

# Psychometric Properties of the Intuitive Eating Scale -2 and Association with Binge Eating Symptoms in a Portuguese Community Sample

Cristiana Duarte\*, José Pinto Gouveia, Ana Mendes

Universidade de Coimbra, Portugal

## ABSTRACT

Intuitive eating entails the ability to connect with and understand one's internal hunger and satiety signals, instead of engaging in reactive maladaptive eating behaviours. The current study aimed at examining the factorial structure and psychometric properties of the Intuitive Eating Scale-2 (IES-2) in the Portuguese population. Also, it aimed at investigating the correlates of intuitive eating and its moderator effect on the association between negative affect and binge eating symptoms. The factorial structure and psychometric properties of the IES-2 were examined in a sample of 545 women and were further corroborated in a distinct sample comprised by men and women from the general community ( $N= 642$ ). Results supported the four-factor structure of the IES-2, including the subscales: eating for physical reasons rather than emotional reasons; unconditional permission to eat; reliance on hunger and satiety cues; and body-food choice congruence. The scale presented good internal consistency, construct and discriminant validity, and test-retest reliability. IES-2 presented negative correlations with BMI, eating psychopathology, especially binge eating, body shame, and depressive, anxiety and stress symptoms; and positive correlations with decentering and body image flexibility. Furthermore, intuitive eating significantly moderated the relationship between negative affect and binge eating symptomatology. Findings support that the IES-2 is a valid and adequate measure of intuitive eating. Results further highlight the association between intuitive eating and mechanisms relevant for eating and weight regulation, and the possible buffer effect of intuitive eating against binge eating symptoms, carrying therefore important implications for the treatment and prevention of eating-related problems.

*Key words:* intuitive eating, IES-2, body image, binge eating.

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### Novelty and Significance

*What is already known about the topic?*

- There is growing research on adaptive eating behaviour, namely intuitive eating.
- The Intuitive Eating Scale -2 (IES-2) is a validated measure of intuitive eating.
- Intuitive eating has been associated with decreased eating psychopathology and elevated wellbeing.

*What this paper adds?*

- The psychometric properties of the Portuguese version of the IES-2 in a large community sample were examined.
- Intuitive eating is associated with decentering and body image flexibility, and decreased eating psychopathology, especially binge eating symptoms.
- Intuitive eating buffers the effect of depressive symptoms on binge eating symptoms.
- Findings suggest the relevance of intuitive eating for the prevention and treatment of disordered eating.

\* Correspondence concerning this article: Cristiana Duarte, Centro de Investigação do Núcleo de Estudos e Intervenção Cognitivo-Comportamental (CINEICC), Faculdade de Psicologia e de Ciências da Educação, Universidade de Coimbra, Rua do Colégio Novo, s/n 3001 -802 Apartado 6153, Coimbra, Portugal. Email: cristianaoduarte@gmail.com. *Acknowledgement:* This research was supported by the first author Grant SFRH/BD/76858/2011, sponsored by Fundação para a Ciência e a Tecnologia (FCT).

Although there has been a continuous effort on the assessment and treatment of disordered eating, the interest on adaptive eating behaviours is rising. There is a growing body of research focused on intuitive eating, which entails the ability to guide eating behaviour through one's connection with and understanding of physiological hunger and satiety signals (Tribole & Resch, 1995). Intuitive eating involves an awareness of one's body's physical needs to reach optimal health, and the use of distinct internal signals to determine when, what, and how much to eat; instead of following predetermined inflexible dietary rules, or eating as a response to emotional states (Tribole & Resch, 1996).

The Intuitive Eating Scale (IES; Tylka, 2006) was developed to measure intuitive eating according to three dimensions: unconditional permission to eat (UPE), reflecting the readiness to eat in response to internal physiological hunger cues and the food that is desired at the moment; eating for physical reasons rather than emotional reasons (EPR), referring to the ability to eat when physically hungry, and not to cope with emotional distress; and reliance on hunger and satiety cues (RHSC) involving the capacity to determine when and how much to eat, based on one's internal hunger and satiety signals (Tribole & Resch, 1995; Tribole & Resch, 1996). The scale showed good internal consistency, test-retest reliability and construct validity. The IES was further validated in other populations (e.g., middle school boys and girls; Dockendorff, Petrie, Greenleaf, & Martin, 2012) and languages (e.g., Portuguese; Duarte, Pinto Gouveia, & Azevedo, 2015).

