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Cross-cultural adaptation of the intuitive eating scale-2: psychometric evaluation in a sample in Turkey

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Abstract

Intuitive eating is the ability to eat in response to physiological hunger and satiety cues rather than to external or emotional cues. The purpose of this research was to adapt the Intuitive Eating Scale-2 (IES-2; Tylka and Kroon Van Diest 2013) to Turkish in an adult sample. The factor structure of the IES-2 was evaluated in Study 1 ($n = 264$) with exploratory factor analysis (EFA), and in Study 2 ($n = 271$) with confirmatory factor analysis (CFA). Additionally, the correlations of the IES-2 scores with measures of self-esteem, disordered eating, obsessive thoughts, and body anxiety in social situations were assessed in Study 1 to evaluate the scale's convergent validity. EFA results supported the four-factor structure of the original scale with the following factors: eating for physical rather than emotional reasons (EPR), unconditional permission to eat (UPE), reliance on hunger and satiety cues (RHSC), and body-food choice congruence (BFCC). Intercorrelations between the IES-2 total scores and other study constructs were in the expected direction, and ranged from medium to large. CFA results yielded acceptable fit values and supported the 4-factor model of the original scale. A second-order CFA showed that UPE had no association with the second-order latent variable, Intuitive Eating. The results suggest that the IES-2 is a valid and reliable measure of intuitive eating for the adult population in Turkey. Furthermore, it is recommended that Turkish IES-2 total scores be computed without the UPE items. The findings and clinical implications are discussed, and suggestions for future research in other cultural contexts are provided.

Keywords Intuitive eating · The intuitive eating Scale-2 · Factor analysis · Validity · Reliability

Intuitive eating has become increasingly recognized as an adaptive eating behavior. Until recently, eating behaviors were mainly classified as pathological and non-pathological. Yet, non-pathological eating behaviors do not necessarily have to be adaptive (Tylka and Wilcox 2006). Intuitive eating is a type of adaptive eating style described as eating in response to physiological hunger and satiety cues, as opposed to emotional or external cues (Carper et al. 2000; Tribole and Resch 1995; Tylka 2006). People who eat intuitively do not have a preoccupation about food, care about taste, and trust primarily internal cues about when, what and how to eat (Tylka and Kroon Van Diest 2013). While there is a wealth of research on eating disorder symptomatology, research on adaptive eating has been relatively scarce.

On the other hand, clinical programs that aim to increase the reliance on intuitive eating are gradually becoming an alternative to traditional weight loss approaches that focus on dieting and weight loss (Bacon et al. 2005), possibly because maladaptive eating including emotional eating is more likely when dieting (Péneau et al. 2013). Programs based on intuitive eating have indeed been found to achieve long-term weight maintenance among obese or overweight women (Bacon et al. 2005), particularly where calorie-restraining diet programs are not successful (Péneau et al. 2013) and with women who are opposed to the dieting mentality (Cole and Horacek 2010).

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Intuitive Eating: What It Is, How It Is Lost, and Physical and Psychological Benefits

The term intuitive eating was initially coined by Tribole and Resch (1995) as the ability to rely on internal cues of hunger, and to eat without experiencing guilt or an ethical dilemma. Subsequently, unconditional permission to eat, eating for physical rather than emotional reasons, and reliance on internal hunger and satiety cues have been proposed by Tylka (2006) as the three subscales of a measure of intuitive eating. Firstly, people who give themselves unconditional permission to eat consume the foods they desire and do not attempt to avoid any particular foods (Tylka 2006). Secondly, people who eat for physical rather than emotional reasons turn to food to satisfy their physical hunger drive rather than to suppress, numb and/or cope with their emotional fluctuations (Tylka 2006). Thirdly, intuitive eaters rely on their internal hunger and satiety signals and thus, they start eating when they are physically hungry and they stop eating when satiety is achieved. (Birch and Deysher 1985; Birch et al. 1989; Polivy and Herman 1999). Research has shown intuitive eating to be positively associated with physical and psychological well-being, and negatively associated with eating disorder symptomatology. Increase in intuitive eating has been found to be associated with increases in optimism, self-esteem and life satisfaction, and negatively associated with BMI and eating disorder symptoms such as chronic dieting and binge eating (Bacon et al. 2002; Denny et al. 2013; Tylka 2006; Tylka and Wilcox 2006). A systematic review of the studies published between 2006 and 2015 found intuitive eating behavior among adult women to be associated with less disordered eating, a more positive body image, greater emotional functioning, and several other psychosocial correlates (Bruce and Ricciardelli 2016).

Infants and young children are capable of self-regulating their food consumption based on the calorie content of the foods suggesting an awareness of the internal hunger and satiety signals (Birch and Deysher 1985, 1986; Carper et al. 2000). Thus, young children are natural intuitive eaters. Different factors may account for why some individuals may lose their intuitive eating tendency over time. Much research points to the role of socialization practices. Though well-intentioned, parental interference with eating behaviors have been found to disrupt intuitive eating and to lead to poor self-regulation in young children (Birch and Fisher 2000; Carper et al. 2000; Faith et al. 2004). Similarly, disordered eating patterns appear to be transmitted through parental modeling, especially from mothers to daughters (Abramovitz and Birch 2000; Pike and Rodin 1991). Maternal intuitive eating, on the other hand, has been found to moderate the association between concern about child weight and restrictive child feeding (Tylka et al. 2015).

