

MESTRADO INTEGRADO
PSICOLOGIA CLÍNICA E DA SAÚDE

Validation of the Portuguese version of the Body Appreciation Scale-2 for Children

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M

2020



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**VALIDATION OF THE PORTUGUESE VERSION OF THE BODY
APPRECIATION SCALE-2 FOR CHILDREN**

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Junho 2020

Dissertação apresentada no Mestrado Integrado de Psicologia,
Faculdade de Psicologia e de Ciências da Educação da Universidade
do Porto, orientada pela Prof.^a Doutora Sandra Torres e coorientada
pela Prof.^a Doutora Raquel Barbosa (FPCEUP).

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O presente estudo foi realizado no âmbito do Projeto “Por Mais Saúde” (<https://pormaissaude.pt/>), que tem como entidade responsável a Escola Superior de Saúde Santa Maria (ESSSM). Este projeto é financiado pelo FEDER (NORTE-01-0145-FEDER-024116).

Agradecimentos

À Prof.^a Doutora Sandra Torres e à Prof.^a Doutora Raquel Barbosa, pela orientação precisa, pela partilha de conhecimentos e pela disponibilidade e paciência que demonstraram ao longo de todo este processo.

Aos meus pais, por me ensinarem que com esforço e dedicação tudo se consegue e por me terem apoiado ao longo de todo o meu percurso.

À minha irmã, por tornar este percurso mais animado.

Ao Daniel, por todo o apoio constante e carinho e por me acalmar nos momentos de maior ansiedade.

Aos meus amigos, por estarem sempre presentes nos bons e maus momentos.

Resumo

A adaptação da Escala de Apreciação Corporal-2 para Crianças (BAS-2C; Halliwell et al., 2017) permite alargar o estudo da imagem corporal positiva a uma fase de desenvolvimento mais precoce e, assim, uma melhor compreensão da imagem corporal positiva ao longo do ciclo de vida. Este estudo teve como objetivo validar a versão portuguesa da BAS-2C. A amostra foi composta por 328 crianças, com idades compreendidas entre os 9 e os 11 anos (50.90% raparigas). A análise fatorial confirmatória sustentou o modelo unifatorial da versão portuguesa da escala e demonstrou invariância em função do sexo. Não foram encontradas diferenças significativas entre sexos na apreciação corporal. A BAS-2C demonstrou uma consistência interna adequada e validade convergente com a qualidade de vida, hábitos alimentares saudáveis, insatisfação com o tamanho corporal e índice de massa corporal (IMC). Os resultados sustentam as boas propriedades psicométricas da versão portuguesa da BAS-2C, possibilitando investigação futura em imagem corporal positiva neste grupo etário.

Palavras-chave: Imagem Corporal Positiva; Apreciação Corporal; Crianças; Avaliação; Psicometria

Abstract

The adaptation of the Body Appreciation Scale-2 for Children (BAS-2C; Halliwell et al., 2017) allows to extend the study of positive body image to early development stages and, thus, a better understanding of positive body image over the lifespan. This study aimed to validate the BAS-2C for use in Portugal. Participants were 328 children, aged 9-11 years (50.90% girls). Confirmatory factor analysis supported the unidimensional factor structure of this scale and demonstrated invariance across sex. There were no significant sex differences in body appreciation. The BAS-2C showed adequate internal consistency and convergent validity with quality of life, healthy eating habits, body size dissatisfaction and body mass index (BMI). Findings supported the good psychometric properties of the Portuguese version of the BAS-2C, allowing for further research into positive body image among this age group.

Keywords: Positive Body Image; Body Appreciation; Children; Assessment; Psychometrics

1. Introduction

Body image is the multifaceted psychological experience of embodiment that includes people's thoughts, beliefs, feelings, and behaviors toward their bodies (Cash, 2004). Body image has negative and positive aspects. Negative body image involves appearance and body dissatisfaction, feelings of shame regarding to the body, a state of body surveillance, and internalization of media appearance ideals (Tylka, 2018). To date, research has been mainly focused on the understanding, preventing, and treating of negative body image (Tylka, 2011; Tylka & Wood-Barcalow, 2015b). However, this scenario has been changing over the last few years with the definition of the positive body image construct. Considered distinct from negative body image, positive body image is a multifaceted concept that allows a broader exploration of the body image (Tylka & Wood-Barcalow, 2015b).