This scale was recently revised by Tylka and Kroon Van Diest (2013) in order to include mostly items designed to assess intuitive eating attitudes and behaviours (e.g., "I allow myself to eat what food I desire at the moment") and not its absence, given that in the original IES, 13 out of 21 items had to be reverse scored to measure this construct (e.g., "I use food to help me soothe my negative emotions"). Furthermore, items were added to the scale with the aim of assessing a fourth domain of intuitive eating that refers to the tendency to select nutritious foods that promote one's health and body functioning (Tribole & Resch, 1996). The analysis of the Intuitive Eating Scale-2 (IES-2), conducted in a large sample of college students, indicated that the scale retained 23 items with a four-factor solution. The examination of this measure seems key for the consolidation of current knowledge on the role of intuitive eating on indicators relevant for the conceptualization and treatment of disordered eating symptomatology.

There is now evidence that individuals who report higher scores of intuitive eating present lower engagement in maladaptive eating behaviours, such as binge eating (Avalos & Tylka, 2006; Denny, Loth, Eisenberg, & Neumark-Sztainer, 2013; Tylka & Wilcox, 2006). Also, intuitive eating is associated with adaptive body image and eating attitudes and behaviours (Augustus-Horvath & Tylka, 2011; Dockendorff *et al.*, 2012; Herbert, Blechert, Hautzinger, Matthias, & Herbert, 2013; Shouse & Nilsson, 2011; Tylka, 2006; Tylka & Kroon Van Diest, 2013), indicators of psychological adjustment (Tylka, 2006; Tylka & Kroon Van Diest, 2013; Tylka & Wilcox, 2006), and awareness and acceptance of distinct emotional states (Shouse & Nilsson, 2011).

Moreover, theoretical and empirical accounts have been emphasising the association between intuitive eating and mindfulness and acceptance-based approaches to body image and eating regulation (e.g., Mathieu, 2009), which focus on cultivating a greater

awareness of hunger and satiety cues as well as of negative emotional states that may trigger pathological eating behaviour (e.g., Bacon & Aphramor, 2011; Kristeller & Wolever, 2010; Sandoz, Wilson, Merwin, & Kellum, 2013; Schoenefeld & Webb, 2013). Binge eating symptoms have been identified as a common consequence of this process, possibly serving the function of reducing or avoiding unpleasant negative affectivity, whilst being disconnected from one's internal signals (Blackburn, Johnston, Blampied, Popp, & Kallen, 2006; Heatherton & Baumeister, 1991; Masheb & Grilo, 2006; Kristeller & Wolever, 2010). The relationship between binge eating and intuitive eating remains, however, unexplored.

The current study aimed at examining the factorial structure and the psychometric properties of the IES-2 in a wide community sample of Portuguese women and men. This study further examined the associations between intuitive eating, body image and disordered eating symptomatology, namely binge eating symptoms, depression, anxiety and stress symptoms, decentering, and body image acceptance. Furthermore, given prior evidence highlighting intuitive eating as an important mechanism that may counteract difficulties in being aware and accept internal experiences (e.g., emotions and bodily sensations; Denny *et al.*, 2013; Mathieu, 2009; Shouse & Nilsson, 2011), and its possible implications for deregulated eating behaviour, this study also aimed at testing the moderator effect of intuitive eating on the relationship between negative affect and binge eating symptoms.

## METHOD

### *Participants*

The IES-2 was analysed in a sample of 545 participants (sample 1; 279 female college students and 266 women from the general population), with ages ranging from 18 to 55 ( $M = 28.30$ ;  $SD = 10.20$ ) years and a mean of 13 ( $SD = 2.66$ ) years of education. The participants' Body Mass Index (BMI) mean was 22.69 ( $SD = 3.70$ ). Forty-six participants were selected from this sample to assess the temporal stability of the IES-2.

An independent sample (sample 2) was used to confirm the scale's structure and properties and to test the measurement invariance across genders. This sample comprised 468 women (225 college students and 243 participants collected from the general population) and 174 men (71 college students and 103 collected from the general population), with ages ranging from 18 to 55. Women presented a mean age of 28.47 ( $SD = 10.70$ ), a mean of 12.78 ( $SD = 2.79$ ) years of education, and a mean BMI of 22.70 ( $SD = 3.58$ ); men mean age was 30.22 ( $SD = 10.56$ ), the mean years of education was 12.39 ( $SD = 3.06$ ), and the mean BMI was 24.22 ( $SD = 4.23$ ). No gender differences regarding demographics were found ( $t_{age}(640) = 1.86, p = .064$ ;  $t_{education}(640) = 1.54, p = .124$ ).