Body acceptance has been proposed as another contributing factor. According to the acceptance model of intuitive eating (Avalos and Tylka 2006), body acceptance by others helps women appreciate their bodies and resist adopting an observer's perspective of their body, which in turn facilitates intuitive/adaptive eating. In fact, body appreciation and resistance to adopt an observer's perspective have been found to mediate the link between body acceptance by others and intuitive eating (Augustus-Horvath and Tylka 2011).

The Intuitive Eating Scale-2 (IES-2)

A recent measure of intuitive eating patterns, used in most of the research reviewed above, is the IES-2, which consist of four factors, (a) unconditional permission to eat (UPE) when hungry and food is desired, (b) eating for physical rather than emotional reasons (EPR), (c) reliance on internal hunger and satiety cues to determine when and how much to eat (RHSC), and (d) tendency to choose foods that honor health and body functioning as well as good taste, namely, body-food choice congruence (BFCC) (Tylka and Kroon Van Diest 2013). The IES-2 scores have been found to be positively associated with different indices of psychological well-being (Tylka and Kroon Van Diest 2013).

The fact that the IES-2 has been adapted to different languages in several Western cultural contexts in the last several years points to the increasing attention on intuitive eating style. In a French adaptation study, a second-order confirmatory factor analysis supported a 3-factor solution influenced by a broader intuitive eating dimension, with satisfactory internal reliability. The IES-2 total score was negatively related to cognitive restraint, emotional eating, uncontrolled eating, and depressive symptoms (Camilleri et al. 2015). Another adaptation study with a sample of French Canadian population in Canada found the IES-2 to have adequate internal consistency and test-retest reliability; intuitive eating was found to be negatively associated with eating disorder symptomatology and with food- and weight-preoccupation, and positively associated with body-esteem and well-being (Carbonneau et al. 2016). An adaptation study with a Portuguese community sample (Duarte et al. 2016) also yielded good internal consistency, construct and discriminant validity, and test-retest reliability; the IES-2 scores were negatively correlated with BMI, eating psychopathology, especially binge eating, body shame, and depressive, anxiety and stress symptoms, and positively correlated with decentering and body image flexibility. Furthermore, intuitive eating played a significant moderating role on the relationship between negative affect and binge eating symptomatology, pointing to a buffering role of intuitive eating on binge eating. Most recently, a German adaptation also found Cronbach's alpha to be quite high for the IES-2 total score, and subscale scores to have negative associations with emotional eating, restraint eating, external eating, binge eating and eating disorder symptomatology, as well as positive

associations with self-efficacy and mental health-related quality of life; in this study, second-order confirmatory factor analysis supported the four-factor solution, with intuitive eating as a higher-order factor (Ruzanska and Warschburger 2017).

The Current Study

Eating behaviors are usually assessed with scales that aim to distinguish disturbed and non-disturbed eating in Turkey, consistent with research trends in the world. The scales that have been previously adapted into Turkish, EAT-40 (Erol and Savaşır 1989), EAT-26 (Ergüney-Okumuş and Sertel-Berk 2016**),** and EDE-Q (Yücel et al. 2011) are some examples. Although a version of the IES-2 was previously adapted to Turkish among a sample of college students, (Bas et al. 2017), findings are difficult to interpret due to methodological and statistical problems. For example, because the IES-2 factor scores are correlated, a factor rotation that allows for factor intercorrelations, such as direct oblimin rotation, is more appropriate. However, the researchers conducted an exploratory factor analysis (EFA) analysis with a varimax rotation, which treats factors as orthogonal. It is surprising that they found exactly the same factor structure using an orthogonal rotation as opposed to a non-orthogonal rotation that was utilized in the original scale. In addition, in the interest of "avoiding capitalization on chance variance" (Kline 2005, p.205), conducting confirmatory factor analysis (CFA) and EFA on the same sample data is not recommended (Brown 2006). Bas et al. (2017) conducted EFA and CFA analysis on the same dataset, which means that cross-validation of the factor structure on an independent sample is lacking. Furthermore, Bas et al. (2017) utilized a university sample, thus, limiting the generalizability of their findings to general population. These are some of the problems that cast doubt on the validity and reliability of this previous adaptation.

A stronger adaptation of the IES-2 to Turkish is important, because it provides an opportunity to reliably compare intuitive eating behaviors in Turkey with international data, thus allowing for cross-cultural comparisons. Additionally, this scale makes it possible to identify individuals who are unable to distinguish physical hunger from emotional hunger, and may be helpful in providing an intervention before an eating disorder develops (Akay 2016). According to the obesity update of the OECD countries in 2017, Turkey is among the top 10 most obese countries, with 29.5% of the adult population identified as obese (OECD 2017).

