Eating Behaviors

Psychometric properties of the Turkish version of the Emotional Eating Scale for children and adolescents

Murat Bektas *, Ilknur Bektas, Yasemin Selekoğlu, Aslı Akdeniz Kudubes, Sema Sal Altan, Dijle Ayar

Dokuz Eylul Universitesi, Hemsirelik Fakultesi, Inciralti, 35340 Izmir, Turkey

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ABSTRACT

This methodological-descriptive-sectional study was performed to assess the validity and reliability of the "Emotional Eating Scale Adapted for Use in Children and Adolescents (EES-C)" scale in Turkey. The sample group of the study was composed of 576 children and adolescents. The data were obtained by using the demographic data collection form and "Emotional Eating Scale Adapted for Use in Children and Adolescents (EES-C)". Cronbach's alpha values for the scale and its subscales were 0.90, 0.86, 0.76 and 0.71; respectively. Item-total correlations for the scale changed between 0.57 and 0.99 ($p < 0.001$). The indices of Model Fit were determined to be Root Mean Square Error of Approximation (RMSA) = 0.051, Goodness of Fit Index (GFI) = 0.91 and Comparative Fit Index (CFI) = 0.97. According to our results, it has been shown that the scale is a valid/reliable instrument to detect the emotional eating of Turkish children and adolescents. EES-C is a convenient tool for professionals to manage and prevent the emotional eating problems.

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1. Introduction

Eating behavior, which starts from the first years of life, is one of the most basic needs that must be met and it is a biological and behavioral process that should be ensured for the healthy growth and development (Bulduk, Yabancı & Demircioğlu, 2002; Savage, Fisher & Birch, 2007). This process is affected by various factors. One of them emotional eating. The emotional response of individuals to eating is named as 'emotional eating'. However, 'emotional eating' is also defined as eating in response to the mood without feeling hunger, apart from the meals or without social necessity. Emotional eating leads to weight gain and thus, obesity. In studies performed on the emotional eating concept, it has been observed that individuals tend to eat more not only under the negative emotional status but also when they have positive feelings (Bekker, van de Meerendonk & Mollerus, 2004; Croker, Cooke & Wardle, 2011; Erkorkmaz, Yılmaz, Demir, Sanislioğlu, Etikan and Özçetin, 2013; Geliebter & Aversa, 2003; Scaglioni, Arrizza, Vecchi & Tedeschi, 2011). When eating is used as a coping method in order to cope with negative feelings, a child will need to eat when she/he has problems even though she/he is not hungry or refuse to eat even though she/he needs to eat. This is an important factor that can affect the eating behavior as well as the health of the child (Bekker et al., 2004; Croker et al., 2011; Erkorkmaz et al., 2013; Geliebter & Aversa, 2003; Scaglioni et al., 2011).

Therefore, it is very crucial to diagnose it correctly and perform the appropriate intervention. In order to do this, there should be effective tools to measure the emotional eating behavior of an individual correctly and efficiently. In our country, there are various descriptive and prevalence studies related to the eating behavior and disorders in the childhood and adolescence (Demirel, Yavuz, Karadere, Şafak & Türkçapar, 2014; Işgın et al., 2014). However, a tool that can measure the eating behavior and the emotional status of children has not yet been found. Therefore, this study has been performed in order to control the validity and reliability of 'Emotional Eating Scale Adapted for Use in Children and Adolescents (EES)' in Turkey. This adult-oriented scale was adapted by Tanofsky-Kraff, Theim, Yanovski, Burns, Ranzenhofer and Yanovski (2007) to be also used in children in order to evaluate their eating behaviors.

2. Material and methods

2.1. Design

This study was designed as methodological, cross-sectional descriptive in order to assess the validity and reliability of 'Emotional Eating Scale Adapted for Use in Children and Adolescents (EES)' in Turkey.

2.2. Participant

This study was performed in randomly selected two high schools and in a secondary school between 1st of February and 30th of April, 2015. It was planned to reach totally 894 students who were studying in classes 5–11 in two high schools and the secondary school in order to clearly show the associations between the items and the scale as

* Corresponding author.

well as to increase the generalizability of scale. We selected the children/adolescents who accepted to participate in the study, who had the consent forms from their parents, who were between the ages of 8–18 and who had the capacity to both read and understand questions in the survey. The 576 children/adolescents who met criteria and filled the survey entirely were included in the study. The rate of access rate was 64.4%.