### *Procedure*

Participants were volunteers who were informed about the procedures and aims of the research. Informed consent was obtained from all participants. Student participants were collected in higher education institutions, with the approval of the respective

educational institution's board, and filled the measures at the end of a lecture. The participants from the general population were collected in distinct institutions (e.g., schools, private companies, retail services), after the institutions' boards approved the study. The subsample used to analyse the scale temporal stability comprised participants who agreed to complete the IES-2 a second time after a 3-4 week interval.

### *Instruments and Measures*

*Intuitive Eating Scale-2* (Tylka & Kroon Van Diest, 2013) includes 23-items assessing four dimensions of intuitive eating: Eating for physical reasons rather than emotional reasons (EPR); unconditional permission to eat (UPE); reliance on hunger and satiety cues (RHSC); and body-food choice congruence (B-FCC). Participants are asked to rate each item using a 5-point Likert scale (ranging from Strongly disagree (1) to Strongly agree (5) selecting the option that best describes their attitudes or behaviours. With the consent of the authors of the original version of the scale (Tylka & Voon Van Kriest, 2013), the scale was translated and adapted to European Portuguese following rigorous procedures of translation and back translation. A bilingual researcher first translated and adapted the scale. The translation was then examined by researchers with a large experience in the field. To assure comparability of content, back-translation procedures were conducted by an independent bilingual researcher. An initial version of the adapted scale was again reviewed by the researchers and was then completed by 20 college students, to whom it was asked to comment about the clarity of the expressions used in the items. Some minor wording adjustments were made and a final version of the adaptation of the scale was created.

*Eating Disorder Examination-Questionnaire* (EDE-Q; Fairburn & Beglin, 1994; Portuguese version by Machado *et al.*, 2014). The EDE-Q includes 36 items providing a comprehensive evaluation of eating psychopathology. The EDE-Q comprises four subscales -restraint, eating concern, weight concern and shape concern- which together compose the scale's total score. The items are rated for frequency of occurrence (on a scale ranging from No days (0) to Every day (6) or for symptoms' severity (on a scale ranging from Not at all (0) to Markedly (6)). The EDE-Q has consistently demonstrated good psychometric properties in both clinical and community samples.

*Binge Eating Scale* (BES; Gormally, Black, Daston, & Rardin, 1982; Portuguese version by Duarte, Pinto Gouveia, & Ferreira, 2015). The BES comprises 16 items and assesses the emotional, cognitive and behavioural aspects of binge eating symptomatology. Each item includes three to four statements and respondents are asked to select the one that best describes their experience. Each statement reflects a rating of severity, ranging from absence of symptoms (0) to severe symptomatology (3). The scale has shown good psychometric properties, with a Cronbach's alpha value of .85 in the original study (Gormally *et al.*, 1982), and .88 in the Portuguese validation study (Duarte, Pinto Gouveia, & Ferreira, 2014).

*Body Image Shame Scale* (BISS; Duarte, Pinto Gouveia, Ferreira, & Batista, 2015). The BISS includes 14 items and assesses the experience and phenomenology of body image shame, that is, negative perceptions of being negatively evaluated by others, negative self-evaluations because of one's body image, and consequent avoidance and body image concealment behaviours. Participants are invited to rate each item according to the frequency with which they experience shame about their body image, using a 5-point Likert scale, ranging from Never (0) to Almost always (4). The scale presents high internal consistency (Cronbach's alpha of .92; Duarte *et al.*, 2014).

*Body Image Acceptance and Action Questionnaire* (BI-AAQ; Sandoz *et al.*, 2013; Portuguese version by Ferreira, Pinto Gouveia, & Duarte, 2011). The BIAAQ includes 12 items and assesses body image flexibility, that is, the ability to fully experience and accept thoughts, emotions and sensations, related to one's body, while pursuing important life values. Respondents are asked to rate the extent to which each statement applies to them, using a 7-point scale ranging from Never true (1) to Always true (7). The scale presented high internal consistency in its original (i.e., with Cronbach's alpha values around .92 and .93 in distinct samples) and Portuguese versions (with a Cronbach's alpha coefficient of .95).

*Experiences Questionnaire* (EQ; Fresco *et al.*, 2007; Portuguese version by Gregório, Pinto Gouveia, Duarte, & Simões, 2015). The EQ includes 14 items assessing decentering, which entails the ability to observe one's thoughts and feelings as temporary subjective internal events, as opposed to true reflections of the self or reality. Respondents are asked to rate each item using a 5-point Likert scale ranging from Never (1) to All the time (5). The original scale has shown high internal consistency (with a Cronbach's alpha coefficient of .83), as well as the Portuguese version used in the current study (with a Cronbach's alpha of .91).