The purpose of the present research was to evaluate the reliability and validity of a Turkish version of the IES-2 in an adult sample that included both students and non-students. With these goals in mind, two studies were conducted. In Study 1, an EFA was conducted to examine the factor structure of the IES-2 scores. The factor structure of the Turkish version of the IES-2 was expected to be generally similar to the original factor structure (Tylka and Kroon Van Diest 2013) with minor differences possibly due to cultural differences. Additionally, correlations of the IES-2 factor scores with other constructs were examined to evaluate the convergent validity of the scale. The IES-2 total scores were expected to be positively associated with the Rosenberg Self-Esteem Scale (Rosenberg 1965) scores, as such an association was previously demonstrated using the IES (Tylka 2006) and the IES-2 (Tylka and Kroon Van Diest 2013). In addition, scores on the IES-2 were expected to be negatively associated with scores on EAT-26 (Garner et al. 1982), Maudsley Obsessive-Compulsive Inventory (Hodgson and Rachman 1977), and Social Physique Anxiety Scale (Hart et al. 1989) scores, which respectively measure disordered eating, obsessive thoughts, and social anxiety about body. We reasoned that, because the IES-2 scores were positively related to body appreciation (Tylka and Kroon Van Diest 2013), they are likely to be negatively associated with anxiety stemming from physical appearance concerns. Also, as intuitive eating is negatively associated with eating disorder symptomatology, a negative association between EAT-26 and the IES-2 total scores was expected. Finally, we predicted a negative association between the IES-2 total scores and obsessive thoughts mainly because, obsessive thinking, especially rumination and checking, would make it very difficult to adopt intuitive eating patterns. As an indicator for criterion validity, a negative association of the IES-2 total scores with body-mass index (BMI) was expected. Finally, test-retest reliability and internal reliability estimates were evaluated.

The goal of Study 2 was to cross-validate the results of Study 1, specifically the IES-2 factor structure, on a separate sample with an application of a CFA. We expected the four-factor model to yield fit indices comparable to the original scale. Finally, a second-order CFA was conducted to evaluate whether the first-order IES-2 factors load onto a second-order Intuitive Eating factor in a Turkish sample, as was the case for the original scale (Tylka and Kroon Van Diest 2013). The aim was to evaluate the appropriateness of employing the higher-order factor, contributing to the cross-cultural generalizability of such a conceptualization of the IES-2 factors.

Study 1

Method

Participants

Sample size was determined based on the common rule of thumb of at least 10–15 participants per variable (i.e., the 23 IES-2 items) in an EFA analysis (Field 2009). Participants consisted of 264 adults (82% women and 18% men). They were

recruited through convenience sampling from the university subject pool, social media, and personal contacts. Participants ranged in age between 18 and 66 years (M = 33.56, SD = 12.83). Of the participants, 5.7% were high school graduates, 54.2% were either bachelor's level students or graduates, and 40% were master or doctoral students or graduates. Student participants received course credit for their participation, but no compensation was provided for non-students.

Measures

Demographic Information Form The demographic information form included questions about age, gender, height and weight, education, marital status, health status, as well as the composition and monthly income of the household. BMI was calculated as (weight in kilograms)/(height in meters)^2.

The Intuitive Eating Scale – 2 (IES – 2) Originally developed by Tylka and Kroon Van Diest (2013), the IES-2 consists of 23 items scored on a 5-point Likert scale, and has 4 factors: 1) Eating for Physical Rather Than Emotional Reasons (EPR), 2) Unconditional Permission to Eat (UPE), 3) Reliance on Hunger and Satiety Cues (RHSC), 4) Body-Food Choice Congruence (BFCC). The total score of the scale yields an intuitive eating score with higher scores indicating greater levels of intuitive eating.

For the adaptation of the IES-2, the original IES-2 was translated to Turkish by one of the authors of this paper. Another author of the paper, and a second native English speaker, translated this version of the scale back to English. The back translations were compared with the original version, discrepancies were discussed and eliminated, and the final version of the scale was constructed. A pilot testing of the scale was conducted on 10 graduate students recruited through convenience sampling from the same university sample. The purpose was to evaluate possible problems in the wording and understanding of the scale items before collecting data for the main studies. Based on our pilot test results, there was no need for further editing of the scale items and this version of the IES-2 scale was utilized in the current study. The reliability estimates of the Turkish IES-2 are presented in the results section.

Rosenberg Self-Esteem Scale (RSES) Rosenberg Self-Esteem Scale (Rosenberg 1965) is a self-report measure and includes 10 items scored on a 5-Likert-type scale (1-strongly disagree, 5- strongly agree). Higher scores indicate greater self-esteem. RSES was standardized into Turkish by Çuhadaroğlu (1986) and demonstrated high internal reliability (α = .82).

Maudsley Obsessive-Compulsive Inventory (MOCI) Maudsley Obsessive-Compulsive Inventory was originally developed by Hodgson and Rachman (Hodgson and Rachman 1977), and includes 30 items in true-false format (true = 1, false = 0). MOCI was standardized into Turkish by Erol and Savaşır (Erol and Savaşır 1988). For the present study, Checking and Rumination subscales of MOCI were utilized. Although Rumination subscale did not exist in the original version, it was added in its adaptation into Turkish. Higher scores indicate greater levels of Checking and Rumination. The total score of these subscales were utilized in the statistical analysis.

