

## Running Head: VALIDATION OF THE BAS-2 IN THREE COUNTRIES

1 **Abstract**

2 In recent years, the study of body image shifted from focusing on the negative aspects to a  
3 more extensive view of body image. The present study seeks to validate a measure of positive  
4 body image, the Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015a) in  
5 Denmark, Portugal, and Sweden. Participants ( $N = 1,012$ ) were adolescents and young adults  
6 aged from 12 to 19. Confirmatory factor analyses confirmed the one-dimensional factor  
7 structure of the scale. Multi-group confirmatory factor analyses indicated that the scale was  
8 invariant across sex and country. Further results showed that BAS-2 was positively correlated  
9 with self-esteem, psychological well-being, and intuitive eating. It was negatively correlated  
10 with BMI among boys and girls in Portugal but not in Denmark and Sweden. Additionally,  
11 boys had higher body appreciation than girls. Results indicated that the BAS-2 has good  
12 psychometric properties in the three languages.

13 *Keywords:* body appreciation; adolescence; psychometrics; measurement invariance;  
14 Denmark; Portugal; Sweden

15

**Introduction**

16

17

18

19

20

21

22

23

24

Traditionally, research on body image has focused on the negative aspects of body image or on body dissatisfaction (Avalos, Tylka, & Wood-Barcalow, 2005). However, over the last decade, scholars have shifted their attention to a broader view including both negative and positive components of body image (Tylka & Wood-Barcalow, 2015b). Indeed, positive body image is a unique construct that is not merely the opposite of negative body image (Striegel-Moore & Cachelin, 1999). Tylka and Wood-Barcalow (2015a) defined body appreciation as “accepting, holding favorable opinions toward, and respecting the body, while also rejecting media-promoted appearance ideals as the only form of human beauty” (2015a, p. 53).

25

26

27

28

29

30

31

32

33

34

35

36

Avalos et al. (2005) created a measure, the Body Appreciation Scale (BAS), to measure body appreciation. The BAS is a 13-item scale which possesses good psychometric properties among both females (Avalos et al., 2005) and males (Tylka, 2013). The BAS is a one-dimensional scale, and its scores evidenced good reliability, consistency, and convergent validity with college women (Avalos et al., 2005). Later, Tylka (2013) also found measurement invariance in BAS scores between college women and men. Although some studies replicated the one-dimension structure of the scale, others have found that the BAS has a multi-dimensional factor structure (Alexias, Togas, & Mellon, 2016; Atari, Akbari-Zardkhaneh, Mohammadi, & Soufiabadi, 2015; Swami, Özgen, Gökçen, & Petrides, 2015; for a review of studies before 2015, see Webb, Wood-Barcalow, & Tylka, 2015). As the BAS does not measure exactly the same concept in different languages, the comparison of body image across cultures is impeded.

37

38

39

Recently, in order to address this issue and to be in keeping with recent developments of the concept of positive body image, Tylka and Wood-Barcalow (2015a) created the Body Appreciation Scale-2 (BAS-2), a 10-item updated version of the scale. Original BAS Items 4

40 and 13 were modified because they contained terms which were associated to a negative body  
41 orientation (e.g., “Despite its imperfections, I still like my body”). Original BAS Items 8 and  
42 9 were deleted because they referred to the ignorance of one’s appearance rather than the  
43 celebration of one’s body (e.g., “My self-worth is independent of my body shape or weight”).  
44 The original BAS Item 12 was deleted because it was sex-specific (“I do not allow  
45 unrealistically thin [muscular] images of women [men] presented in the media to affect my  
46 attitudes toward my body”). Additional items were created for the BAS-2 that were based on  
47 findings from qualitative positive body image studies (e.g., Frisén & Holmqvist, 2010).

48 In samples of college and community women and men, Tylka and Wood-Barcalow  
49 (2015a) found that the final 10-item BAS-2 had a one-dimensional structure and its scores  
50 were internally consistent and stable across a 3-week period. Following the validation of the  
51 BAS-2 in English, Tiggemann (2015) called for an examination of its factorial equivalence  
52 among different cultures. Since then, the BAS-2 has been validated in Cantonese (Swami &  
53 Ng, 2015), Standard Chinese (Swami, Ng, & Barron, 2016), Dutch (Alleva, Martijn,  
54 Veldhuis, & Tylka, 2016), French (Kertechian & Swami, 2017), Icelandic (Pálmarsdóttir &  
55 Karlsdóttir, 2016), Japanese (Namatame, Uno, & Sawamiya, 2017), Persian (Atari, 2016),  
56 Polish (Razmus & Razmus, 2017), Brazilian Portuguese (Alcaraz-Ibáñez, Cren Chiminazzo,  
57 Sicilia Camacho, & Teixeira Fernandes, 2017), Romanian (Swami, Tudorel, Goian, Barron,  
58 & Vintila, 2017), Serbian (Jovic, Sforza, Jovanovic, & Jovic, 2016), and Spanish (Swami,  
59 García, & Barron, 2017).

60 These studies have shown that, across many geographic regions, scores on the BAS-2  
61 have evidenced good convergent validity. The BAS-2 is positively correlated with various  
62 well-being indices, including self-esteem (e.g., Atari, 2016; Swami, García, et al., 2017;  
63 Swami & Ng, 2015), life satisfaction (e.g., Atari, 2016; Swami, García, et al., 2017; Swami et  
64 al., 2016), intuitive eating (Tylka & Wood-Barcalow, 2015a), positive affect (Razmus &

65 Razmus, 2017), positive life orientation (Razmus & Razmus, 2017), subjective happiness  
66 (Swami, Tudorel, et al., 2017), and proactive coping (Tylka & Wood-Barcalow, 2015a).  
67 Among women, the BAS-2 is also negatively correlated with actual-ideal weight discrepancy  
68 (Swami & Ng, 2015; Swami et al., 2016) and positively correlated with optimistic life  
69 orientation (Alleva et al., 2016). The results regarding the relationship between the BAS-2  
70 and body mass index (BMI) are not so clear: Swami, García, et al. (2017) and Swami,  
71 Tudorel, et al. (2017) found a negative relationship between the BAS-2 and BMI, while other  
72 studies found no relationship (Swami & Ng, 2015; Swami et al., 2016).

73 Furthermore, studies have revealed measurement invariance (i.e., equivalence) of the  
74 BAS-2 between women and men (e.g., Kertechian & Swami, 2017; Swami, García, et al.,  
75 2017; Tylka & Wood-Barcalow, 2015a), which indicates that men's and women's scores on  
76 the BAS-2 can be meaningfully compared. Although Swami et al. (2016), Swami, García, et  
77 al. (2017), and Razmus and Razmus (2017) found no difference between men and women in  
78 mainland China, Spain, and Poland respectively, most studies reported that men have  
79 significantly higher body appreciation than women, with a small or moderate effect size,  
80 Cohen's  $d = 0.13$  to  $0.58$  (e.g., Atari, 2016; Kertechian & Swami, 2017; Tylka & Wood-  
81 Barcalow, 2015a).

82 As body image is at its most vulnerable state during adolescence (Littleton &  
83 Ollendick, 2003), it is important to investigate its development during this particular period.  
84 Findings regarding the evolution of positive body image during adolescence are mixed. Some  
85 research studies found that positive body image was stable during adolescence (Von Soest &  
86 Wichstrøm, 2009) while other results indicated either a decrease (Eisenberg, Neumark-  
87 Sztainer, & Paxton, 2006) or an increase (Holsen, Jones, & Birkeland, 2012). The  
88 inconsistency of these results may be due to the variability of the instruments used to measure  
89 positive body image. According to our knowledge, only three studies have used the BAS-2

90 among children and adolescents (Alcaraz-Ibáñez et al., 2017; Halliwell, Jarman, McNamara,  
91 Risdon, & Jankowski, 2015; Halliwell, Jarman, Tylka, & Slater, 2017). Halliwell et al. (2015)  
92 examined the changes in body appreciation, after a body image intervention, among 14- and  
93 15-year old girls. Alcaraz-Ibáñez et al. (2017) examined the factor structure of the BAS-2  
94 among Brazilian adolescents. Halliwell et al. (2017) created the Body Appreciation Scale-2  
95 for Children (BAS-2C), an adapted version of the scale that can be used among children as  
96 young as 9 years old.