*Depression Anxiety and Stress Scales -21* (DASS21; Lovibond & Lovibond, 1995; Portuguese version by Pais-Ribeiro, Honrado, & Leal, 2004). DASS21 includes three subscales, with 7 items each, assessing depressive, anxiety and stress symptoms. Respondents are asked to indicate the frequency with which they experienced each symptom over the previous week, using a 4-point Likert scale ranging from Did not apply to me at all (0) to Applied to me very much or most of the time (3). The depression, anxiety and stress subscales present high internal consistency, with Cronbach's alpha values of .88, .82, and .90, respectively, in the original version (Lovibond & Lovibond, 1995), and .85, .74, and .81, respectively, in the Portuguese version (Pais-Ribeiro *et al.*, 2004).

*Body Mass Index* (BMI) was calculated with self-reported data using the formula weight/height squared.

### *Data analysis*

To analyse the dimensionality of the Portuguese version of the IES-2, second-order confirmatory factor analyses (CFA), with maximum likelihood estimation method, testing the theoretical model proposed by the original authors (Tylka & Kroon Van Diest, 2013) were conducted in two separate samples. Each item was specified to load on the respective latent first-order factor, which, in turn, was specified to load on a second-order factor. We estimated correlated errors between items of the IES-2 that were similarly worded, as they were expected to share method variance (Tylka & Voon Van Kriest, 2013; Kline, 2005). The adequacy of the model fit was determined according to the following indices: chi-square goodness-of-fit index; normed chi-square (CMIN/df) with values <5 indicating acceptable fit; the Comparative Fit Index (CFI), which values may range from 0 (no fit) to 1 (perfect fit); the Standardized Root-Mean Square Residual (SRMR), with values around .08 or lower indicating reasonably good fit; and the Root Mean Square Error of Approximation index (RMSEA), which indicate an adequate fit when values <.08 (Arbuckle, 2008; Hu & Bentler, 1999; Kline, 2005). The model invariance between genders was examined by a multigroup analysis. The construct reliability and convergent validity of the scale were examined through the

calculation of the Composite Reliability (CR) and Average Variance Extracted (AVE; Fornell & Larcker, 1981). The relationships between the IES-2 and related constructs were examined through Pearson product-moment correlation coefficients in the female participants. The test-retest reliability of the IES-2 was estimated through Intraclass Correlation Coefficients (ICC) using data from the subsample of participants who completed the measure at both administrations (3-4 weeks apart). To test the IES-2 ability to discriminate between participants with no or low scores of binge eating and participants with moderate to high scores of binge eating a Student t-Test for independent samples was conducted.

To further examine the potential beneficial role of intuitive eating in regards to the regulation of eating behaviour, we tested the moderator effect of intuitive eating on the association between depressive symptoms (independent variable) and binge eating symptoms (dependent variable). The moderation was examined through a hierarchical regression analysis considering the interaction of the centered predictors' values (Cohen, Cohen, West, & Aiken, 2003).

The software SPSS 21.0 (Statistical Package for the Social Sciences) and the software AMOS version 21 (SPSS Inc, Chicago, IL, USA) were used to conduct the analyses.

## RESULTS

Results of the CFA (sample 1;  $N= 545$ ) indicated an adequate model fit [ $\chi^2_{(209)} = 653.48$ ;  $p < .001$ ; CMIN/df= 3.13; CFI= .93; SRMR= .07; RMSEA= .06, 90% CI (.06 to .07)]. Regarding local adjustment indices, results indicated that the items presented Standardized Regression Weights (SRW) that ranged from .41 (item 13) to .89 (item 11) for EPR, .60 (item 1) to .68 (item 16) for UPE, .54 (item 22) to .84 (item 6) for RHSC, and .49 (item 18) to .88 (item 19) for B-FCC. The individual items' reliability (assessed by the Squared Multiple Correlations – SMC) values ranged from .17 (item 13) to .79 (item 11) for EPR, .37 (item 1 and 4) to .46 (item 16) for UPE, .30 (item 22) to .71 (item 6) for RHSC, and .24 (item 18) to .77 (item 19) for B-FCC.