EAT-26 EAT-26 is a self-report measure that aims to assess disturbances in eating patterns, and includes 26 items scored on a 6-Likert-type scale (Garner et al. 1982). It is highly correlated with EAT-40 (r = 0.98) (Garner et al. 1982), as it is a shortened and more economic version of the EAT-40 scale (Garner and Garfinkel 1979). EAT-26 has three factors: dieting, bulimia, and food occupation and oral control. The cut-off score is 20, with scores above 20 pointing to the presence of disturbance in eating patterns. The total score of EAT-26 was utilized in the present study with higher scores indicating more disturbance in eating patterns. EAT-26 was standardized into Turkish by Ergüney-Okumuş and Sertel-Berk (2016), and has good internal reliability (α = .75).

Social Physique Anxiety Scale (SPAS) SPAS includes 12 items scored on a 5-Likert-type scale (Hart et al. 1989). The scores range from 12 to 60 with higher scores indicating more anxiety about physical appearance. SPAS was standardized into Turkish by Mülazımoğlu and Aşçı (2006), and has high internal reliability (α = .81 for women, α = .77 for men). In the Turkish version, the items are scored on a 6-Likert-type scale.

Procedure

The data were collected through Survey Monkey via an anonymous survey link. Participants were first informed about the study via informed consent form, and then proceeded to fill out the aforementioned scales. The order of the scales was randomized for each participant. Out of 264, 139 participants provided their e-mail addresses for a second application (i.e., retest) of the IES-2. In this second application, participants (n = 58) only filled out the IES-2. Mean test-retest interval was 24.5 days (SD = 6.764, range = 18–45 days). All procedures were conducted based on the ethical regulations of the XXXXX University Ethics Committee, and data collection started after Ethics Approval was obtained from the committee.

Statistical Analyses

All statistical analyses were conducted using SPSS and R (R Core Team 2017) statistical packages. An exploratory factor analysis (EFA) was conducted on the 23 IES-2 items using principal axis factoring. As the IES-2 factors are correlated,

direct oblimin rotation with a delta weight of zero was employed. The following four criteria were used in determining the number of factors to retain: eigenvalues above 1.0, scree plot, parallel analysis, and the interpretability of the factor solutions (Tabachnick and Fidell 2007). Internal reliability was assessed by Cronbach alpha estimates, and test-retest reliability was assessed by intra-class correlation coefficients (ICC). Convergent validity was evaluated by the correlations of the IES-2 total scores and factor scores with the other measured constructs. Criterion validity was examined by the correlation of the IES-2 total scores with BMI.

Results

Exploratory Factor Analysis

The EFA was performed on 23 items of the Turkish IES-2. Kaiser-Meyer-Olkin test of sampling adequacy was 0.88, implying adequate common variance (Tabachnick and Fidell 2007). The results of the EFA yielded five factors with eigenvalues greater than 1.0. Initial eigenvalues and percentage of variance accounted for by each of these factors were 8.13 and 35.35% for Factor 1, 2.61 and 11.36% for Factor 2, 2.21 and 9.63% for Factor 3, 1.52 and 6.62% for Factor 4 and 1.14 and 4.97% for Factor 5. Together they accounted for 67.94% of the total variance. When the scree plot was examined, there was some uncertainty as to whether a 3 or a 4-factor model best fit the data. The EFA was run again by fixing the number of factors to 3 and then to 4. Item composition of the 3-factor model was not theoretically interpretable because the items that were clustered into the same factor did not measure a uniform subject. Thus, the 3-factor model was theoretically problematic due to item composition, and the 4-factor model had better fit to the data and theoretical expectations. Finally, a parallel analysis was conducted for a more accurate and objective estimation of the number of factors in the data set (Brown 2006). Parallel analysis shows eigenvalues of the existing data set along with a random data set that has identical dimensionality, and the intersection point is accepted as the appropriate factor number (Brown 2006). Results of the parallel analysis also supported the 4-factor structure. Based on these criteria, we concluded that the Turkish IES-2 supported the 4-factor structure.

Table 1 presents the pattern matrix of the item-factor loadings of the IES-2 total scores. Items with a factor loading of 0.40 are considered to sufficiently represent a factor (Tabachnick and Fidell 2007). In the first run of the EFA, Item 21 (*Most of the time, I desire to eat nutritious foods*) had primary factor loading lower than .40. When Item 21 was removed and EFA was conducted again, Item 6 (*I do NOT follow eating rules or dieting plans that dictate what, when, and/or how much to eat*) had a low primary factor loading. When Item 6 was removed and a final EFA was conducted, all remaining items had acceptable factor loadings. These two items were removed from the scale and were excluded from further statistical analyses (Field 2009; Tabachnick and Fidell 2007).

The IES-2 factor intercorrelations are presented in Table 2. All factor scores correlated positively with the IES-2 total scores. Factor intercorrelations were all positive except for the correlation between UPE and BFCC. Also, associations of UPE with EPR and RHSC were not statistically significant.

Reliability

Internal Reliability The Cronbach's alpha of the IES-2 total scores was .89. Cronbach's alpha estimates for the IES- 2 subscales of EPR, UPE, RHSC, and BFCC were .94, .71, .92, and .87 respectively.

