) = 7.73, p < .007$, and the urge to eat in the presence of Restlessness was not predicted by anything (see Table 7).

### DISCUSSION

The main objective of the present study was to validate the EES-C (Tanofsky-Kraff et al., 2007) in a sample of Spanish children and adolescents. A descriptive analysis of the items showed that children reported eating most frequently in response to feeling resentful and disobedient.

Regarding their psychometric properties, the results indicated that the Spanish translated EES-C is an internally consistent, stable, and valid tool for evaluating the need to eat induced by mood. The CFA revealed that the EES-C factorial structure is composed of five factors assessing the desire to eat due to Anger, Anxiety, Depression, Restlessness, and Helplessness. This structure is similar to the one obtained by Tanofsky-Kraff et al. (2007; Anxiety/Anger/Frustration and Unsettled subscales), but more refined. With the exception of the Restlessness subscale, which did not correlate with any of the study measures, the rest of the subscales presented small to medium positive correlations with the externalizing and internalizing scales from the CBCL, and with both anxiety (as trait) and depression. These results do not agree with the findings from the Tanofsky-Kraff study, which showed no relationships with trait anxiety or with externalizing behaviors. Although in the present study there are associations between the EES-C and mood and externalizing/internalizing measures, the strength of the relationships was low to moderate. Thus, these constructs are clearly different but partially related. Finally, it should be highlighted that the eating psychopathology measures presented correlations only with Anger and Anxiety from the EES-C.

Regarding the differences in emotional eating, there were no differences among groups in their desire to eat due to Anxiety or Restlessness. However, there were significant differences between the BE and NED groups (with the OE group in the middle position) in the desire to eat when Anger or Helplessness were present. In the case of Helplessness, gender had a clear influence because the girls had higher scores in the BE condition. In the case of eating due to Anger, these differences were not influenced by gender or weight. However, although

### TABLE 7

| Prediction Variables | Including STAI Stepwise Regression Model | Not Including STAI Stepwise Regression Model |
|----------------------|-----------------------------------------|-------------------------------------------|
| EES-C                | $\beta$ | t | $\beta$ | t |
| Anger                | STAI-C  | .500 | 5.03** | ChEAT | .375 | 3.56** |
| Anxiety              | STAI-C  | .314 | 2.90** | CBCL | .299 | 2.78** |
| Depression           | STAI-C  | .322 | 3.13** | CDI  | .223 | 2.08* |
|                      | Age    | .268 | 2.52*  | CBCL | .261 | 2.50* |
|                      |        |     |        | Externalization | .217 | 2.27* |
| Restlessness         |        |     |        |               |     |      |
| Helplessness         | STAI-C  | .468 | 4.66** | CDI  | .411 | 4.01** |
|                      | Age    | .232 | 2.30*  |     |     |      |

Note: EES-C = Emotional Eating Scale version for children; STAI-C = State-Trait Anxiety Inventory for Children; ChEAT = Child Eating Attitudes Test; CBCL = Child Behavior Checklist; CDI = Child Depression Inventory.

*p < .05, **p < .01.
age had no influence in the BE or NED groups, being older in the OE group was also related to a greater frequency of eating due to Anger. Finally, although there were no differences among the LOC groups on eating due to Depression, the influence of age was significant, with the older groups obtaining higher scores on their desire to eat when this mood was present.

Finally, the regression analysis showed the importance of trait-anxiety as a predictor of emotional eating. Also, eating due to Anxiety was predicted by Externalizing scores. In addition, eating for Helplessness was predicted by the CDI and eating for Depression was predicted by a model composed of CDI, age, and Externalizing behaviors. Finally, eating due to Anger was predicted by the measure of eating psychopathology, the CheAT score.

Taking together, our results agree with those of Van Strien and Osterveld (2008), who indicated that most young children show a biologically natural reaction to emotional stressors (i.e., loss of appetite when feeling lonely, depressed, or afraid). For most people, emotional overeating may start to occur only later in life. In the present study, a tendency to eat for depression and anger could be observed as the participants got older. The emergence of emotional eating is of great interest due to its low prevalence in young children and its strong link with binge eating in adolescent and adult clinical samples. In support of this finding, a recent study carried out with adult subclinical ED women, Fox and Froom (2009) found strong correlations between disordered eating and the negative emotions, but only anger and sadness were left as significant contributors to disordered eating within the regression analysis.