2.3. Ethical considerations

The permission was obtained from Tanofsky-Kraff et al., who developed the Child and Adolescent Emotional Eating Scale in 2007, via e-mail in order to adapt the scale into Turkish. The consent forms were obtained from University Ethical Committee (IRB approval number: 1268-GOA-2015/06-32) and Provincial National Education Directorate for state schools. Oral consents were obtained from children, and written consent documents were obtained from their families in order them to participate in our study.

2.4. Measure

2.4.1. Demographic data collection form
This form included information regarding the age, gender, class, economic status, height, weight and parental educational status of children/adolescents.

2.4.2. Emotional Eating Scale Adapted to Use in Children and Adolescents (EES-C)
This scale was developed in order to evaluate the emotional eating status of children and adolescents between the ages of 8–17. The original adult based scale was adapted by Tanofsky-Kraff et al. (2007) into children and adolescent emotional eating scale. The scale was composed of 25 items that defined the emotional status related eating behaviors. The scale had three subscales with respect to the reason for eating an excess amount of food; anxiety, anger, and frustration (EES-C-AAF), depressive symptoms (EES-C-DEP) and feeling unsettled (EES-C-UNS). The total variance of these three subscales was 67.2%. Factor loads were between 0.61–0.79 for EES-C-AAF; between 0.57–0.84 for EES-C-DEP; and between 0.52–0.72 for EES-C-UNS. The Cronbach's alpha values were 0.95, 0.92 and 0.83 for three subscales; respectively. In a scale prepared according to the five-point Likert system, the answers were as '1: I never want to eat' and '5: I want to eat a lot'. As the score increases, it can be observed that the eating behavior also increases as a response for the emotional status. Perpiñá, Cebolla, Botella, Lurbe and Torró (2011) adapted this scale into Spanish. Unlike the original scale, the adapted scale had five subscales such as anxiety, anger, depression, restlessness, and helplessness. Five factors explained the 49.1% of the total variance. The Cronbach's alpha values for these five subscales were 0.75, 0.74, 0.64, 0.67 and 0.60; respectively. The factor loads of the Spanish version of the scale were between 0.44–0.65 for anxiety subscale; 0.36–0.75 for anger subscale; between 0.36–0.66 for depression subscale; between 0.36–0.68 for restlessness subscale; and between 0.48–0.67 for helplessness subscale. The scale was found to be reliable and valid for the Spanish population (Perpiñá, Cebolla, Botella, Lurbe and Torró, 2011).

2.5. Data analysis

The validity analyses of the scale were examined by using exploratory and confirmatory factor analyses. The database was divided the scale into two parts by statistical program. Exploratory factor analysis (EFA) was performed in the first part and confirmatory factor analysis (CFA) was performed in the second part. The internal consistency of the scale was evaluated by using Cronbach's alpha, Spearman-Brown and Guttman split-half coefficients. The relationship between item-total score and item subscale total scores were examined by Pearson correlation analysis. In the evaluation of the stability of the scale, Student-t test and Pearson correlation analyses were used. The significance level was determined as 0.05.

3. Results

The mean age of the students was 12.83 ± 1.99, and their age range was 10–18. The 54.3% of the students were male. The 8% of the students were fourth grade, 28.8% f them were fifth grade, 10.8% of them were sixth, grade14.7% of them were seventh grade, 18.2% of them were eighth grade, 9.5% of them were ninth grade, 5.6% of them were tenth grade and 4.0% of them were eleventh grade. The 59.4% of the students stated that their economical status was an average level.

3.1. Validity analyses of ESS-C-T

Item Content Validity Index (I-CVI) and scale CVI (S-CVI) were calculated. The I-CVI between experts were detected between 0.88–0.96 for each item, and S-CVI was 0.91 for of the scale.

As a result of the EFA, the Kaiser-Meyer-Olkin katsayısı (KMO) coefficient was found as 0.904 and Barlett test result was found as $\chi^2 = 5630.693$, p < 0.001. Three factors were detected with eigenvalues less than 1. The variances were 18.9%, 12.7% and 10.8% for three subscales such as EES-C-AAF, EES-C-UNS and EES-C-DEP; respectively. The total explained variance rate was 42.4%. The factor loads were between 0.36–0.67 for EES-C-AAF, they were between 0.37–0.89 for EES-C-UNS and they were between 0.43–0.68 for EES-C-DEP (Table 1).