Test-Retest Reliability The ICC was estimated from one-way random effect ANOVA model with the participants as the random effect (Shrout and Fleiss 1979). ICC was 0.89 for the IES-2 total score [95% *CI* = 0.82–0.94], 0.87 for EPR [95% *CI* = 0.78–0.92], 0.68 for UPE [95% *CI* = 0.47–0.81], 0.86 for RHSC [95% *CI* = 0.77–0.92], and 0.82 for BFCC [95% *CI* = 0.70–0.89].

Validity

Convergent Validity Correlations of the IES-2 total scores and subscale scores with the other measures are presented in Table 2. The IES-2 total scores as well as EPR and RHSC subscale scores were positively associated with self-esteem scores but negatively associated with EAT-26, SPAS, and MOCI scores. UPE subscale scores were negatively correlated with EAT-26 and SPAS scores, but correlations with MOCI and self-esteem scores were not statistically significant. BFCC subscale scores were negatively correlated with SPAS scores and positively correlated with self-esteem scores, but correlations with EAT-26 and MOCI scores were not statistically significant.

Criterion Validity The mean BMI was 22.88 with $SD = 3.96$ for women, and was 25.77 with $SD = 3.98$ for men. BMI ($n = 228$) was negatively associated with the IES-2 total scores ($r = -.26$, $p < .001$), EPR subscale ($r = -24$, $p < .001$), RHSC subscale ($r = -.15$, $p = .020$), and BFCC subscale ($r = -.21$, $p = .002$), but was not reliably associated with UPE subscale ($r = -.07$, $p = .25$).

Study 2

As the results of EFA partly depend on sampling variability, it is recommended that CFA is conducted on a separate sample (Brown 2006). The purpose of Study 2 to was to cross-validate the factor structure obtained from Study 1 on a

Table 1 Pattern matrix factor loadings of the Turkish IES-2

	Factor			
	1	2	3	4
1. Eating for Physical Reasons (EPR)				
10 - I find myself eating when I am stressed out, even when I'm not physically hungry.	.94			
8 - I find myself eating when I am lonely, even when I'm not physically hungry.	.92			
9 - I use food to help me soothe my negative emotions.	.92			
7 - I find myself eating when I'm feeling emotional (e.g., anxious, depressed, sad), even when I'm not physically hungry.	.88			
13 - When I am lonely, I do NOT turn to food for comfort.	.75			
14 - I find other ways to cope with stress and anxiety than by eating.	.68		.16	.11
12 - When I am bored, I do NOT eat just for something to do.	.55		.16	
11 - I am able to cope with my negative emotions (e.g., anxiety, sadness) without turning to food for comfort.	.46		.24	
2. Unconditional Permission to Eat (UPE)				
1 - I try to avoid certain foods high in fat, carbohydrates, or calories.	−.11	.70		
2 - I have forbidden foods that I don't allow myself to eat.	.15	.62	−.14	
5 - I allow myself to eat what food I desire at the moment.		.55	.16	
3 - I get mad at myself for eating something unhealthy.	.15	.52		
4 - If I am craving a certain food, I allow myself to have it.	−.10	.50		
6 (*removed*) - I do NOT follow eating rules or dieting plans that dictate what, when, and/or how much to eat.	.12	.24	.16	−.12
3. Relying on Hunger and Satiety Cues (RHSC)				
17 - I trust my body to tell me how much to eat.			.86	
18 - I rely on my hunger signals to tell me when to eat.			.86	
20 - I trust my body to tell me when to stop eating.			.84	
19 - I rely on my fullness (satiety) signals to tell me when to stop eating.			.78	
15 - I trust my body to tell me when to eat.	.13		.71	
16 - I trust my body to tell me what to eat.	.10		.69	
4. Body-Food Choice Congruence (BFCC)				
23- I mostly eat foods that give my body energy and stamina.	.15			.90
22 - I mostly eat foods that make my body perform efficiently (well).	.15	−.11		.74
21 - (*removed*) - Most of the time, I desire to eat nutritious foods.				.26

different sample, thus providing further support to the factor structure of the Turkish IES-2.

Method

Participants

A similar convenience sampling was used in Study 2, approximately three months after the completion of Study 1. Announcements of Study 2 were distributed through social media and contacts of the authors. The initial target was a sample of 300 participants and the final sample size ended up somewhat lower than the initial aim, but satisfied the minimum of five participants per estimated parameter criterion for a CFA (Field 2009; Tabachnick and Fidell 2007). Participants consisted of 271 adults (83.8% women, 15.5% men), with age ranging between 18 and 63 years ($M = 28.22$, $SD = 11.30$). Of the participants, 4.8% were high school graduates, 66.8% were either bachelor's level students or graduates, and 28.4% were master or doctoral students or graduates. Participants were asked to not participate in this second study if they had already participated in the first one. No other exclusion criteria were employed. Student participants received course credit for their participation, but no compensation was provided for non-students.

Measures

Only two measures that were utilized in Study 1, The Turkish version of the IES-2 and the demographic questionnaire (see Study 1) were used in Study 2.