Finally, the OE group appears to be a risk group. Without having lost control of eating, this group eats large amounts of food and is always in the middle position between the group that has episodes of binging and the one that has NED episodes. This combination of overeating and experiencing negative emotions, especially anger or depression, could place the adolescent in danger of suffering more serious problems in the future. More research is needed to study the development of anomalous eating patterns in adolescence.

There are a number of limitations that must be taken into account when interpreting these results. The first is the size of the sample, which, according to the number of items on the EES-C, should have been somewhat larger, although it was slightly larger than the one used in the study by Tanofsky-Kraff et al. (2007). The fact that all the data were self-reported is also another limitation. Further, the factorial structure developed in the present study (five factors) was obtained in an exploratory analysis of the same sample that was used for the confirmatory factor analysis. Obviously this may capitalize on chance, and cross-validation of results is needed. To obtain strong evidence of confirmatory factorial validity, a new study with an additional sample from the same population would be required.

One of the strengths of the present study is that part of the sample was extracted from a clinical setting (Pediatric Unit specialized in childhood weight loss treatment), so that a broad spectrum of children was obtained, and not only from the community. Another strength is that multi-informant data were used, including the parents’ answers about the presence of psychopathology in children on the CBCL questionnaire.

Implications for Research, Policy, and Practice

This study has shown that different emotions affect emotional eating in children in different ways, so that emotional eating should not be understood as a unique construct but rather as multifactorial. Future research should analyze the relationships between the emotions evaluated with the EES-C and eating habits or diet in children and measure the possible presence of emotional eating in the parents or the feeding practices. Some results have corroborated the heritability of eating behavior, and findings have shown that higher levels of emotional eating by parents are related to higher levels of adolescents’ emotional eating (Snoek, Engels, Janssens, & Van Strien, 2007; Van Strien, van Niekerk & Ouwens, 2009). It would also be interesting to adapt the EES-C to an ecological momentary assessment protocol, wherein children can rate their moods immediately before, during, and after eating.

Several studies have pointed to the increase in eating disorders and obesity in the last few years. The onset of these disorders and problems related to eating in most cases occurs in early childhood. Given the epidemic nature of obesity and its chronic outcome, early identification and intervention may be especially useful. Therefore, the development of valid and reliable instruments to identify patterns related to disordered-eating, such as emotional eating in early childhood, is particularly important. As Tanofsky-Kraff and colleagues (2007) pointed out, the EES-C may serve as a tool to identify targets for treatment intervention with children who are overweight, are at risk for becoming overweight, or present disordered eating patterns. The results of the present study support the potential utility of the EES-C in the study of emotional eating in children and in Spanish samples.

REFERENCES

Achenbach, T. M. (1991). Manual for the Child Behavior Checklist/4-18 and 1991 profile. Burlington: University of Vermont.

Albores, L., Lara-Muñoz, C., Esperón-Vargas, C., Cárdenas, J. A., Pérez, A. M., & Villanueva, G. (2007). CBCL/6-18 validity and
American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: American Psychiatric Association.

Arnow, B., Kenardy, J., & Agras, W. (1995). The Emotional Eating Scale: The development of a measure to assess coping with negative affect by eating. *International Journal of Eating Disorders, 18*, 79–90.

Bentler, P. M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 544–551.

Craighead, W. E., Smucker, M. R., Craighead, L. W., & Ilardi, S. S. (1998). Factor analysis of the Children’s Depression Inventory in a community sample. *Psychological Assessment, 10*, 156–165.

Craigs, J., Rief, W., & Hilbert, A. (2009). Emotion regulation and binge eating in children. *International Journal of Eating Disorders, 42*, 356–362.

Del Barrio, M. V., & Carrasco, M. A. (2004). *Manual of Childhood Depression Inventory by Kovacs*. Madrid, Spain: TEA-Ediciones.

Faith, M. S., Allison, D. B., & Geliebter, A. (1997). Emotional eating and obesity: Theoretical considerations and practical recommendations. In S. Dalton (Ed.), *Obesity and weight control: The health professional’s guide to understanding and treatment* (pp. 439–465). Gaithersburg, MD: Aspen.