As a result of CFA, factor loads were between 0.38–0.64 for EES-C-AAF, they were between 0.43–0.66 for EES-C-UNS and they were between 0.30–0.62 for EES-C-DEP. Model compliance indicators were GFI = 0.91, NFI = 0.95, NNFI = 0.97, CFI = 0.97, IFI = 0.97, $\chi^2 = 717.84$, df = 293, p < 0.001 and RMSEA AS 0.051(Fig. 1). The correlation coefficients between the subscales of the scale were as follows: it was 0.78 between EES-C-AAF and EES-C-UNS, it was 0.79 between EES-C-AAF and EES-C-DEP, it was 0.74 between EES-C-UNS and EES-C-DEP (Fig. 1).

3.2. Reliability analysis of ESS-C-T

The total Cronbach's alpha coefficient was detected as 0.90. The Cronbach's alpha value was 0.86 for anger, anxiety and frustration subscales, it was 0.76 for restlessness subscale, and it was 0.72 for depression subscale.

The data were divided into two for the reliability analyses, and the Cronbach's alpha values were found as 0.82 and 0.83 for the first and the second parts; respectively. The correlation coefficient between the first and the second part of the data was calculated as 0.79 (p < 0.05). Spearman-Brown coefficients were calculated as 0.88 for the whole scale, 0.84 for ESS-C-AAF, 0.81 for ESS-C-UNS, and 0.76 for ESS-C-DEP. Guttman split-half coefficients were 0.88, 0.83, 0.81 and 0.74 for the whole scale, ESS-C-AAF, ESS-C-UNS and ESS-C-DEP.

The floor and ceiling effects were found less than 15% when the total score of both the scale and subscales were considered as basal values.

It was determined that the total scale scores of the items and their correlations altered between 0.57–0.99. The item-subscale total score correlation value was 0.47–0.67 for anger, anxiety and frustration subscales, it was between 0.58–0.82 for restlessness subscale, and it was between 0.52–0.67 for depression subscale.

According to the results obtained from the two measurements performed in every three weeks, there was no statistically significant difference between mean scores of the scale and its subscales (p > 0.01).

There was a strong and positive significant relationship between the test-retest scores of ESS and three subscales (ESS = 0.92; EES-C-AAF: 0.73; ESS-C-UNS: 0.75; ESS-C-DEP: 0.86).

The test-retest reliability coefficient of each item was between 0.31–0.72 and it was statistically significant (p < 0.001).

Table 1
Factor loads of the three extracted factor after varimax rotation (n = 288).

items	Factor loads		
	EES-C-AAF	EES-C-UNS	EES-C-DEP
Resentful		0.59	
Discouraged		0.42	
Shaky		0.87	
Worn Out		0.89	
Not doing enough		0.51	
Excited			0.68
Disobedient			0.51
Down	0.62		
Stressed out	0.36		
Sad	0.58		
Uneasy	0.53		
Irritated	0.53		
Jealous			0.49
Worried	0.53		
Frustrated	0.54		
Lonely		0.37	
Furious			0.49
On edge	0.42		
Confused			0.43
Nervous			0.53
Angry	0.56		
Guilty	0.61		
Bored	0.67		
Helpless	0.67		
Upset	0.62		
Happy			0.67
Explained variance (%)	18.9	12.7	10.8
Total explained variance (%)	42.4		
Eigenvalue	7.830	1.681	1.520

4. Discussion

4.1. Validity analyses of ESS-C-T

In this study, both the I-CVI and S-CVI values were found higher than 0.78. It can be emphasized that the compliance between experts are high, the scale items are compatible with Turkish culture and represent the desired area and content validity is ensured (Polit, Beck, & Owen, 2007; Terwee et al., 2007).

In this study, three factors were determined whose eigenvalues were higher than 1. These three factors explained the 42.4% of the total variance. It has been emphasized that the acceptable limit is 40.0–60.0% for the variance (Çam & Baysan-Arabacı, 2010; Hayran & Hayran, 2011; Şencan, 2005). In this study, the total variance was within the accepted values. This result shows that the scale has a strong factor construct. In our study, the total variance was higher than the variance calculated in the study performed by Perpiñá et al. (2011) whereas it was lower than the variance calculated in the study of Tanofsky-Kraff et al. (2007).