Procedure

The data were collected through Survey Monkey via an anonymous survey link. All participants signed an informed consent form prior to enrolling in the study, and were informed that a debriefing would be possible via e-mail. After providing

Table 2 Descriptive statistics, the IES-2 subscale intercorrelations, and correlations of the IES-2 scores with other variables

Variable	1	2	3	4	5	6	7	8	9
1. IES-2 total score	–								
2. IES-2 EPR subscale	0.89 **	–							
3. IES-2 UPE subscale	0.34 **	0.08	–						
4. IES-2 RHSC subscale	0.80 **	0.57 **	0.11	–					
5. IES-2 BFCC subscale	0.36 **	0.28 **	−0.17 *	0.28 **	–				
6. EAT-26	−0.29 **	−0.19 *	−0.38 **	−0.23 **	0.09	–			
7. Social Physique Anxiety	−0.63 **	−0.56 **	−0.21 **	−0.52 **	−0.21 **	0.40 **	–		
8. MOCI – Checking & Rumination	−0.31 **	−0.31 **	−0.02	−0.26 **	−0.08	0.24 **	0.33 **	–	
9. Self-esteem	0.41 **	0.39 **	0.01	0.35 **	0.23 **	−0.07	−0.49 **	0.41 **	–
M, women	3.31	3.13	3.34	3.54	3.27	13.11	39.91	18.29	30.42
SD, women	.64	1.03	.69	.89	.91	8.48	12.21	2.74	5.59
M, men	3.66	3.81	3.44	3.72	3.40	11.45	34.53	18.77	32.23
SD, men	.57	.88	.89	.82	.87	6.62	12.83	2.49	4.84
α	.89	.94	.71	.92	.87	.79	.89	.78	.90

$N = 264$. IES-2, intuitive eating scale 2; EPR, eating for physical rather than emotional reasons; UPE, unconditional permission to eat; RHSC, reliance on hunger and satiety cues; BFCC, body–food choice congruence; MOCI, maudsley obsessive-compulsive inventory, α, cronbach's alpha

* $p < .01$, ** $p < .001$

consent, participants first filled out the Turkish version of the IES-2, and second, the demographic information form.

Statistical Analyses

All statistical analyses were conducted using the R package lavaan (Rosseel 2012). A confirmatory factor analysis was conducted to evaluate the fit indices of the four-factor model. One indicator of each factor was chosen as a marker variable. As the IES-2 is rated on an ordinal scale, Unweighted Least Squares (ULS) was used as the estimation method (also see Camilleri et al. 2015 for use of ULS). ULS provides more accurate and less variable parameter estimates, precise standard errors, and better coverage rates (Forero et al. 2009; Koğar and Yılmaz Koğar 2015). The model fit was evaluated using traditional criteria. Specifically, good model fit is indicated by root mean square error of approximation (RMSEA) (≤ .06, 90% CI ≤ .06), standardized root mean residual (SRMR) (≤ .08), comparative fit index (CFI) (≥ .95), and Tucker-Lewis index (TLI) (≥ .95) (Brown 2006). In addition to the fit indices of the standard four-factor model, a second-order CFA was conducted. In this analysis, all indicators of the first-order CFA model were kept the same, but a second-order latent variable was specified, and it was regressed on the first order latent variables.

Results

Confirmatory Factor Analysis

The CFA was performed on 21 items of the Turkish IES-2. The goodness-of-fit indices of the four-factor model demonstrated good fit to the data (see Table 3). Modification indices higher than 10 were examined in order to explore sources of ill-fit. Items 4 and 5, 15 and 18, 19 and 20, 7 and 10, and 15 and 19 had relatively high modification indices, mainly because their wordings were similar. Other researchers have also reported the effects of similarly worded items on the scale's factor structure. For example, Tylka and Kroon Van Diest (2013) also found these same items sharing method variance in their study. Correlated errors between the aforementioned items were estimated in a new CFA analysis, and the results showed a slight improvement in the fit indices (see Table 3).

A second-order CFA was conducted to examine whether four factors load on a second-order intuitive eating factor, as was the case in previous studies (Camilleri et al. 2015; Tylka and Kroon Van Diest 2013). A higher order factor was named "Intuitive Eating", and all the first-order latent variables, i.e., the IES-2 factors, were specified to load onto this second-order factor. The results indicated that two of the goodness of fit indices were worse than the accepted baselines (RMSEA = 0.073 with 90% *CI* = 0.065–0.082 and SRMR = 0.082), but others were found to be acceptable (CFI = 0.962, TLI = 0.957). As it was the case in the first-order CFA, correlated errors between items 4 and 5, 15 and 18, 19 and 20, 7 and 10, and 15 and 19 were estimated in a new CFA, since these items were found to share method variance. Goodness of fit indices for this modified model with correlated errors showed a slightly better fit to data (see Table 3).