97         Moreover, in order to compare the level of positive body image among different  
98 cultures, it is essential to examine the cross-cultural equivalence of the BAS-2 (Swami,  
99 García, et al., 2017). Even though the BAS-2 has been used among more than 10 culture  
100 groups (e.g., Atari, 2016; Kertechian & Swami, 2017; Namatame et al., 2017), its cross-  
101 cultural measurement invariance has not been tested. Although the BAS-2 has been validated  
102 in many countries, it has not been validated in Denmark, Portugal, and Sweden. The  
103 validation of the BAS-2 in these additional three countries will increase its cross-cultural  
104 validity. Cross-cultural classifications (Hofstede, 2001; House, Hanges, Javidan, Dorfman, &  
105 Gupta, 2004) grouped Denmark and Sweden in the same cluster (i.e., Nordic Europe) while  
106 Portugal is either grouped with other southern European countries (i.e., Latin Europe) or with  
107 countries from South America (i.e., Latin America). Therefore, by comparing the level of  
108 body appreciation between these three countries, we can assess cross-cultural differences,  
109 whether small (expected between Denmark and Sweden) or large (expected between  
110 Denmark and Portugal and between Portugal and Sweden).

111         The present study aimed to validate the BAS-2 among adolescents and young adults  
112 from three different countries: Denmark, Portugal, and Sweden. First, we examined the factor  
113 structure of the BAS-2 among adolescent and young adult males and females in these  
114 countries. As all studies that examined the BAS-2 factor structure found that the BAS-2 is

115 composed of one dimension (e.g., Atari, 2016; Kertechian & Swami, 2017; Swami, García, et  
116 al., 2017), it was hypothesized that the BAS-2 has a one-factor structure in all samples.  
117 Second, the measurement invariance of the BAS-2 across sex and country was assessed. As  
118 previous studies reported a similar factor structure and good psychometric properties (e.g.,  
119 Alleva et al., 2016; Swami et al., 2016; Tylka & Wood-Barcalow, 2015a), it was  
120 hypothesized that the BAS-2 is invariant across sex and country. Third, we examined the  
121 convergent validity of the Danish, Portuguese, and Swedish versions of the BAS-2 by  
122 examining their correlations with self-esteem, psychological well-being, intuitive eating, and  
123 BMI in both sexes. Taking into account the results found in other validation studies (e.g.,  
124 Atari, 2016; Swami, García, et al., 2017; Swami & Ng, 2015; Tylka & Wood-Barcalow,  
125 2015a) and results using the BAS among adolescents (Atari, Jamali, Bahrami-Ehsan, &  
126 Mohammadi, 2017), it was hypothesized that the BAS-2 will be positively correlated with  
127 self-esteem, psychological well-being, and intuitive eating and negatively correlated with  
128 BMI in all samples. These variables were selected as they were used to assess convergent  
129 validity in previous validation studies of the BAS-2. Finally, differences between sex and  
130 country were assessed. In accordance with previous results (e.g., Atari, 2016; Kertechian &  
131 Swami, 2017; Tylka & Wood-Barcalow, 2015a), it was expected that girls would have lower  
132 body appreciation than boys, but that the effect size of the difference will be either small or  
133 moderate. The intercultural difference in terms of body appreciation has never been studied.  
134 Therefore, our last objective of this study is to begin this line of inquiry by testing the  
135 following research question: is there a difference in terms of body image among Danish,  
136 Portuguese, and Swedish adolescents?

137

**Method****138 Participants**

139           The total sample consisted of 1,012 adolescents and young adults (482 boys and 530  
140 girls) from Denmark ( $n = 129$ ), Portugal ( $n = 513$ ), and Sweden ( $n = 370$ ). They were aged  
141 from 12 to 19 years old ( $M = 15.1$ ,  $SD = 1.9$  for the total sample;  $M = 14.4$ ,  $SD = 2.1$  for the  
142 Danish sample;  $M = 15.0$ ,  $SD = 2.1$  for the Portuguese sample; and  $M = 15.5$ ,  $SD = 1.3$  for the  
143 Swedish sample). Participants were significantly older in Sweden and significantly younger  
144 in Denmark,  $F(2, 1009) = 20.28$ ,  $p < .001$ ,  $\omega^2 = .037$ . The self-reported BMI level of  
145 participants ranged from 11.72 to 51.14 kg/m<sup>2</sup> ( $M = 21.01$ ,  $SD = 3.57$  for the total sample;  $M$   
146  $= 19.61$ ,  $SD = 3.85$  for the Danish sample;  $M = 20.89$ ,  $SD = 3.41$  for the Portuguese sample;  
147 and  $M = 21.68$ ,  $SD = 3.54$  for the Swedish sample). Participants had a significantly greater  
148 BMI in Sweden and a significantly smaller BMI in Denmark,  $F(2, 961) = 16.13$ ,  $p < .001$ ,  $\omega^2$   
149  $= .030$ .

**150 Measures**

151           The questionnaires which were not available in Danish, Portuguese, and Swedish  
152 were translated in the respective languages following the back-translation technique (Brislin,  
153 1970). One researcher translated the scale into the new language as the first step. Then, the  
154 translated version was translated back into English by another researcher. Finally, differences  
155 between the original scale and the back translation were discussed and resolved by the two  
156 translators involved in the project. The factor structure of all translated measures (i.e., the  
157 IES-2 and the RSES in Danish and Swedish) have been assessed (the results are presented in  
158 Supplementary Tables 1-4). To assess understanding of the questions and their face validity  
159 (Streiner & Norman, 2008), the translation procedure was followed by a pilot testing of the  
160 questionnaires in the target audience. Two boys and two girls from 12 to 19 years old were  
161 recruited by country. They took part individually in an interview with a researcher. The

162 researcher read each item out loud to the participants and asked them if the questions made  
163 sense and were clear and easy to understand. These students indicated that all BAS-2 items  
164 made sense and were clear and easy to understand.

165 **Demographics.** Participants provided demographic information including sex, age,  
166 years of schooling, height, and weight. Self-reported height and weight were used to calculate  
167 the participants' BMI.

168 **Body appreciation.** Participants answered the Body Appreciation Scale-2 (Tylka &  
169 Wood-Barcalow, 2015a), a 10-item scale measuring positive body image. All items are  
170 answered on a 5-point scale, ranging from 1 (*Never*) to 5 (*Always*). The BAS-2 is composed  
171 of one dimension with good internal reliability (Cronbach  $\alpha = .91-.94$ ) and 3-week stability,  $r$   
172 = .90 in samples of college and community women and men (Tylka & Wood-Barcalow,  
173 2015a; Webb, 2015). Halliwell et al. (2015) found good internal reliability (Cronbach  $\alpha =$   
174 .94-.95) in BAS-2 scores among a group of 14- and 15-year-old girls.

175 **Self-esteem.** Participants completed the 10-item Rosenberg Self-Esteem Scale  
176 (RSES; Rosenberg, 1965). The already validated Portuguese version (Pechorro, Marôco,  
177 Póiares, & Vieira, 2011) was used in Portugal. Items are rated on a 4-point scale, ranging  
178 from 1 (*strongly agree*) to 4 (*strongly disagree*). The RSES is composed of one dimension  
179 with both good internal reliability (Cronbach  $\alpha = .81$ ) and 1-week stability ( $r = .82$ ) among a  
180 sample of male and female students (Fleming & Courtney, 1984). Bagley, Bolitho, and  
181 Bertrand (1997) found a good internal reliability estimate (Cronbach's  $\alpha = .85-.90$ ) for BAS-2  
182 scores among a group of 12- to 19-year-old adolescents.

183 **Psychological well-being.** Participants completed the psychological well-being  
184 dimension of the KIDSCREEN-27 (Ravens-Sieberer et al., 2014). The KIDSCREEN-27 is a  
185 European cross-cultural and standardized instrument, developed within the European project  
186 "Screening and Promotion for Health-Related Quality of Life in Children and Adolescents –



187 A European Public Health Perspective” (Ravens-Sieberer et al., 2014). It is available in 38  
188 languages including Danish, Portuguese, and Swedish. The well-being dimension is  
189 composed of 7 items and the answers are reported on a 5-point scale assessing either  
190 frequency (from *never* to *always*) or intensity (from *not at all* to *extremely*). Its scores have  
191 been shown to yield good internal reliability among children and adolescents from 8- to 18-  
192 years old (Robitail et al., 2007).

193 **Intuitive eating.** The 23-item Intuitive Eating Scale-2 (IES-2; Tylka & Kroon Van  
194 Diest, 2013) was used to assess intuitive eating. The already validated Portuguese version  
195 (Duarte, Pinto Gouveia, & Mendes, 2016) was used in Portugal. Items are rated on a 5-point  
196 scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The IES-2 is composed of four  
197 dimensions: Eating for Physical rather than Emotional Reasons; Unconditional Permission to  
198 Eat; Reliance on Hunger and Satiety Cues; and Body–Food Choice Congruence. The total  
199 scale and subscale scores were used in the present study. The total IES-2 scores have  
200 evidenced good internal reliability (Cronbach  $\alpha = .85-.89$ ) and 3-week stability ( $r = .88$  to  
201  $.92$ ) in samples of college women and men (Tylka & Kroon Van Diest, 2013). Although no  
202 study has investigated the psychometric properties of the IES-2 among adolescents,  
203 Dockendorff, Petrie, Greenleaf, and Martin (2012) reported that the original IES could be  
204 used among young adolescents.