As a result of the EFA, the factor loads of the items in three subscales were higher than 0.30. The factor loads in this study was similar to the ones in the original (Tanofsky-Kraff et al., 2007) and the Spanish version (Perpiñá et al., 2011) of the scale. These results show that the Turkish version of the scale has a strong factor construct.

According to the CFA performed with the second part of the data, factor loads of all subscales were higher than 0.30, fit indexes were higher than 0.90 and RMSEA was lower than 0.080. There was a strong and significant relationship between the subscales (Fig. 1). According to literature, Model Compliance indicators should be >0.90 and RMSA should be <0.08 (Hooper, Coughlan & Mullen, 2008; Şimşek, 2010). In our study, CFA results indicate that the data are compatible with the model, they confirm the items of the each subscale, the subscales have relationships with the scale and, items of the each subscale sufficiently explain their factors. In this study, CFA results were not compared with the original scale since CFA values were not calculated in the original study (Tanofsky-Kraff et al., 2007) and same as Spanish version (Perpiñá et al., 2011).

According to our study, the results of exploratory and confirmatory factor analyses support the construct validity of the Turkish version and they show that this version is a valid tool in order to use it with the Turkish samples.

4.2. Reliability analysis of ESS-T

In literature, Cronbach's alpha coefficient value between 0.60 and 0.80 shows that the scale is very reliable (Çam & Baysan-Arabacı, 2010; Nunnally & Bernstein, 2010; Rattray & Jones, 2007; Şencan, 2005). In this study, the Cronbach's alpha coefficient was detected as 0.90 for the whole scale. Cronbach's alpha coefficients for the subscales of the scale were 0.86, 0.76 and 0.72, respectively. These findings show that Cronbach's alpha values of the total scale and the first subscale were highly reliable as well as reliable in other subscales. Results of this study were lower than the results of the original scale whereas they were higher than the results of the Spanish version of the scale.

Another method that is recommended for the reliability analyses is the split-half method (Nunnally & Bernstein, 2010; Rattray & Jones, 2007). In this study, all of the values were found higher than 0.70. Experts specify that the acceptable minimum value of the Cronbach's alpha is 0.70 for Spearman-Brown and Guttman split-half values (Çam & Baysan-Arabacı, 2010; Nunnally & Bernstein, 2010; Rattray & Jones, 2007; Şencan, 2005). The findings indicate that the scale and subscales have high reliability.

Floor and ceiling effects are higher than 15.0%, both the reliability and the validities are inversely influenced (Nunnally & Bernstein, 2010; Rattray & Jones, 2007; Şencan, 2005; Terwee et al., 2007). In this study, it was found that the floor and ceiling effects were lower
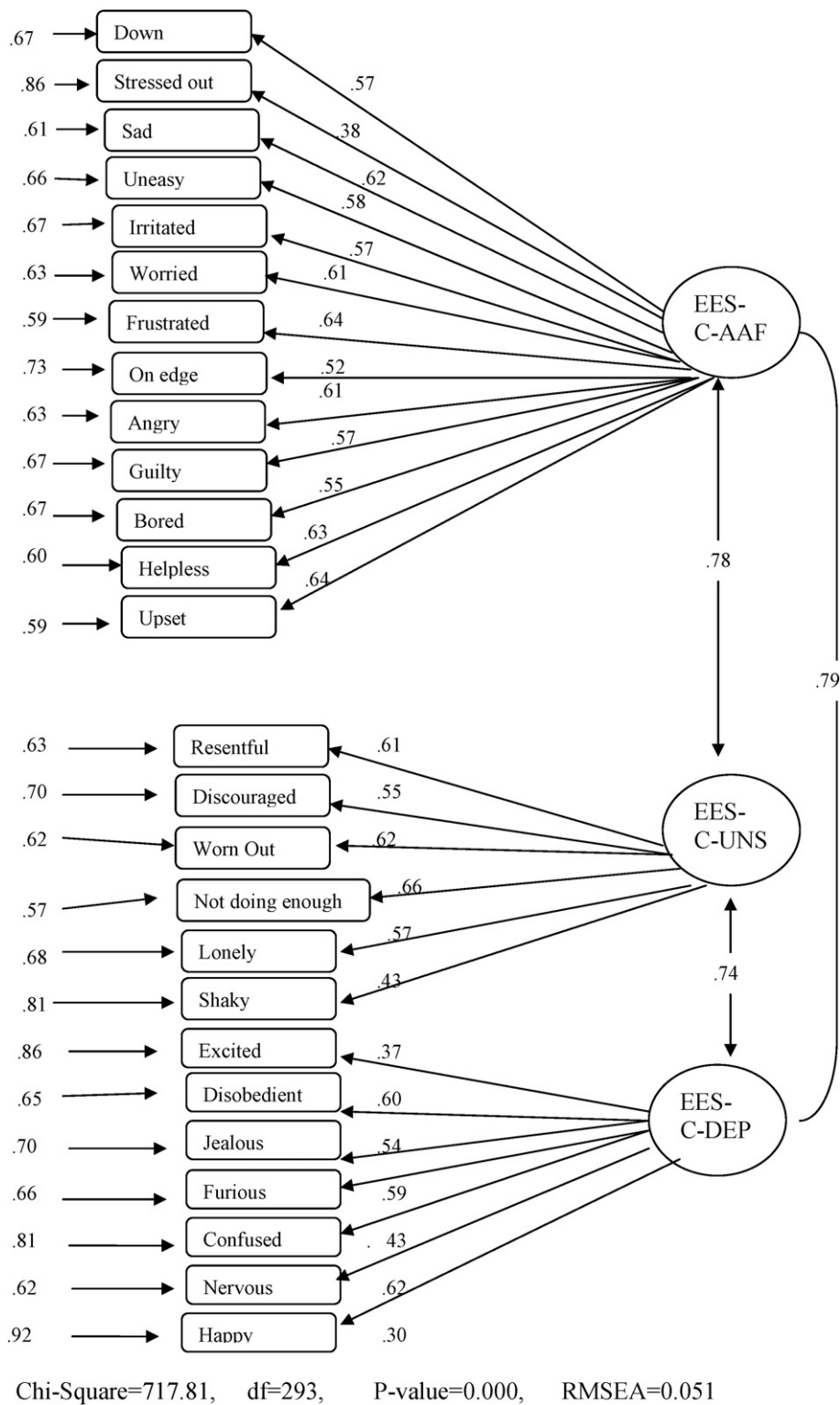
Chi-Square=717.81, df=293, P-value=0.000, RMSEA=0.051