Finally, when the factor loadings were examined, it was seen that UPE loaded weakest on the second-order Intuitive Eating factor with a loading of 0.01 ($p > .05$) while other

Table 3 Goodness of Fit indices of first and second-order CFA of the IES-2 scores

Models	χ^2	*df*	χ^2/df	CFI	TLI	RMSEA	90% CI	SRMR
First order								
1	344.07	183	1.88	0.98	0.97	0.057	0.048–0.066	0.07
2	280.14	178	1.57	0.99	0.98	0.046	0.036–0.056	0.06
Second-Order								
1	454.77	185	2.46	0.96	0.96	0.073	0.065–0.082	0.08
2	388.39	180	2.16	0.97	0.97	0.065	0.057–0.074	0.07
Second-Order (Study 1)								
1	417.38	185	2.25	0.98	0.98	0.069	0.060–0.078	0.07
2	368.01	180	2.04	0.99	0.98	0.063	0.054–0.072	0.06

N = 271 for Study 2 and n = 264 for Study 1. 1 refers to the 4-factor model, 2 refers to the modified 4-factor model. CFI, comparative fit index; TLI, tucker-lewis index; RMSEA, root mean square error of approximation; CI, confidence interval; SRMR, standardized root mean residual

factors had strong positive loadings (EPR = 0.66, RHSC = 0.71, BFCC = 0.44). UPE's loading on the second-order factor was statistically significant in the original study, and the French adaptation of the IES-2 (Camilleri et al. 2015; Tylka and Kroon Van Diest 2013). We considered whether this finding was specific to the present data. A post hoc second-order CFA was conducted on the data from Study 1 to examine whether UPE's non-significant loading to the second-order factor would be evident in a different sample. The second-order CFA on Study 1 data also indicated that UPE had a statistically non-significant loading (0.01), whereas other factors had significant strong loadings (EPR = 0.78, RHSC = 0.78, BFCC = 0.37) on the second-order Intuitive Eating factor, consistent with the Study 2 findings. UPE was not associated with the second-order factor in either of the samples.

Discussion

The present research aimed to adapt the IES-2 (Tylka and Kroon Van Diest 2013) to Turkish in an adult sample. To this end, two different studies were carried out. The original IES-2 was translated to Turkish, and its factor structure was explored through an EFA together with evaluations of test-retest and internal reliability, and convergent validity. Test–retest reliability was high for three subscales, and moderate for the UPE. Internal reliability estimates of the IES-2 factors were high except for the UPE, where, again, internal reliability was moderate. Results suggested the Turkish IES-2 to be a reliable and valid tool for the assessment of adaptive, intuitive eating patterns.

The EFA results of the Turkish IES-2 revealed a factor structure similar to the one in the original study (Tylka and Kroon Van Diest 2013) except for the low factor loadings of the two items. The Turkish IES-2 became a 21-item scale, after the removal of Item 21 ('*Most of the time, I desire to eat nutritious foods'*) and item 6, ('*I do NOT follow eating rules or dieting plans that dictate what, when, and/or how much to eat'*). The remaining two BFCC items are about stamina and energy, and thus, are not necessarily related to the nutrition value of the food. It is possible that Turkish people may have a more distinct idea about nutritious foods compared to other Western cultures where the scale was adapted, and may have responded differently to Item 21 compared to the other BFCC items. In this interpretation, nutrition value of food does not necessarily entail stamina and energy. Item 6 is the only one among the UPE items that is not about eating habits and the restraints; rather it is about rules and plans. Since it is distinct from the other UPE items, it is possible to say that the participants might have responded in a different response set to this item as well.

All the IES-2 subscales had statistically significant associations with the IES-2 total score. Similar to the original study, UPE was negatively associated with BFCC. Such a result is not surprising, because sometimes giving unconditional permission to eat may conflict with choosing the food that yields energy and stamina (Tylka and Kroon Van Diest 2013). Convergent validity was determined by examining the correlations of the IES- 2 total scores with scores on self-esteem, disordered eating, obsessive thoughts, and body anxiety in social situations; and the pattern of correlations supported our initial predictions. The Turkish IES-2 had positive association with self-esteem, but negative associations with disordered eating, in line with prior studies. As for the novel findings, higher levels of intuitive eating were associated with lower levels of obsessive thoughts and social physique anxiety. The size of these associations was in the moderate to large range. The mechanisms related to these associations should be examined in future studies. The negative association of the IES-2 total scores with BMI provided evidence for the scale's criterion validity. BMI had statistically significant associations with all IES2-subscales except for the UPE, though the direction of association was negative. Intuitive eating is related to a

lower BMI (Tylka and Kroon Van Diest 2013) suggesting that listening to bodily signals and eating according to these signals helps with weight control. The reason for this relationship is likely to rest on the effect of dietary restraints on eating habits. Dietary or parental restraints reduce sensitivity to bodily hunger signals leading to increased emotional eating and adverse changes in BMI (Birch and Fisher 2000; Costanzo et al. 2001). The Turkish IES-2 has good convergent and criterion validity based on these correlational findings.

The goal of Study 2 was to cross-validate the Turkish IES-2 on a different sample, and a CFA was conducted to examine the fit indices of the factor structure that emerged from Study 1. The CFA results indicated that the original 4-factor model (Tylka and Kroon Van Diest 2013) had the best fit with the data. Furthermore, when correlated errors were estimated in a modified version of the 4-factor model, the goodness of fit indices showed slight improvement. Similar modifications to the original 4-factor structure were also the case in the original study (Tylka and Kroon Van Diest 2013), and thus, not unique to the Turkish translation of the scale. The factor structure of the Turkish IES-2 obtained in Study 1 via EFA was confirmed in Study 2 via CFA.