## 205 **Procedures**

206 Passive parental consent and active participant consent were obtained. Participants  
207 answered the questionnaire at school, during a class, using online web software. Each  
208 questionnaire was presented on a new page. The order of the scales was counterbalanced to  
209 control for order effects. Participants were also asked to provide their demographics. The  
210 study was approved by the ethics committee of the National Committee on Health Research  
211 Ethics in Denmark (number H-16044295), the Ethics Committee of the Faculty of

212 Psychology and Education Sciences of the University of Porto in Portugal (reference 6-  
213 05/2016), and the Ethical Committee at Lund University in Sweden (number 2016/264).

#### 214 **Statistical Analyses**

215 Our analyses were organized in four sections. First, in order to test the BAS-2's  
216 construct validity (i.e., its factor structure and item-factor loadings), confirmatory factor  
217 analyses (CFAs) were performed using the lavaan package (Rosseel, 2012) from the R  
218 software (R Core Team, 2013). The CFAs were conducted on the boy and girl samples from  
219 the three countries (Denmark, Portugal, and Sweden). Following the recommendations from  
220 Hu and Bentler (1999), Jöreskog and Sörbom (1989), and Kline (2011), the model fit was  
221 interpreted by using the Chi-square ( $\chi^2$ ), the Comparative Fit Index (CFI; Bentler, 1990), the  
222 Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), the Root Mean Square Error of  
223 Approximation (RMSEA; Steiger, 1990), with a 90% confidence interval, and the  
224 Standardized Root Mean Square Residual (SRMR; Jöreskog & Sörbom, 1989). In agreement  
225 with Marsh, Wen, and Hau (2004) and Chen, Curran, Bollen, Kirby, and Paxton (2008), the  
226 global model fit based on the constellation of these indices rather than a universal cut-off  
227 value for a particular index was interpreted.

228 Multi-group CFAs were conducted to test the invariance of the BAS-2 across sex and  
229 country by using the “step-down” methodology (Brown, 2006). The multi-group CFAs were  
230 realized with the semTools package (Pornprasertmanit, Miller, Schoemann, & Rosseel,  
231 2016). In the first step, all parameters were freely estimated across groups in order to  
232 establish a baseline unconstrained model (configural invariance; Horn & McArdle, 1992).  
233 Next, factor loadings were constrained to equality across groups (metric invariance; Horn &  
234 McArdle, 1992). In the following step, item intercepts were constrained to be equal (scalar  
235 invariance; Steenkamp & Baumgartner, 1998). If metric or scalar invariance was rejected,  
236 less strict invariance hypotheses were assessed (the partial metric or the partial scalar



261 Portuguese, and Swedish girl and Portuguese boy samples and Item 8 in the Danish boy  
262 sample (see Table 3). Item 5 had the lowest factor loading, ranging from .44 to .70. However,  
263 we kept Item 5 as its loading was above the .32 threshold (Tabachnick & Fidell, 2001).

#### 264 **Measurement Invariance**

265 Multi-group CFAs were performed on the BAS-2 across both sex and country. The  
266 results displayed in Table 4 and Supplementary Table 5 indicate that there was evidence of  
267 metric and partial scalar invariance across Denmark and Portugal (metric  $\Delta CFI = .003$ , scalar  
268  $\Delta CFI = .024$ , and partial scalar  $\Delta CFI = .008$ ); Denmark and Sweden (metric  $\Delta CFI = .001$ ,  
269 scalar  $\Delta CFI = .016$ , and partial scalar  $\Delta CFI = .008$ ); and Portugal and Sweden (metric  $\Delta CFI$   
270  $= .004$ , scalar  $\Delta CFI = .020$ , and partial scalar  $\Delta CFI = .007$ ).

271 Next, multi-group CFAs on the girl and boy samples from each country were carried  
272 out in order to test whether the BAS-2 was invariant across sexes in the three languages. The  
273 results of the multi-group CFAs on BAS-2 showed that the BAS-2 is metric and partial scalar  
274 invariant across boys and girls in Denmark (metric  $\Delta CFI = .003$ , scalar  $\Delta CFI = .024$ , and  
275 partial scalar  $\Delta CFI = .007$ ) and metric and scalar invariant across boys and girls in Portugal  
276 (metric  $\Delta CFI = .000$ , and scalar  $\Delta CFI = .001$ ) and Sweden (metric  $\Delta CFI = .008$ , and scalar  
277  $\Delta CFI = .006$ ; see Supplementary Table 5).

#### 278 **Internal Consistency Reliability**

279 Scores on the Danish, Portuguese, and Swedish versions of the BAS-2 were shown to  
280 be internally consistent for both boys ( $\alpha = .92$ ,  $.91$ , and  $.94$ , respectively) and girls ( $\alpha = .93$ ,  
281  $.94$ , and  $.94$ , respectively).

#### 282 **Convergent Validity**

283 Prior to assessing the convergent validity of the BAS-2, we performed factor analyses  
284 on all translated instruments (RSES and IES-2 in Danish and Swedish) to assess their factor  
285 structure. The factor structure of the Portuguese version of the IES-2 was also assessed, as

286 this measure has not previously been used among adolescents (details regarding factor  
287 loadings and fit indices are presented in Supplementary Tables 3 and 4). Convergent validity  
288 was assessed by looking at the correlations between the BAS-2 and self-esteem,  
289 psychological well-being, intuitive eating, and BMI for boys and girls in Denmark, Portugal,  
290 and Sweden separately. The results showed similar patterns in the three countries for both  
291 boys and girls (see Tables 5-7). For girls, body appreciation was moderately to strongly  
292 positively correlated with self-esteem, psychological well-being, and intuitive eating (Cohen,  
293 1988). All these relationships were significant at  $p < .001$ . There was a weak negative  
294 relationship between the BAS-2 and BMI in the three countries; however, this relationship  
295 was significant in Portugal ( $r = .14, p = .015$ ), but not in Denmark ( $r = .19, p = .117$ ) or  
296 Sweden ( $r = .15, p = .077$ ), which may be due to the larger sample size in Portugal. For boys,  
297 body appreciation was moderately to strongly positively correlated with self-esteem,  
298 psychological well-being, and intuitive eating – although the relationship between body  
299 appreciation and intuitive eating was weaker in Portugal ( $z = 2.57, p = .010$ ) and Sweden ( $z =$   
300  $2.03, p = .042$ ). All these relationships are significant at  $p < .001$ . The relationship between  
301 body appreciation and BMI for boys was also less clear, as a weak negative relationship was  
302 found in Portugal ( $r = -.33, p < .001$ ), but there was no statistically significant relationship  
303 either in Denmark or in Sweden.

#### 304 **Group Comparisons**

305 A two-way ANOVA was conducted to assess the differences in terms of body  
306 appreciation between sex and country. Results show that there was a significant effect of sex,  
307  $F(1, 1006) = 105.45, p < .001, \omega^2 = .093$ . Boys ( $M = 4.21, SD = 0.73$ ) had a higher level of  
308 body appreciation than girls ( $M = 3.72, SD = 0.85$ ). There was also a significant effect of  
309 country,  $F(2, 1006) = 3.42, p = .033, \omega^2 = .004$ , on the level of body appreciation.

310 As the homogeneity of variance was not respected, a Games-Howell post-hoc test  
311 (Field, 2013) was carried out. Results showed that the level of body appreciation was not  
312 significantly different across the three countries: Denmark ( $M = 3.89$ ,  $SD = 0.78$ ), Portugal  
313 ( $M = 4.01$ ,  $SD = 0.79$ ), and Sweden ( $M = 3.89$ ,  $SD = 0.90$ ). The interaction between sex and  
314 country was nonsignificant,  $F(2, 1006) = 0.75$ ,  $p = .475$ ,  $\omega^2 = .000$ .

### 315 **Discussion**

316 The main objective of the study was to accrue psychometric evidence for the BAS-2  
317 among adolescents and young adults in three countries: Denmark, Portugal, and Sweden.  
318 Consistent with results from other studies examining the factor structure of the BAS-2 within  
319 different countries (Alcaraz-Ibáñez et al., 2017; Alleva et al., 2016; Atari, 2016; Halliwell et  
320 al., 2017; Jovic et al., 2016; Kertechian & Swami, 2017; Namatame et al., 2017;  
321 Pálmarsdóttir & Karlsdóttir, 2016; Razmus & Razmus, 2017; Swami, García, et al., 2017;  
322 Swami & Ng, 2015; Swami et al., 2016; Swami, Tudorel, et al., 2017; Tylka & Wood-  
323 Barcalow, 2015a), our results showed that the BAS-2 is composed of a single factor within  
324 Denmark, Portugal, and Sweden. The 10 items of the BAS-2 were found to load on one latent  
325 factor in both sexes in these three countries. These results are similar to those found by Tylka  
326 and Wood-Barcalow (2015a) in the English validation of the BAS-2, who also found that the  
327 10 items of the English version of the BAS-2 loaded on one latent variable. Overall, the  
328 present study's findings provide support for the use of the BAS-2 among adolescent boys and  
329 girls from Denmark, Portugal, and Sweden.