Favaro, A., Zanetti, T., Tenconi, E., Degortes, D., Ronzan, A., Veronese, A., et al. (2005). Temperament and impulsive behaviors in eating disordered subjects. *Eating Disorders, 13*, 61–70.

Fox, R. E., & Froom, K. (2009). Eating disorders: A basic emotion perspective. *Clinical Psychology and Psychotherapy, 16*, 328–335.

Garner, D. M., Olmsted, M. P., Bohr, Y., & Garfinkel, P. E. (1982). The Eating Attitudes Test: Psychometric features and clinical correlates. *Psychological Medicine, 12*, 871–878.

Hu, L. T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modelling: Concepts, issues, and applications* (pp. 76–99). Thousand Oaks, CA: Sage.

Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.

Johnson, W. G., Grieve, F. G., Adams, C. D., & Sandy, J. (1999). Measuring binge eating in adolescents: Adolescent and parent versions of the questionnaire of eating and weight patterns. *International Journal of Eating Disorders, 26*, 301–314.

Johnson, W. G., Kirk, A. A., & Reed, A. E. (2001). Adolescent version of the Questionnaire of Eating and Weight Patterns: Reliability and gender differences. *International Journal of Eating Disorders, 29*, 94–97.

Kovacs, M. (1985). The Children Depression Inventory (CDI). *Psychopharmacology Bulletin, 21*, 995–998.

Maloney, M. J., McGuire, J. B., & Daniels, S. R. (1988). Reliability testing of a children’s version of the Eating Attitude Test. *Journal of the American Academy of Child and Adolescent Psychiatry, 27*, 541–543.

Sancho, C., Asorey, O., Aijo, V., & Canals, J. (2005). Psychometric characteristics of the children’s eating attitudes test in a Spanish sample. *European Eating Disorders Review, 13*, 338–343.

Seidertes, N. (1990). *STA-I-C: Self-Assessment Questionnaire*. Madrid, Spain: TEA Ediciones S.A.

Shapiro, J. R., Woolson, S. L., Hamer, R. M., Kalarchian, M. A., Marcus, M. D., & Bulik, C. M. (2007). Evaluating binge eating disorder in children: Development of the children’s binge eating disorder scale (C-BEDS). *International Journal of Eating Disorders, 40*, 82–89.

Snook, H. M., Engels, R. C., Janssens, J. M., & van Strien, T. (2007). Parental behaviour and adolescents’ emotional eating. *Appetite, 49*, 223–230.

Tanofsky-Kraff, M., Theim, K., Yanovski, S., Bassett, A., Burns, N., Ranzenhofer, L., et al. (2007). Validation of the Emotional Eating Scale Adapted for Use in Children and Adolescents (EES-C). *International Journal of Eating Disorders, 40*, 232–240.

Van Strien, T., Frijters, J. E. R., Bergers, G. P. A., & Defares, P. B. (1986). Dutch Eating Behaviour Questionnaire for assessment of restrained, emotional and external eating behaviour. *International Journal of Eating Disorders, 5*, 295–315.

Van Strien, T., Herman, C. P., & Verheijden, M. W. (2009). Eating style, overeating, and overweight in a representative Dutch sample. Does external eating play a role? *Appetite, 52*, 380–387.

Van Strien, T., & Oosterveld, P. (2008). The Children’s DEBQ for Assessment of Restrained, Emotional, and External Eating in 7- to 12-Year-Old Children. *International Journal of Eating Disorders, 41*, 72–81.

Van Strien, T., van Nickerk, R., & Ouwens, M. (2009). Perceived parental food controlling practices are related to obesogenic or lepotogenic child lifestyle behaviors. *Appetite, 53*, 151–154.

Waller, G., & Osman, S. (1998). Emotional eating and eating psychopathology among non eating-disordered women. *International Journal of Eating Disorders, 25*, 419–424.

Weiss, R., Dziura, J., Bergert, T. S., Tamborlane, W. V., Taksali, S. E., Yeckel, C. W., et al. (2004). Obesity and the metabolic syndrome in children and adolescents. *New England Journal of Medicine, 350*, 2362–2374.