Lastly, the possibility of a higher-order factor, Intuitive Eating, was examined by a second-order CFA. Although the second-order CFA model yielded good fit to the data, the fit indices were slightly lower than the first-order CFA models. Importantly, UPE's factor loading on the second-order factor was not statistically significant; in fact, it was zero, indicating the absence of an association. To explore whether this might have to do with the characteristics of the sample, a post hoc second-order CFA was conducted on the Study 1 data, and the results were almost identical to the previous analysis, suggesting that Study 2 results are not an artifact of sampling. These findings suggest that UPE had no relationship with Intuitive Eating in the Turkish sample. Although it is not possible to give a definite reason for this cultural difference, a tentative argument might be suggested here. Collectivistic cultures are usually considered as relying more on intuitions. As collectivistic and individualistic tendencies have been found to coexist among young people in Turkey (Göregenli 1995), it can be hypothesized that a factor that has a high amount of mental involvement might not be perceived as an intuitive process. Mental involvement refers to more deliberate, intentional decisions leading to conditional eating patterns (i.e., which foods are forbidden, which foods need to be avoided, etc.) rather than acting on intuition. Such a pattern is likely to dissociate UPE items from intuitive eating. Our recommendation for researchers who use the Turkish IES-2, is to not include UPE items in the IES-2 total score calculations as UPE was unrelated to higher-order Intuitive Eating factor in this study, confirmed by two separate analyses on two separate samples. A more extensive analysis is beyond the scope of current study; however it is important to keep in mind this cultural difference for future research. Future research should investigate the reasons and underlying mechanisms for this perception of UPE in the Turkish population as well as in other cultures.

Although an adaptation of the IES-2 to Turkish was conducted by Bas et al. (2017), methodological and statistical problems in that study make it very difficult to take their results for granted. Our findings indicate that the factor structure of the Turkish IES-2 differs in some respects from the original version. The discrepancy between our and Bas et al.'s (2017) findings is likely to be a combination of differences in the application of statistical analysis, as well as the sampling characteristics and data collection methods. In their study, participants were college students and all data were collected in classrooms. In contrast, our sample consisted of adults sampled from both students and non-students, varied more in age; and all data collection was done online. The present study was conducted with a total sample of 535 participants who varied on demographic characteristics such as age and socioeconomic background. As such, the sample was more heterogeneous. As this is a scale that will probably be applied to the general population, and not just to young adults, we believe that our findings have higher external validity.

Clinical Implications

The Turkish IES-2 is the first scale that assesses adaptive eating behaviors in Turkish. Scales measuring eating related attitudes that have been adapted into Turkish so far assess disordered eating behaviors. However, low disordered eating symptomatology does not mean that the individual has the ability to distinguish physical hunger from emotional hunger, or that he/she has adaptive eating behaviors. Thus, previous scales are not adequate to assess adaptive eating patterns. This scale makes it is possible to assess intuitive/adaptive eating behaviors among the Turkish population. Furthermore, this scale makes it possible to compare the Turkish data with international data, allowing for cross-cultural comparisons.

A systematic review of the intuitive eating interventions suggested that intuitive eating is associated with lower depression, anxiety and negative affect, and higher self-esteem, body image and interpersonal effectiveness as well as improvements in blood pressure and cardiorespiratory fitness even in the absence of weight loss (Schaefer and Magnuson 2014). Furthermore, another review article concluded that intuitive eating reduces disordered eating and body image concerns and promotes greater emotional functioning and psychological well-being (Bruce and Ricciardelli 2016). Thus, intuitive eating has shown to promote both physical and psychological well-being.

Limitations and Suggestions for Future Research

There are several limitations of the current studies. First, although both male and female participants were included in the

studies, male participants were much fewer than female participants, limiting the generalizability of the data for men. Future research should involve more male participants or focus solely on men and their intuitive eating behaviors. Second, the characteristics of the samples in these two studies may not represent the Turkish population as a whole. The education and income levels of the participants were much higher than the average population. Future research should be conducted with a more representative sample. Third, these data were collected from participants who do not have a diagnosed eating disorder. It would be interesting to collect data from people who have different eating disorders like anorexia nervosa, bulimia nervosa, and binge-eating disorder. This is likely to be useful in comparing disorder-specific fluctuations in the IES-2 total and factor scores.

Conclusion

Adaptive eating is not the same as non-disordered eating and has its own dynamics; hence, scales that assess disordered eating are inadequate for its assessment. Intuitive eating is one type of adaptive eating and the IES-2 is one of the best tools that assess it. The Turkish IES-2 will be beneficial in identifying individuals' ability to distinguish physical hunger from emotional hunger in the Turkish population. The present research, despite its limitations, may be regarded as a valuable contribution towards assessing adaptive eating behaviors in Turkish. The value of these studies is not limited to its use with the Turkish population. Future adaptations of the IES-2 into different languages can benefit from the method and the findings of this research.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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