330 Item 5 had a lower factor loading ranging from .44 to .70. However, Item 5 was kept  
331 as its loading was above the .32 threshold (Tabachnick & Fidell, 2001), and Item 5 has been  
332 found to have the lowest factor loading in other languages: .33 in Dutch women (Alleva et  
333 al., 2016), .55 in the French female sample (Kertechian & Swami, 2017), and .65 in Spanish  
334 (Swami, García, et al., 2017).

335           The invariance of the scale was assessed across sex and country. This is the first time  
336 that the cross-cultural invariance of the BAS-2 has been examined. It was found that the  
337 BAS-2 is partially scalar invariant across Denmark, Portugal, and Sweden, indicating that the  
338 BAS-2 is equivalent in these three languages. Hence, the scores on the BAS-2 can be  
339 compared between these three countries. Regarding sex invariance, it was found that the scale  
340 is partially scalar invariant between boys and girls in Denmark and scalar invariant between  
341 boys and girls in Portugal and Sweden, which enables sex comparisons. These results are in  
342 line with previous findings of sex invariance reported in other validation articles of the BAS-  
343 2 within other countries (Kertechian & Swami, 2017; Razmus & Razmus, 2017; Swami,  
344 García, et al., 2017; Swami et al., 2016). In the original validation of the BAS-2, Tylka and  
345 Wood-Barcalow (2015a) also examined sex invariance and found that the BAS-2 was  
346 invariant among men and women.

347           Results regarding the convergent validity of the BAS-2's scores were found to be very  
348 similar in the three countries investigated. Body appreciation is positively associated with  
349 self-esteem, psychological well-being, and intuitive eating for both boys and girls from  
350 Denmark, Portugal, and Sweden. These findings are consistent with previously reported  
351 results indicating a positive relationship between BAS-2 and self-esteem (e.g., Atari, 2016;  
352 Swami, García, et al., 2017; Swami & Ng, 2015) and between BAS-2 and intuitive eating  
353 (Tylka & Wood-Barcalow, 2015a) in different countries than the ones investigated in the  
354 present study. Although Alleva et al. (2016) and Swami et al. (2016) investigated the  
355 relationship between BAS-2 and optimistic life orientation (Scheier, Carver, & Bridges,  
356 1994) and between BAS-2 and life satisfaction (Diener, Emmons, Larsen, & Griffin, 1985)  
357 respectively, the relationship between BAS-2 and psychological well-being assessed via the  
358 KIDSCREEN-27 has not yet been studied. Regarding the relationship between BAS-2 and  
359 BMI, different patterns were observed: there is a negative relationship for boys and girls in

360 Portugal, but no significant difference was found in Denmark and Sweden. Although most  
361 studies have found a negative relationship between body appreciation and BMI in various  
362 countries (e.g., Rasmus & Rasmus, 2017; Swami, Tudorel, et al., 2017), some have found no  
363 relationship among men or women (e.g., Swami, García, et al., 2017; Swami & Ng, 2015;  
364 Swami et al., 2016).

365 In the last step of our analyses, differences between sex and country were  
366 investigated. As in previous comparisons between men and women, we found that boys have  
367 higher body appreciation than girls, with a moderate effect size (e.g., Atari, 2016; Kertechian  
368 & Swami, 2017; Tylka & Wood-Barcalow, 2015a). Our results indicated that the difference  
369 between countries was marginal with a small effect size. Although these findings need  
370 replication across different cultures before firm conclusions can be drawn, they suggest that  
371 cross-cultural differences on the level of body appreciation among adolescents and young  
372 adults may not be large.

373 Our recruitment strategy was limited in some ways. Participants were assessed at  
374 school, and as only a few schools from each country (i.e., four in Denmark, six in Portugal,  
375 and six in Sweden) participated in the study, our sample is probably not representative of the  
376 general adolescent and young adult populations in these three countries. Although some  
377 participants were 18 or 19 years old, our study did not include full adult samples, which may  
378 limit the generalizability of our results to adult populations. Future studies could investigate  
379 the psychometric properties of the BAS-2 in Danish, Portuguese, and Swedish among an  
380 adult population. The IES-2 has not previously been used among adolescents which may be  
381 considered an additional limitation. However, previous studies found that the original IES is  
382 an appropriate measure of intuitive eating among both adults and adolescents (Andrew,  
383 Tiggemann, & Clark, 2016; Dockendorff et al., 2012). Moreover, the results of the factor  
384 analyses on the IES-2 that we conducted among our three samples upheld its factor structure.



385 Many variables have been associated with body appreciation, although additional studies  
386 could investigate the association between the BAS-2 and other concepts such as body  
387 acceptance by others (Avalos & Tylka, 2006), body flexibility (Sandoz, Wilson, Merwin, &  
388 Kellum, 2013), or physical well-being. Due to the recommendation to have a 5:1 or 10:1 ratio  
389 of participants by parameters to estimate (Bentler & Chou, 1987; Bollen, 1989) or a 10:1  
390 ratio of participants per variables (Nunnally, 1967), the smaller sample size in Denmark can  
391 be seen as an additional limitation. However, Wolf, Harrington, Clark, and Miller (2013)  
392 found that a sample size of 70 participants was sufficient with a one-factor model composed  
393 of eight indicators and factor loadings of .50. Their results also show that a sample size of 40  
394 participants was large enough for the same model when the factor loadings were around .65.  
395 Therefore, we are confident that, in regards to the results of Wolf et al. (2013), the smaller  
396 sample size in Denmark do not limit our findings.

397 In conclusion, this study supports the psychometric properties of the BAS-2: it can be  
398 used with confidence among adolescents and young adults from 12 to 19 years old in  
399 Denmark, Portugal, and Sweden, and the scores across countries and across boys and girls  
400 can be compared. Along with previous validation studies among children (Halliwell et al.,  
401 2017) and adults (Tylka & Wood-Barcalow, 2015a), these results enable researchers to  
402 investigate the development of positive body image over the life span (Tiggemann, 2015).

#### 403 **Disclosure statement**

404 Conflicts of interest: none

#### 405 **Acknowledgements**

406 We would like to thank Dr. Tracy L. Tylka for her permission for translation and  
407 validation of the BAS-2. This article is based upon work from COST Action Appearance

408 Matters IS1210, supported by COST (European Cooperation in Science and Technology).

409 [www.cost.eu](http://www.cost.eu)

410

### **Funding**

411 This research did not receive any specific grant from funding agencies in the public,

412 commercial, or not-for-profit sectors.

413

414 **References**

- 415 Alcaraz-Ibáñez, M., Cren Chiminazzo, J. G., Sicilia Camacho, Á., & Teixeira Fernandes, P.  
416 (2017). Examining the psychometric properties of the Body Appreciation Scale-2 in  
417 Brazilian adolescents. *Psychology, Society, & Education, 9*, 505-515. doi:  
418 10.25115/psye.v9i3.1101
- 419 Alexias, G., Togas, C., & Mellon, R. (2016). Psychometric properties of the Greek version of  
420 the Body Appreciation Scale. *Hellenic Journal of Psychology, 13*, 73-92.
- 421 Alleva, J. M., Martijn, C., Veldhuis, J., & Tylka, T. L. (2016). A Dutch translation and  
422 validation of the Body Appreciation Scale-2: An investigation with female university  
423 students in the Netherlands. *Body Image, 19*, 44-48. doi:  
424 10.1016/j.bodyim.2016.08.008
- 425 Andrew, R., Tiggemann, M., & Clark, L. (2016). Predictors and health-related outcomes of  
426 positive body image in adolescent girls: A prospective study. *Developmental*  
427 *Psychology, 52*, 463. doi: 10.1037/dev0000095
- 428 Atari, M. (2016). Factor structure and psychometric properties of the Body Appreciation  
429 Scale-2 in Iran. *Body Image, 18*, 1-4. doi: 10.1016/j.bodyim.2016.04.006
- 430 Atari, M., Akbari-Zardkhaneh, S., Mohammadi, L., & Soufiabadi, M. (2015). The factor  
431 structure and psychometric properties of the Persian version of Body Appreciation  
432 Scale. *American Journal of Applied Psychology, 3*, 62-66.
- 433 Atari, M., Jamali, R., Bahrami-Ehsan, H., & Mohammadi, L. (2017). Development and  
434 validation of Adolescent Comparative Body and Appearance Satisfaction Scale  
435 (ACBASS). *Current Psychology, 3*, 61-70. doi: 10.1007/s12144-016-9452-0
- 436 Avalos, L. C., & Tylka, T. L. (2006). Exploring a model of intuitive eating with college  
437 women. *Journal of Counseling Psychology, 53*, 486-497. doi: 10.1037/e527492007-  
438 001