This structure was further examined in an independent sample comprising both genders (sample 2;  $N= 642$ ). Results supported the adequacy of the examined model [ $\chi^2_{(209)} = 695.94$ ;  $p < .001$ ; CMIN/df= 3.36; CFI= .94; SRMR= .08; RMSEA= .06; 90% CI (.06 to .07)]. Regarding local adjustment indices, SRW values ranged from .33 (item 13) to .89 (item 11) for EPR, .55 (item 4) to .73 (item 16) for UPE, .55 (item 22) to .79 (item 8) for RHSC, and .67 (item 18) to .92 (item 19) for BFCC. The SMC values ranged from .11 (item 13) to .79 (item 11) for EPR, .30 (item 4) to .54 (item 16) for UPE, .31 (item 22) to .62 (item 8) for RHSC, and .45 (item 18) to .85 (item 19) for B-FCC, supporting the items reliability. Results are reported in Table 1.

Results of the multigroup analysis supported the model invariance between genders. Results revealed no differences in regard to factor weights ( $\Delta$ CFI= .00) and item's means ( $\Delta$ CFI= -.001; Chen, Sousa, & West, 2005; Cheung & Rensvold, 2002).

Reliability and validity analysis results in sample 1 indicated a CR of .96 for the total scale, .93 for EPR, .86 for UPE, .91 for RHSC, and .91 for B-FCC. Also, an AVE



Table 1. Items' means (M), standard deviations (SD), standardized regression weights (SRW) and squared Multiple Correlations (SMC) in sample 1 (N= 545) and sample 2 (N= 642)

Items	Sample 1				Sample 2			
	M	SD	SRW	SMC	M	SD	SRW	SMC
<b>EPR</b>								
2	3.01	1.18	.87	.76	3.30	1.20	.85	.72
5	3.24	1.11	.76	.58	3.52	1.11	.80	.64
10	3.44	1.14	.87	.75	3.59	1.11	.86	.74
11	3.25	1.18	.89	.79	3.44	1.16	.89	.79
12	3.59	1.02	.59	.34	3.80	1.01	.52	.27
13	3.40	1.05	.41	.17	3.40	1.14	.33	.11
14	3.58	1.02	.70	.48	3.69	1.05	.61	.38
15	3.93	0.79	.64	.41	4.01	0.82	.53	.29
<b>UPE</b>								
1	2.77	1.12	.60	.37	2.87	1.15	.56	.32
3	3.23	1.16	.62	.39	3.83	0.78	.58	.34
4	3.58	1.11	.61	.37	3.43	1.10	.55	.30
9	3.84	0.79	.62	.39	3.62	1.17	.65	.42
16	3.66	0.85	.68	.46	3.76	0.82	.73	.54
17	3.58	1.02	.67	.45	3.54	1.09	.69	.47
<b>RHSC</b>								
6	3.50	0.93	.84	.71	3.65	0.91	.75	.57
7	3.07	0.91	.71	.50	3.22	0.94	.61	.38
8	3.39	0.92	.81	.65	3.46	0.92	.79	.62
21	3.57	0.80	.68	.47	3.66	0.80	.70	.49
22	3.72	0.83	.54	.30	3.63	0.88	.55	.31
23	3.61	0.87	.74	.55	3.65	0.86	.76	.58
<b>B-FCC</b>								
18	3.54	0.79	.49	.24	3.73	0.83	.67	.45
19	3.64	0.80	.88	.77	3.78	0.78	.92	.85
20	3.61	0.72	.84	.71	3.75	0.75	.81	.65

Notes: EPR= Eating for Physical Reasons Rather Than Emotional Reasons; UPE= Unconditional Permission to Eat; RHSC= Reliance on Hunger and Satiety Cues; B-FCC= Body-Food Choice Congruence.

of .60 was obtained for the total score, .65 for EPR, .51 for UPE, .63 for RHSC, and .78 for B-FCC. The measure's validity was further examined in sample 2. The total scale presented a CR of .96, and the subscales EPR, UPE, RHSC and B-FCC presented CR values of .92, .86 .90 and .91, respectively, supporting the measure's construct validity. Regarding the AVE, results indicated a value of .59 for the total scale, .60 for EPR, .51 for UPE, .61 for RHSC, and .76 for B-FCC, corroborating the items' convergent validity. The AVE values of the factors were higher than the squared correlation between each pair of variables, which provided evidence for the subscales' discriminant validity.