Fig. 1. Confirmatory factor analysis of ESS-C-T.

than 15.0% for all scale and its subscales. These findings show that the scale and its subscales have high reliability.

In this study, both the total item scores and item subscale scores were higher than 0.30. According to these results, total scores of the all items of the scale and total scores of their subscales show sufficient correlation, they adequately measure the desired quality and item reliability of the scale and subscales are high (p < 0.001).

One of the best methods, in order to show the stability of the scales, is the test-retest method (Çam & Baysan-Arabacı, 2010; Nunnally & Bernstein, 2010; Rattray & Jones, 2007; Şencan, 2005). In this study, according to the test-retest analysis results, there was no statistically significant difference between the mean scores of two measurements scale and subscales (p > 0.01). There was a strong and positive relationship between the test-retest scores of the scale and the three subscales

(p < 0.001). The findings of this study and the original scale study show similarities, there was no difference between this study and the original one in terms of the test-retest scores and there is a high correlation between them (Tanofsky-Kraff et al., 2007).

In this study, test-retest coefficients for each item were between 0.31–0.72 (p < 0.001). Accordingly, the answers of the individuals are reliable and items clearly and sufficiently explain the desired topic.

The study has some limitations. The first limitation is that there were no children/adolescents who were clinically diagnosed with overweight or obesity. The second limitation was that all data were obtained from children or adolescents.

5. Conclusion

According to the study, it has been determined that the Children and Adolescents Emotional Eating Scale has high validity and reliability for the Turkish samples. This tool is the reliable and valid tool that can be used by professionals in order to determine the effects of the feelings of children on their eating attitudes. Nurses or other professionals can use this tool to prevent or early detect the eating disorders occur due to the emotional status.

Abbreviations

EES	Emotional Eating Scale
CVI	Content Validity Index
RMSEA	Root Mean Square Error of Approximation
NNFI	Non-Normed Fit Index
CFI	Comparative Fit Index
IFI	Incremental Fit Index
GFI	Goodness of Fit Index
KMO	Kaiser-Meyer-Olkin coefficient
EFA	Exploratory factor analysis
CFA	Confirmatory factor analysis

Authors' contributions

MB conceptualized and designed the study, acquired, analyzed and interpreted the data, and drafted the manuscript. M.B, İ.B, Y.A, D.A, A.A.K and SSA designed the study and revised the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

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