- 439 Avalos, L. C., Tylka, T. L., & Wood-Barcalow, N. (2005). The Body Appreciation Scale:  
440 Development and psychometric evaluation. *Body Image, 2*, 285-297. doi:  
441 10.1016/j.bodyim.2005.06.002
- 442 Bagley, C., Bolitho, F., & Bertrand, L. (1997). Norms and construct validity of the Rosenberg  
443 Self-Esteem Scale in Canadian high school populations: Implications for counselling.  
444 *Canadian Journal of Counselling, 31*, 82-92.
- 445 Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin,*  
446 *107*, 238-246. doi: 10.1037/0033-2909.107.2.238
- 447 Bentler, P. M., & Chou, C.-P. (1987). Practical issues in structural modeling. *Sociological*  
448 *Methods & Research, 16*, 78-117. doi: 10.1177/0049124187016001004
- 449 Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.
- 450 Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural*  
451 *Psychology, 1*, 185-216. doi: 10.1177/135910457000100301
- 452 Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York: Guilford  
453 Press.
- 454 Chen, F., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation  
455 of the use of fixed cutoff points in RMSEA test statistic in structural equation models.  
456 *Sociological Methods & Research, 36*, 462-494. doi: 10.1177/0049124108314720
- 457 Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing  
458 measurement invariance. *Structural Equation Modeling, 9*, 233-255. doi:  
459 10.1207/s15328007sem0902\_5
- 460 Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2 ed.). New York:  
461 Academic press.

- 462 Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life  
463 Scale. *Journal of Personality Assessment*, *49*, 71-75. doi:  
464 10.1207/s15327752jpa4901\_13
- 465 Dockendorff, S. A., Petrie, T. A., Greenleaf, C. A., & Martin, S. (2012). Intuitive Eating  
466 Scale: An examination among early adolescents. *Journal of Counseling Psychology*,  
467 *59*, 604-611. doi: 10.1037/a0029962
- 468 Duarte, C., Pinto Gouveia, J., & Mendes, A. (2016). Psychometric properties of the Intuitive  
469 Eating Scale-2 and association with binge eating symptoms in a Portuguese  
470 community sample. *International Journal of Psychology and Psychological Therapy*,  
471 *16*, 329–341.
- 472 Eisenberg, M. E., Neumark-Sztainer, D., & Paxton, S. J. (2006). Five-year change in body  
473 satisfaction among adolescents. *Journal of Psychosomatic Research*, *61*, 521-527.  
474 doi: 10.1016/j.jpsychores.2006.05.007
- 475 Field, A. (2013). *Discovering statistics using IBM SPSS Statistics: (and sex and drugs and*  
476 *rock 'n' roll)* (4 ed.). London: Sage.
- 477 Fleming, J. S., & Courtney, B. E. (1984). The dimensionality of self-esteem: II. Hierarchical  
478 facet model for revised measurement scales. *Journal of Personality and Social*  
479 *Psychology*, *46*, 404-421. doi: 10.1037/0022-3514.46.2.404
- 480 Frisé, A., & Holmqvist, K. (2010). What characterizes early adolescents with a positive  
481 body image? A qualitative investigation of Swedish girls and boys. *Body Image*, *7*,  
482 205-212. doi: 10.1016/j.bodyim.2010.04.001
- 483 Halliwell, E., Jarman, H., McNamara, A., Risdon, H., & Jankowski, G. (2015).  
484 Dissemination of evidence-based body image interventions: A pilot study into the  
485 effectiveness of using undergraduate students as interventionists in secondary schools.  
486 *Body Image*, *14*, 1-4. doi: 10.1016/j.bodyim.2015.02.002

- 487 Halliwell, E., Jarman, H., Tylka, T., & Slater, A. (2017). Adapting the Body Appreciation  
488 Scale-2 for Children: A psychometric analysis of the BAS-2C. *Body Image, 21*, 97-  
489 102. doi: 10.1016/j.bodyim.2017.03.005
- 490 Harrell Jr, F. E. (2017). Hmisc: Harrell Miscellaneous. R package version 4.0-3. Retrieved  
491 16/08/2017, from <https://CRAN.R-project.org/package=Hmisc>
- 492 Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and*  
493 *organizations across nations* (2 ed.). Thousand Oaks, CA: Sage.
- 494 Holsen, I., Jones, D. C., & Birkeland, M. S. (2012). Body image satisfaction among  
495 Norwegian adolescents and young adults: A longitudinal study of the influence of  
496 interpersonal relationships and BMI. *Body Image, 9*, 201-208. doi:  
497 10.1016/j.bodyim.2012.01.006
- 498 Horn, J. L., & McArdle, J. J. (1992). A practical and theoretical guide to measurement  
499 invariance in aging research. *Experimental Aging Research, 18*, 117-144. doi:  
500 10.1080/03610739208253916
- 501 House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (2004). *Culture,*  
502 *leadership, and organizations: The GLOBE study of 62 societies*. Thousand Oaks:  
503 Sage publications.
- 504 Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure  
505 analysis: Conventional criteria versus new alternatives. *Structural Equation*  
506 *Modeling: A Multidisciplinary Journal, 6*, 1-55. doi: 10.1080/10705519909540118
- 507 Jöreskog, K. G., & Sörbom, D. (1989). *LISREL 7: A guide to the program and applications*.  
508 Chicago: SPSS.
- 509 Jovic, M., Sforza, M., Jovanovic, M., & Jovic, M. (2016). The Acceptance of Cosmetic  
510 Surgery Scale: Confirmatory factor analyses and validation among Serbian adults.  
511 *Current Psychology, 1-12*. doi: 10.1007/s12144-016-9458-7

- 512 Kertechian, S., & Swami, V. (2017). An examination of the factor structure and sex  
513 invariance of a French translation of the Body Appreciation Scale-2 in university  
514 students. *Body Image*, 21, 26-29. doi: 10.1016/j.bodyim.2017.02.005
- 515 Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3 ed.). New  
516 York: Guilford.
- 517 Korkmaz, S., Goksuluk, D., & Zararsiz, G. (2014). MVN: An R package for assessing  
518 multivariate normality. *The R Journal*, 6, 151-162. doi: 10.1002/hfm.20355
- 519 Littleton, H. L., & Ollendick, T. (2003). Negative body image and disordered eating behavior  
520 in children and adolescents: What places youth at risk and how can these problems be  
521 prevented? *Clinical Child and Family Psychology Review*, 6, 51-66.
- 522 Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications.  
523 *Biometrika*, 57, 519-530. doi: 10.1093/biomet/57.3.519
- 524 Marsh, H. W., Wen, Z., & Hau, K.-T. (2004). Structural equation models of latent  
525 interactions: Evaluation of alternative estimation strategies and indicator construction.  
526 *Psychological Methods*, 9, 275-300. doi: 10.1037/1082-989x.9.3.275
- 527 Namatame, H., Uno, K., & Sawamiya, Y. (2017). Development of Japanese version of the  
528 Body Appreciation Scale-2. *The Japanese Journal of Psychology*, 92-99. doi:  
529 10.4992/jjpsy.88.16216
- 530 Nunnally, J. C. (1967). *Psychometric theory*. New York, NY: McGraw-Hill.
- 531 Pálmarsdóttir, Þ. G., & Karlsdóttir, A. E. (2016). Psychometric properties of the Icelandic  
532 translation of the Body Appreciation Scale-2. Retrieved 27/08/2017, from  
533 <http://skemman.is/en/item/view/1946/24746>
- 534 Pechorro, P., Marôco, J., Poiares, C., & Vieira, R. X. (2011). Validação da Escala de Auto-  
535 Estima de Rosenberg com adolescentes Portugueses em contexto forense e escolar.  
536 *Arquivos de Medicina*, 25, 174-179. doi: 10.1590/S1516-44462001000400008