Women presented significantly lower scores comparing to men in the IES-2 total score ( $M= 3.51, SD= 0.52; M= 3.76, SD= 0.46; t_{(640)} = 5.55, p <.001$ ), and the subscales EPR ( $M= 3.46, SD= 0.81; M= 3.95, SD= 0.70; t_{(640)} = 7.00, p <.001$ ), UPE ( $M= 3.45, SD= 0.73; M= 3.67, SD= 0.70; t_{(640)} = 3.41, p= .001$ ), and RHSC ( $M= 3.51, SD= 0.68; M= 3.61, SD= 0.69; t_{(640)} = 2.30, p= .022$ ). No significant differences were verified in the B-FCC subscale ( $M= 3.78, SD= 0.67; M= 3.68, SD= 0.71; t_{(640)} = 1.75, p= .082$ ).

The ICC between the first and second administration (test-retest reliability) were .88 for the total IES-2, .89 for EPR, .87 for UPE, .88 for RHSC, and .80 for B-FCC, supporting the scale's temporal stability.

Product-moment Pearson correlation coefficients (Table 2) revealed positive moderate to strong correlations between IES-2 total score and subscales. Negative

Table 2. IES-2 correlations with other measures and Cronbach's alphas (N= 1013).

	EPR	UPE	RHSC	B-FCC	EDEQ	BES	BIAAQ	EQ	DEP	ANX	STR	BMI
<i>a</i>	.90	.80	.88	.77	.95	.87	.96	.84	.88	.86	.91	-
IES-2	.83**	.61**	.72**	.39**	-.60**	-.63**	.55**	.35**	-.26**	-.19**	-.22**	-.35**
EPR	-	.28**	.39**	.24**	-.47**	-.59**	.42**	.32**	-.30**	-.24**	-.26**	-.25**
UPE	-	-	.29**	-.08**	-.49**	-.27**	.39**	.11**	-.07**	-.08*	-.08*	-.29**
RHSC	-	-	-	.33**	-.39**	-.45**	.38**	.22**	-.12**	-.06	-.12**	-.24**
B-FCC	-	-	-	-	-.15**	-.29**	.19**	.25**	-.14**	-.06*	-.07*	-.16**

Notes: \* =  $p < .05$ ; \*\* =  $p < .001$ ; IES-2= Intuitive Eating Scale -2; EPR= Eating for Physical Reasons rather than Emotional Reasons; UPE= Unconditional Permission to Eat; RHSC= Reliance on Hunger and Satiety Cues; B-FCC= Body-Food Choice Congruence; EDEQ= Eating Disorder Examination Questionnaire; BES= Binge Eating Scale; BISS= Body Image Shame Scale; BIAAQ= Body Image Acceptance and Action Questionnaire; EQ= Experiences Questionnaire; DEP, ANX, STR= Depression, Anxiety and Stress Scale -21; BMI= Body Mass Index.

associations were verified between the total IES-2 and subscales and eating psychopathology measured by the EDE-Q, with the UPE subscale presenting the stronger correlation with EDE-Q. Regarding binge eating symptoms, the total IES-2 and subscales were negatively correlated with the BES, with the EPR and RHSC subscales presenting the strongest correlations. Negative significant associations were also found between IES-2 and its subscales, especially EPR and RHSC, and body image shame as measured by the BISS. Negative associations were also found between the IES-2 total score and subscales, and BMI. Moreover, results indicated that the total IES-2 and its subscales were positively and significantly correlated with body image flexibility. Positive associations were also found between the total IES-2 score and subscales, especially the subscale EPR, and decentering measured by EQ. Regarding psychological adjustment, the total IES-2 and subscales were negatively correlated with anxiety, depression and stress, presenting low magnitudes of correlation.

To examine IES-2 ability to discriminate between participants with significant symptoms of binge eating -according to the cut-off score of 17 in the BES (Duarte, Pinto Gouveia, & Ferreira, 2015; Marcus, Wing, & Lamparski, 1985)- two groups with similar demographic characteristics ( $t_{(180)age} = .59, p = .557$ ;  $t_{(180)education} = .40, p = .689$ ;  $t_{(180)BMI} = 1.876, p = .062$ ) were selected from the total sample. One group included 77 participants identified as having moderate to high scores of binge eating; the second group comprised 105 participants with no or low symptoms of binge eating. Statistically significant differences were found between the groups, with participants with higher scores of binge eating symptoms presenting lower scores on the IES-2 total score ( $M = 2.76, SD = 0.50$ ;  $M = 3.17, SD = 0.41$ ;  $t_{(180)} = 6.14, p < .001$ ) and in the subscales EPR ( $M = 2.39, SD = 0.74$ ;  $M = 2.99, SD = 0.72$ ;  $t_{(180)} = 5.48, p < .001$ ), RHSC ( $M = 2.69, SD = 0.77$ ;  $M = 3.24, SD = 0.60$ ;  $t_{(180)} = 5.48, p < .001$ ) and B-FCC ( $M = 3.16, SD = 0.83$ ;  $M = 3.57, SD = 0.62$ ;  $t_{(180)} = 3.77, p < .001$ ). There was also a trend for the group with higher levels of binge eating to present lower levels on the subscale UPE, in comparison to the group with no to lower levels of binge eating, but this difference was not statistically significant ( $t_{(180)} = 0.19, p = .851$ ;  $M = 3.14, SD = 0.70$ ;  $M = 3.16, SD = 0.63$ ).