- 537 Pornprasertmanit, S., Miller, P., Schoemann, A., & Rosseel, Y. (2016). semTools: Useful  
538 tools for structural equation modeling. R package version 0.4-14. Retrieved  
539 16/08/2017, from <https://cran.r-project.org/web/packages/semTools/index.html>
- 540 Ravens-Sieberer, U., Herdman, M., Devine, J., Otto, C., Bullinger, M., Rose, M., & Klasen,  
541 F. (2014). The European KIDSCREEN approach to measure quality of life and well-  
542 being in children: Development, current application, and future advances. *Quality of*  
543 *Life Research*, 23, 791-803. doi: 10.1007/s11136-013-0428-3
- 544 Razmus, M., & Razmus, W. (2017). Evaluating the psychometric properties of the Polish  
545 version of the Body Appreciation Scale-2. *Body Image*, 23, 45-49. doi:  
546 10.1016/j.bodyim.2017.07.004
- 547 Revelle, W. (2017). psych: Procedures for psychological, psychometric, and personality  
548 research. R package version 1.7.5. Retrieved 12/05/2017 from [https://CRAN.R-](https://CRAN.R-project.org/package=psych)  
549 [project.org/package=psych](https://CRAN.R-project.org/package=psych)
- 550 Robitail, S., Ravens-Sieberer, U., Simeoni, M.-C., Rajmil, L., Bruil, J., Power, M., . . .  
551 Mazur, J. (2007). Testing the structural and cross-cultural validity of the  
552 KIDSCREEN-27 quality of life questionnaire. *Quality of Life Research*, 16, 1335-  
553 1345. doi: 10.1007/s11136-007-9241-1
- 554 Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton  
555 University Press.
- 556 Sandoz, E. K., Wilson, K. G., Merwin, R. M., & Kellum, K. K. (2013). Assessment of body  
557 image flexibility: The Body Image-Acceptance and Action Questionnaire. *Journal of*  
558 *Contextual Behavioral Science*, 2, 39-48. doi: 10.1016/j.jcbs.2013.03.002
- 559 Satorra, A., & Bentler, P. M. (1988). Scaling corrections for chi-square statistics in  
560 covariance structure analysis. *American Statistical Association Proceedings of the*



- 561 *Business and Economic Section* (pp. 308-313). Washington, DC: American Statistical  
562 Association.
- 563 Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from  
564 neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the  
565 Life Orientation Test. *Journal of Personality and Social Psychology*, *67*, 1063-1078.  
566 doi: 10.1037/0022-3514.67.6.1063
- 567 Steenkamp, J. B. E., & Baumgartner, H. (1998). Assessing measurement invariance in cross-  
568 national consumer research. *Journal of Consumer Research*, *25*, 78-107. doi:  
569 10.1086/209528
- 570 Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation  
571 approach. *Multivariate Behavioral Research*, *25*, 173-180. doi:  
572 10.1207/s15327906mbr2502\_4
- 573 Streiner, D. L., & Norman, G. R. (2008). *Health measurement scales: A practical guide to*  
574 *their development and use* (4 ed.). Hampshire, UK: Oxford University Press.
- 575 Striegel-Moore, R. H., & Cachelin, F. M. (1999). Body image concerns and disordered eating  
576 in adolescent girls: Risk and protective factors. In N. G. Johnson, M. C. Roberts, & J.  
577 Worell (Eds.), *Beyond appearance: A new look at adolescent girls* (pp. 85–108).  
578 Washington, DC: American Psychological Association.
- 579 Swami, V., García, A. A., & Barron, D. (2017). Factor structure and psychometric properties  
580 of a Spanish translation of the Body Appreciation Scale-2 (BAS-2). *Body Image*, *22*,  
581 13-17. doi: 10.1016/j.bodyim.2017.05.002
- 582 Swami, V., & Ng, S.-K. (2015). Factor structure and psychometric properties of the Body  
583 Appreciation Scale-2 in university students in Hong Kong. *Body Image*, *15*, 68-71.  
584 doi: 10.1016/j.bodyim.2015.06.004

- 585 Swami, V., Ng, S.-K., & Barron, D. (2016). Translation and psychometric evaluation of a  
586 Standard Chinese version of the Body Appreciation Scale-2. *Body Image, 18*, 23-26.  
587 doi: 10.1016/j.bodyim.2016.04.005
- 588 Swami, V., Özgen, L., Gökçen, E., & Petrides, K. (2015). Body image among female  
589 university students in Turkey: Concurrent translation and validation of three body  
590 image measures. *International Journal of Culture and Mental Health, 8*, 176-191. doi:  
591 10.1080/17542863.2014.917117
- 592 Swami, V., Tudorel, O., Goian, C., Barron, D., & Vintila, M. (2017). Factor structure and  
593 psychometric properties of a Romanian translation of the Body Appreciation Scale-2.  
594 *Body Image, 23*, 61-68. doi: 10.1016/j.bodyim.2017.08.001
- 595 Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4 ed.). Boston, MA:  
596 Allyn and Bacon.
- 597 Tiggemann, M. (2015). Considerations of positive body image across various social identities  
598 and special populations. *Body Image, 14*, 168-176. doi:  
599 10.1016/j.bodyim.2015.03.002
- 600 Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor  
601 analysis. *Psychometrika, 38*, 1-10. doi: 10.1007/bf02291170
- 602 Tylka, T. L. (2013). Evidence for the Body Appreciation Scale's measurement  
603 equivalence/invariance between US college women and men. *Body Image, 10*, 415-  
604 418. doi: 10.1016/j.bodyim.2013.02.006
- 605 Tylka, T. L., & Kroon Van Diest, A. M. (2013). The Intuitive Eating Scale–2: Item  
606 refinement and psychometric evaluation with college women and men. *Journal of*  
607 *Counseling Psychology, 60*, 137-153. doi: 10.1037/a0030893.supp

- 608 Tylka, T. L., & Wood-Barcalow, N. L. (2015a). The Body Appreciation Scale-2: Item  
609 refinement and psychometric evaluation. *Body Image, 12*, 53-67. doi:  
610 10.1016/j.bodyim.2014.09.006
- 611 Tylka, T. L., & Wood-Barcalow, N. L. (2015b). What is and what is not positive body  
612 image? Conceptual foundations and construct definition. *Body Image, 14*, 118-129.  
613 doi: 10.1016/j.bodyim.2015.04.001
- 614 Von Soest, T., & Wichstrøm, L. (2009). Gender differences in the development of dieting  
615 from adolescence to early adulthood: A longitudinal study. *Journal of Research on*  
616 *Adolescence, 19*, 509-529. doi: 10.1111/j.1532-7795.2009.00605.x
- 617 Webb, J. B. (2015). Body image flexibility contributes to explaining the link between body  
618 dissatisfaction and body appreciation in White college-bound females. *Journal of*  
619 *Contextual Behavioral Science, 4*, 176-183. doi: 10.1016/j.jcbs.2015.06.001
- 620 Webb, J. B., Wood-Barcalow, N. L., & Tylka, T. L. (2015). Assessing positive body image:  
621 Contemporary approaches and future directions. *Body Image, 14*, 130-145. doi:  
622 10.1016/j.bodyim.2015.03.010
- 623 Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size  
624 requirements for structural equation models: An evaluation of power, bias, and  
625 solution propriety. *Educational and Psychological Measurement, 76*, 913-934. doi:  
626 10.1177/0013164413495237
- 627

628 Table 1

629 *Means, standard deviations, and Cronbach's alphas of all measures across country and sex*

	Denmark				Portugal				Sweden			
	Girls		Boys		Girls		Boys		Girls		Boys	
	<i>M</i> ( <i>SD</i> )	Cronbach $\alpha$ [95% CI]	<i>M</i> ( <i>SD</i> )	Cronbach $\alpha$ [95% CI]	<i>M</i> ( <i>SD</i> )	Cronbach $\alpha$ [95% CI]	<i>M</i> ( <i>SD</i> )	Cronbach $\alpha$ [95% CI]	<i>M</i> ( <i>SD</i> )	Cronbach $\alpha$ [95% CI]	<i>M</i> ( <i>SD</i> )	Cronbach $\alpha$ [95% CI]
BAS-2	3.73 (0.79)	.93 [.91-.95]	4.13 (0.72)	.92 [.89-.95]	3.81 (0.83)	.94 [.93-.95]	4.31 (0.65)	.91 [.89-.93]	3.55 (0.91)	.95 [.94-.96]	4.13 (0.81)	.94 [.93-.95]
RSES	2.87 (0.54)	.88 [.84-.92]	3.21 (0.46)	.78 [.69-.87]	2.90 (0.61)	.88 [.87-.90]	3.19 (0.56)	.83 [.80-.87]	2.75 (0.60)	.90 [.88-.92]	3.15 (0.54)	.84 [.80-.87]
KIDSCREEN	3.83 (0.69)	.88 [.84-.92]	4.13 (0.52)	.76 [.66-.87]	3.68 (0.74)	.86 [.84-.89]	4.09 (0.67)	.81 [.77-.85]	3.58 (0.87)	.92 [.90-.94]	4.06 (0.70)	.82 [.78-.86]
IES-2	3.54 (0.51)	.79 [.73-.86]	3.72 (0.49)	.75 [.65-.85]	3.40 (0.55)	.79 [.75-.82]	3.63 (0.53)	.78 [.73-.82]	3.52 (0.64)	.87 [.84-.90]	3.68 (0.59)	.79 [.75-.83]
UPE	3.52 (0.86)	.77 [.69-.85]	3.66 (0.69)	.57 [.38-.77]	3.18 (0.87)	.69 [.63-.75]	3.28 (0.91)	.70 [.63-.76]	3.37 (0.95)	.80 [.75-.85]	3.52 (0.95)	.72 [.66-.78]
EPR	3.59 (0.90)	.86 [.81-.91]	3.75 (0.82)	.76 [.66-.87]	3.28 (1.04)	.87 [.85-.90]	3.66 (1.03)	.87 [.85-.90]	3.45 (0.92)	.81 [.76-.86]	3.80 (0.87)	.73 [.68-.79]
RHSC	3.67 (0.69)	.79 [.71-.86]	3.85 (0.86)	.86 [.79-.92]	3.58 (0.84)	.85 [.83-.88]	3.84 (0.80)	.85 [.82-.88]	3.64 (0.90)	.89 [.86-.92]	3.72 (1.07)	.92 [.90-.93]
B-FCC	3.26 (0.86)	.84 [.78-.91]	3.52 (0.88)	.85 [.77-.92]	3.58 (0.79)	.76 [.71-.81]	3.70 (0.81)	.81 [.77-.85]	3.63 (0.80)	.83 [.78-.88]	3.59 (1.01)	.88 [.85-.91]

630 *Note.*  $N = 1,012$ ;  $n = 79$  Danish girls;  $n = 50$  Danish boys;  $n = 296$  Portuguese girls;  $n = 217$  Portuguese boys;  $n = 155$  Swedish girls;  $n = 215$  Swedish boys; BAS-2 = Body  
631 Appreciation Scale-2; RSES = Rosenberg Self-Esteem Scale; KIDSCREEN = psychological well-being dimension; IES-2 = Intuitive Eating Scale-2; UPE = Unconditional  
632 Permission to Eat; EPR = Eating for Physical rather than Emotional Reasons; RHSC = Reliance on Hunger and Satiety Cues; B-FCC = Body–Food Choice Congruence;  $M =$   
633 Mean;  $SD =$  Standard Deviation; CI = Confidence Interval.

634

635 Table 2

636 *Fit indices of the BAS-2 by sex and country*

	<i>Satorra-Bentler</i> $\chi^2$	<i>df</i>	Scale correction	Robust CFI	Robust TLI	Robust RMSEA	Robust RMSEA CI	Robust SRMR
Denmark								
Girls ( <i>n</i> = 79)	50.36	35	1.14	.97	.96	.08	[.01, .13]	.05
Boys ( <i>n</i> = 50)	49.71	35	1.32	.91	.89	.11	[.00, .17]	.06
Portugal								
Girls ( <i>n</i> = 296)	96.61	35	1.25	.97	.96	.09	[.07, .11]	.03
Boys ( <i>n</i> = 217)	62.15	35	1.47	.97	.96	.07	[.04, .10]	.04
Sweden								
Girls ( <i>n</i> = 155)	70.11	35	1.27	.97	.96	.09	[.06, .12]	.03
Boys ( <i>n</i> = 215)	72.80	35	1.59	.96	.95	.09	[.06, .12]	.04

637 *Note.* *df* = degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean  
638 Square Error of Approximation; CI = Confidence Interval; SRMR = Standardized Root Mean Square Residual.

639

640 Table 3

641 *Standardized item-factor loadings for the BAS-2 among boys and girls in Denmark, Portugal,*  
 642 *and Sweden*

Items	Denmark		Portugal		Sweden	
	Girls	Boys	Girls	Boys	Girls	Boys
1. I respect my body.	.79	.67	.68	.73	.76	.84
2. I feel good about my body.	.68	.76	.88	.86	.90	.84
3. I feel that my body has at least some good qualities.	.69	.76	.74	.60	.80	.80
4. I take a positive attitude towards my body.	.86	.86	.83	.83	.90	.85
5. I am attentive to my body's needs.	.55	.70	.56	.44	.59	.64
6. I feel love for my body.	.88	.94	.90	.77	.87	.71
7. I appreciate the different and unique characteristics of my body.	.81	.76	.77	.72	.82	.83
8. My behavior reveals my positive attitude toward my body; for example, I hold my head high and smile.	.72	.47	.67	.68	.74	.79
9. I am comfortable in my body.	.84	.82	.90	.84	.92	.85
10. I feel like I am beautiful even if I am different from media images of attractive people (e.g., models, actresses/actors).	.77	.64	.78	.69	.80	.76

643 *Note.*  $N = 1,012$ ;  $n = 79$  Danish girls;  $n = 50$  Danish boys;  $n = 296$  Portuguese girls;  $n = 217$  Portuguese boys;  $n$   
 644  $= 155$  Swedish girls;  $n = 215$  Swedish boys.

645

646

647 Table 4

648 *Multi-group CFAs testing for measurement invariance between sex and country*

		Metric invariance	Scalar invariance	Non-invariant intercepts
Country	Denmark - Portugal	Yes	No	Items 1 & 5
	Denmark - Sweden	Yes	No	Item 6
	Portugal - Sweden	Yes	No	Items 1 & 3
Sex by country	Danish boys - Danish girls	Yes	No	Items 3 & 8
	Portuguese boys - Portuguese girls	Yes	Yes	
	Swedish boys - Swedish girls	Yes	Yes	

649

650

651 Table 5

652 *Bivariate correlations for Danish boys and girls*

	(1)	(2)	(3)	(4)	(5)
(1) Body appreciation		.82***	.70***	.52***	-.19
(2) Self-esteem	.60***		.60***	.52***	-.04
(3) Psychological well-being	.61***	.50***		.48***	-.08
(4) Intuitive eating	.57***	.41**	.42**		-.19
(5) Body mass index	-.07	-.05	-.10	-.17	

653 *Note.* Correlations above the diagonal correspond to the girl sample ( $n = 79$ ); correlations below the diagonal  
 654 correspond to the boy sample ( $n = 50$ ); \*\*  $p < .01$ , \*\*\*  $p < .001$ .

655

656



657 Table 6

658 *Bivariate correlations for Portuguese boys and girls*

	(1)	(2)	(3)	(4)	(5)
(1) Body appreciation		.67***	.59***	.32***	-.14*
(2) Self-esteem	.50***		.62***	.34***	-.04
(3) Psychological well-being	.54***	.55***		.35***	-.04
(4) Intuitive eating	.23***	.33***	.39***		-.13*
(5) Body mass index	-.33***	-.11	-.15*	-.14*	

659 *Note.* Correlations above the diagonal correspond to the girl sample ( $n = 296$ ); correlations below the diagonal  
 660 correspond to the boy sample ( $n = 217$ ); \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

661

662

663 Table 7

664 *Bivariate correlations for Swedish boys and girls*

	(1)	(2)	(3)	(4)	(5)
(1) Body appreciation		.79***	.66***	.57***	-.15
(2) Self-esteem	.62***		.72***	.55***	-.12
(3) Psychological well-being	.64***	.63***		.53***	-.01
(4) Intuitive eating	.31***	.36***	.37***		-.17*
(5) Body mass index	-.04	.10	.01	.02	

665 *Note.* Correlations above the diagonal correspond to the girl sample ( $n = 155$ ); correlations below the diagonal  
 666 correspond to the boy sample ( $n = 215$ ); \*  $p < .05$ , \*\*\*  $p < .001$ .

667

668

**Appendix A: Body Appreciation Scale-2 in Danish**

669 Instructions for participants: Vær venlig og angiv om svar er sandt aldrig, sjældent, nogen  
670 gange, ofte eller altid

671

672 1. Jeg respekterer min krop

673 2. Jeg trives med min krop

674 3. Jeg synes at min krop har i det mindste nogen gode kvaliteter

675 4. Jeg har en positiv indstilling til min krop

676 5. Jeg er opmærksom på min krops behov

677 6. Jeg kan godt lide min krop

678 7. Jeg kan godt lide min krops særlige udseende

679 8. Jeg opfører mig så min glæde ved min krop kan ses, for eksempel holder jeg mit hoved  
680 højt og smiler

681 9. Jeg føler mig godt tilpas i min krop

682 10. Jeg synes jeg er smuk selv om jeg ikke ser ud som dem i ugebladene (modeller og  
683 skuespillere)

684

685 Scoring: 1 = Aldrig; 2 = Sjældent; 3 = Nogen gange; 4 = Ofte; 5 = Altid

686

687

688

**Appendix B: Body Appreciation Scale-2 in Portuguese**

689 Instructions for participants: Por favor, indica até que ponto cada uma das afirmações é  
690 verdadeira em relação a ti, escolhendo uma das seguintes opções: nunca, raramente, às vezes,  
691 frequentemente, ou sempre

692

693 1. Respeito o meu corpo.

694 2. Sinto-me bem com o meu corpo.

695 3. Sinto que o meu corpo tem algumas qualidades.

696 4. Tenho uma atitude positiva em relação ao meu corpo.

697 5. Estou atento(a) às necessidades do meu corpo.