The moderator analysis was conducted in women given the identified gender differences regarding intuitive eating scores. Depressive symptoms were entered in the regression model in the first step, producing a statistically significant model [ $R^2 = .13$ ;  $F_{(1, 1004)} = 153.83, p < .001$ ;  $\beta_{depression} = .36$ ]. Intuitive eating was added on the second step and the model was also significant [ $R^2 = .44, F_{(1, 1003)} = 545.47, p < .001$ ;  $\beta_{depression} = .22$ ;



$\beta_{\text{intuitive eating}} = -.57$ ]. In the third step there was a significant increase in  $R^2$  to .46 [ $F_{(1, 1002)} = 42.11, p < .001$ ], with a  $\beta$  of .18 for depressive symptoms ( $p < .001$ ), a  $\beta$  of  $-.56$  for intuitive eating ( $p < .001$ ), and results indicated that the interaction between the two predictors was also significant with a  $\beta$  of  $-.16$  ( $p < .001$ ).

A graphic was plotted to clarify these associations. Three curves were considered taking into account the following levels of intuitive eating: one *SD* below the mean, the mean, and one *SD* above the mean (Cohen *et al.*, 2003). The graphical representation of the findings (see Figure 1) shows that in participants with low levels of intuitive eating the relationship between depressive symptoms and binge eating symptoms is higher; participants with higher levels of intuitive eating present lower levels of binge eating symptoms regardless of the degree of negative affect.

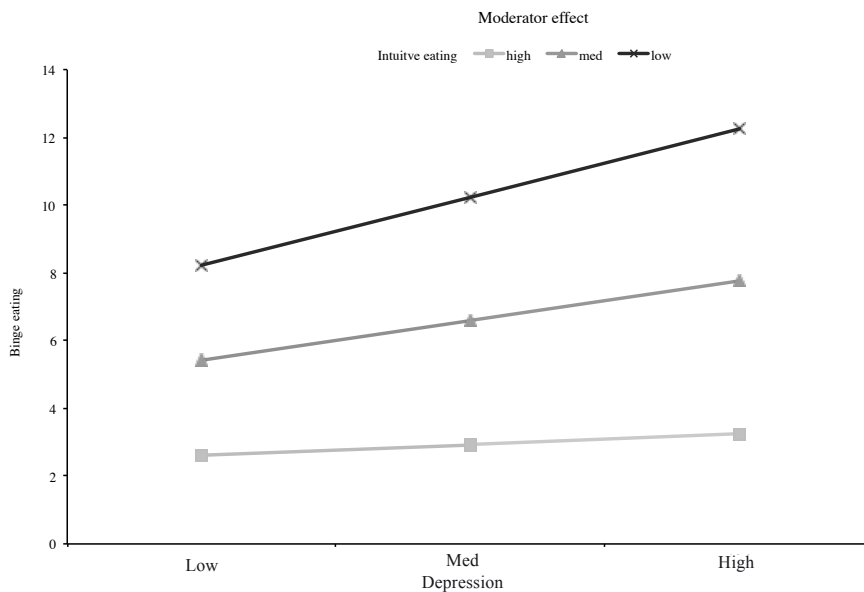


Figure 1. Moderator effect of intuitive eating (IES-2 total score) on the association between depressive symptoms (Depression subscale of DASS21) and binge eating symptoms (as measured by the BES).

## DISCUSSION

The current study aimed at examining the psychometric properties of the IES-2 in a community sample of the Portuguese population comprising college students and participants from the general population. This study further investigated the associations between intuitive eating and body image and eating related dimensions, such as body image shame, body image flexibility and disordered eating, namely binge eating symptoms.