698 6. Sinto amor pelo meu corpo.

699 7. Aprecio as várias características únicas do meu corpo.

700 8. O meu comportamento revela a atitude positiva que tenho em relação ao meu corpo; por  
701 exemplo, mantenho a cabeça erguida e sorrio.

702 9. Sinto-me confortável no meu corpo.

703 10. Sinto-me bonito(a) mesmo sendo diferente das imagens de pessoas atraentes que  
704 aparecem nos meios de comunicação social (ex. modelos, atrizes/atores).

705

706 Scoring: 1 = Nunca; 2 = Raramente; 3 = Às vezes; 4 = Frequentemente; 5 = Sempre

707

708

**Appendix C: Body Appreciation Scale-2 in Swedish**

709 Instructions for participants: Var god, ange om påståendet är sant om du aldrig, sällan, ibland,  
710 ofta eller alltid:

711

712 1. Jag respekterar min kropp

713 2. Jag trivs med min kropp

714 3. Jag tycker att min kropp har åtminstone några bra egenskaper

715 4. Jag har en positiv inställning till min kropp

716 5. Jag är uppmärksam på min kropps behov

717 6. Jag älskar min kropp

718 7. Jag uppskattar min kropps olika och unika egenskaper

719 8. Mitt beteende visar min positiva inställning till min kropp, till exempel sträcker jag på mig  
720 och ler

721 9. Jag är bekväm i min kropp

722 10. Jag tycker att jag är vacker även om jag inte ser ut som attraktiva människor (t ex  
723 modeller, skådespelare) på bilder i media

724

725 Scoring: 1 = Aldrig; 2 = Sällan; 3 = Ibland; 4 = Ofta; 5 = Alltid

726

727 **Supplementary Materials**

728 Supplementary Table 1

729 *Standardized item-factor loadings for the Rosenberg Self-esteem Scale in Denmark and*

730 *Sweden*

Items	Denmark		Sweden	
	PSE	NSE	PSE	NSE
On the whole, I am satisfied with myself.	.83		.82	
At times, I think I am no good at all.		.56		.71
I feel that I have a number of good qualities.	.58		.75	
I am able to do things as well as most other people.	.54		.65	
I feel I do not have much to be proud of.		.75		.70
I certainly feel useless at times.		.75		.73
I feel that I'm a person of worth, at least on an equal plane with others.	.78		.72	
I wish I could have more respect for myself.		.58		.65
All in all, I am inclined to feel that I am a failure.		.59		.74
I take a positive attitude toward myself.	.81		.71	

731 *Note.*  $n = 129$  Danish;  $n = 370$  Swedish; PSE = Positive Self-Esteem; NSE = Negative Self-Esteem; all Factor  
 732 loadings are statistically significant ( $p < .001$ ).

733

734

735 Supplementary Table 2

736 *Fit indices of the Rosenberg Self-esteem Scale in Denmark and Sweden*

	<i>Satorra-Bentler <math>\chi^2</math></i>	<i>df</i>	Scale correction	Robust CFI	Robust TLI	Robust RMSEA	Robust RMSEA CI	Robust SRMR
Denmark	55.93	34	1.35	.93	.91	.09	[.04, .13]	.06
Sweden	61.11	34	1.15	.98	.97	.05	[.03, .07]	.03

737 *Note.* *n* = 129 Danish; *n* = 370 Swedish; *df* = degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-  
 738 Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; SRMR =  
 739 Standardized Root Mean Square Residual.

740

741 Supplementary Table 3

742 *Standardized item-factor loadings for the Intuitive Eating Scale-2 in Denmark, Portugal, and*

743 *Sweden*

Items	Denmark	Portugal	Sweden
<b>F1: Unconditional Permission to Eat</b>			
I try to avoid certain foods high in fat, carbohydrates, or calories.	.71	.72	.70
I have forbidden foods that I don't allow myself to eat.	.70	.73	.78
I get mad at myself for eating something unhealthy.	.60	.57	.77
I allow myself to eat what food I desire at the moment.	.50	.39	.38
<b>F2: Eating for Physical Rather than Emotional Reasons</b>			
I find myself eating when I'm feeling emotional (e.g., anxious, depressed, sad), even when I'm not physically hungry.	.75	.84	.38
I find myself eating when I am lonely, even when I'm not physically hungry.	.58	.85	.80
I use food to help me soothe my negative emotions.	.85	.88	.83
I find myself eating when I am stressed out, even when I'm not physically hungry.	.84	.86	.80
I find other ways to cope with stress and anxiety than by eating.	.50	.39	.48
<b>F3: Reliance on Hunger and Satiety Cues</b>			
I trust my body to tell me when to eat.	.76	.76	.88
I trust my body to tell me what to eat.	.73	.88	.73
I trust my body to tell me how much to eat.	.70	.89	.85
I rely on my hunger signals to tell me when to eat.	.65	.65	.88
I rely on my fullness (satiety) signals to tell me when to stop eating.	.62	.50	.73
<b>F4: Body-Food Choice Congruence</b>			
Most of the time, I desire to eat nutritious foods.	.65	.64	.69
I mostly eat foods that make my body perform efficiently (well).	.94	.82	.89
I mostly eat foods that give my body energy and stamina.	.86	.80	.90

744 *Note.*  $n = 129$  Danish;  $n = 370$  Swedish;  $n = 513$  Portuguese; Items 4, 6, 11, 12, 13, and 20 are not presented  
 745 above, as they were deleted from the analyses to improve the fit indices.

746

747



## 748 Supplementary Table 4

749 *Fit indices of the Intuitive Eating Scale-2 in Denmark, Portugal, and Sweden*

	<i>Satorra-Bentler <math>\chi^2</math></i>	<i>df</i>	Scale correction	Robust CFI	Robust TLI	Robust RMSEA	Robust RMSEA CI	Robust SRMR
Denmark	155.33	113	1.22	.93	.92	.06	[.04, .09]	.09
Portugal	350.18	113	1.30	.92	.91	.07	[.06, .08]	.08
Sweden	300.53	113	1.25	.93	.91	.08	[.07, .09]	.10

750 *Note.*  $n = 129$  Danish;  $n = 370$  Swedish;  $n = 513$  Portuguese; *df* = degree of freedom; CFI = Comparative Fit  
751 Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence  
752 Interval; SRMR = Standardized Root Mean Square Residual.

753

754 Supplementary Table 5

755 *Fit indices multi-group Confirmatory Factor Analyses of the Body Appreciation Scale-2 in*

756 *Denmark, Portugal, and Sweden*

	<i>Satorra-Bentler <math>\chi^2</math></i>	<i>df</i>	<i>CFI</i>	<i><math>\Delta</math>Satorra-Bentler <math>\chi^2</math></i>	<i><math>\Delta</math>df</i>	<i>p</i>	<i><math>\Delta</math>CFI</i>
<b>Country</b>							
<b>Denmark - Portugal</b>							
Configural	241.81	70	.96				
Metric	265.25	79	.96	23.44	9	.005	.003
Scalar	384.06	88	.94	118.81	9	< .001	.024
Partial scalar (Items 1 and 5)	310.53	86	.95	45.28	7	< .001	.008
<b>Denmark - Sweden</b>							
Configural	255.18	70	.95				
Metric	261.11	79	.96	5.93	9	.747	.001
Scalar	336.30	88	.94	75.19	9	< .001	.016
Partial scalar (Item 6)	301.45	87	.95	40.35	8	< .001	.008
<b>Portugal - Sweden</b>							
Configural	334.00	70	.09				
Metric	367.14	79	.09	33.14	9	< .001	.004
Scalar	513.78	88	.11	146.63	9	< .001	.020
Partial scalar (Items 1 and 3)	424.85	86	.95	57.71	7	< .001	.007
<b>Sex by country</b>							
<b>Danish boy - Danish girl</b>							
Configural	122.67	70	.94				
Metric	128.82	79	.94	6.15	9	.724	.003
Scalar	158.40	88	.93	29.57	9	< .001	.024
Partial scalar (Items 3 and 8)	142.04	86	.94	13.22	7	.067	.007
<b>Portuguese boy - Portuguese girl</b>							
Configural	212.30	70	.96				
Metric	222.50	79	.96	10.20	9	.335	.000
Scalar	265.63	88	.95	43.14	9	< .001	.010
<b>Swedish boy - Swedish girl</b>							
Configural	204.77	70	.96				
Metric	238.61	79	.95	33.84	9	< .001	.008
Scalar	264.97	88	.94	26.36	9	< .001	.006

757 *Note.*  $N = 1,012$ ;  $n = 79$  Danish girls;  $n = 50$  Danish boys;  $n = 296$  Portuguese girls;  $n = 217$  Portuguese boys;  $n$   
 758  $= 155$  Swedish girls;  $n = 215$  Swedish boys; *df* = degree of freedom; CFI = Comparative Fit Index.

759