The current study corroborated the four factor structure proposed by Tylka and Kroon Van Diest (2013). Moreover, results supported the measurement invariance between genders (Chen *et al.*, 2005; Cheung & Rensvold, 2002). The analysis of individual

parameters indicated the items' robustness. Item 13 ("When I am bored, I do NOT eat just for something to do") presented the lowest factor loadings and individual reliability, which may be due to the fact that the item is negatively worded, imposing understanding difficulties in its Portuguese language translation. Furthermore, results indicated that the measure presents good construct reliability and convergent validity, and its subscales also present good discriminant validity (Hair, Black, Babin, & Anderson, 2010). Findings supported that IES-2 total score and subscales present high test-retest reliability.

Results also indicated that, in the Portuguese population, women present lower scores of intuitive eating than men, which corroborates prior evidence suggesting that women present increased difficulties in being aware of internal experiences (e.g., thoughts, emotions and sensations) and connect with physiological hunger and satiety cues, with this having deleterious consequences for the regulation of eating behaviour (Denny *et al.*, 2013; Duarte *et al.*, 2014; Kessler *et al.*, 2013; Tylka & Kroon Van Diest, 2013).

Findings supported the strong and negative association between intuitive eating and BMI and measures of disordered eating behaviour, namely binge eating symptoms (e.g., Augustus-Horvath & Tylka, 2011; Avalos & Tylka, 2006; Tylka, 2006; Tylka & Kroon Van Diest, 2013). Moreover, intuitive eating was negatively related to body image shame. These findings are in line with prior evidence that this ability to be aware of one's body's needs and signals and to use these signals to guide one's eating behaviour is associated with lower levels of difficulties related with body image and of thin-ideal internalization (Dockendorff *et al.*, 2012; Tylka, 2006). Moreover, results indicated that intuitive eating abilities are associated with decreased symptoms of depression, anxiety and stress.

The current study also followed on prior research demonstrating the association between intuitive eating and self-regulatory processes (Schoenefeld & Webb, 2013). Results suggested that intuitive eaters present higher levels of decentering and body image flexibility, which may be translated into a higher ability to observe their difficult thoughts and feelings (e.g., about their body image), without engaging in reactive behaviours in their response (e.g., binge eating; Kristeller & Wolever, 2010).

In the current study, participants with lower intuitive eating presented more binge eating symptoms. There is consistent evidence on how impairments in regulating eating behaviour, especially binge eating symptoms, may emerge as a consequence of maladaptive self-regulatory and emotion regulation processes (Blackburn *et al.*, 2006; Heatherton & Baumeister, 1991; Masheb & Grilo, 2006; Stice, 2002) including the difficulty of being aware and accept negative thoughts, emotions and sensations (Duarte & Pinto Gouveia, 2015; Katterman, Kleinman, Hood, Nackers, & Corsica, 2014; Kristeller & Wolever, 2010; Lillis & Kendra, 2014; Sandoz, Wilson, & DuFrene, 2010). As intuitive eating involves the ability to mindfully discriminate cues leading to food consumption and a more aware individual choice (Mathieu, 2009; Tribole & Resch, 1995), it is hypothesized that the promotion of this ability may have important implications for the prevention and treatment of eating and weight-related difficulties.

These assumptions were supported by the moderator analysis' findings. In fact, results corroborated the moderator effect of intuitive eating on the association between depressive symptoms and binge eating, with the tested model accounting for 46% of

the variance of binge eating symptoms. Although based on cross-sectional data and thus limiting our conclusions regarding causality, findings suggested that women with a higher awareness of and respect for their internal body's signals present a lower tendency to engage in binge eating symptoms even when presenting higher levels of negative affect. These findings suggest that intuitive eating may have an important protective effect against a reactive form of eating in the face of negative emotional experiences. The cultivation of intuitive eating may promote the awareness of the initiation and cessation of eating based on internal hunger and satiety signals, instead of on emotional cues (Tribole & Resch, 1995; Tribole & Resch, 1996).

This study presents other limitations that should be considered by future studies. Although the Portuguese version of the scale was analysed in a large community sample, the sample is not fully representative of the general population. Future studies should include a wider sample of men, and the scale's structure and psychometric properties should be analysed in other samples with marked difficulties in regulating eating behaviour and managing weight. Future research should investigate the scale's sensitivity to changes throughout psychological intervention programmes addressing the development of a more aware and accepting attitude towards eating behaviour and body image.

Nevertheless, the current study provides an examination of the dimensionality and psychometric properties of the Portuguese version of the IES-2, in a large sample including students and participants from the general population and extends prior evidence on intuitive eating and its correlates. Data from the current study corroborated the adequacy and validity of the IES-2 to assess intuitive eating and offer important suggestions regarding the potential importance of this construct in the prevention and treatment of difficulties in regulating eating behaviour in the general community.

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