Positive body image involves several components: (1) to appreciate and express love and acceptance for bodies' features, functionality, and health, even when not totally satisfied with all those aspects; (2) an adaptive appearance investment, by connecting mindfully with the body and engaging in appearance-related self-care; (3) a broadly conceptualization of beauty, even when it is not coincident with the sociocultural ideals, and the belief that beauty can come from inside; (4) and lastly filtering information in a body protective manner, rejecting negative information that could harm positive body image (Tylka & Wood-Barcalow, 2015b).

The Body Appreciation Scale-2 (BAS-2; Tylka & Wood-Barcalow, 2015a) is a widely-used measure of positive body image in that it reflects core components of the construct, such as body appreciation, body acceptance and love, broadly conceptualizing beauty, and the influence of inner positivity on outer demeanor (Tylka, 2018). The BAS-2 has been validated in Western and non-Western countries demonstrating to be a psychometrically sound measure to assess body appreciation. It has been found a consistent unidimensional factor structure, adequate reliability, and convergent validity with body image satisfaction (e.g., Alleva et al., 2016; Swami, García, & Barron, 2017), body-esteem (Torres et al., 2018), and other facets of positive body image, such as functionality satisfaction (Alleva et al., 2016; Soulliard & Wal, 2019), and body image flexibility (Meneses et al., 2019; Soulliard & Wal, 2019).

There is some evidence that body appreciation is positively associated with well-being (e.g., Karlsdóttir & Pálmarsdóttir, 2016; Lemoine et al., 2018) and positive affect (Rasmus & Rasmus, 2017). It could be a protective factor for eating disorders given its positive

association with intuitive eating (Lemoine et al., 2018; Meneses et al., 2019) and body-food choice congruence (Karlsdóttir & Pálmarsdóttir, 2016), and negative association with symptoms of disordered eating (Swami, Tudorel, et al., 2017) and body surveillance (Halliwell et al., 2017; Tylka & Wood-Barcalow, 2015a). Given to its potential protective effect on health and psychological well-being, the study of positive body image (by means of the BAS-2) has increased considerably.

The BAS-2 is available to use with adolescents (Alcaraz-Ibáñez et al., 2017; Góngora et al., 2020; Lemoine et al., 2018), adults (e.g., Swami et al., 2016; Tylka & Wood-Barcalow, 2015a), and older adults (Meneses et al., 2019). The BAS-2 has also a version for children – the BAS-2C (Halliwell et al., 2017; Namatame et al., 2020). In this version some adjustments to age were made: four items of the BAS-2 were revised for clarity (items 4, 7, 8 and 10), the order of the first two items was switched in the scale, and lastly the option *Seldom* in the 5-point scale of response was replaced by *Rarely* (Halliwell et al., 2017).

To our best knowledge, only two studies have analyzed the psychometric properties of the BAS-2C; they were performed with British (Halliwell et al., 2017) and Japanese children (Namatame et al., 2020). The unidimensional factor structure of the BAS-2C was also confirmed in both studies, as well as an adequate internal consistency and good test-retest reliability over 4 (Namatame et al., 2020) and 6 weeks (Halliwell et al., 2017). The Japanese version showed to be invariant across sex (Namatame et al., 2020). Convergent validity of the BAS-2C was supported in both versions. The BAS-2C was significantly and positively correlated with body-esteem (Halliwell et al., 2017), self-esteem (Namatame et al., 2020), life satisfaction (Namatame et al., 2020), and significantly and negatively correlated with body surveillance (Halliwell et al., 2017), awareness of media influence (Halliwell et al., 2017), internalization of media influence (Halliwell et al., 2017), and media influence pressures (Halliwell et al., 2017). The correlation between the BAS-2C and body size dissatisfaction in girls was marginally significant and negative (Namatame et al., 2020). Criterion-related validity was also supported by means of a positive correlation with positive affect and a negative correlation with negative affect in both sexes (Halliwell et al., 2017). The BAS-2C made an incremental contribution to positive and negative affect over and above body-esteem, providing evidence for its incremental validity (Halliwell et al., 2017). Sex differences were found, with boys having higher body appreciation than girls (Halliwell et al., 2017).

These findings suggest that the BAS-2C can be a promising tool in facilitating research on positive body image in children. To extend its use it is now crucial to investigate the psychometric properties of the BAS-2C across different cultures and languages.

The assessment of positive body image in children is of major interest because it would enable researchers to investigate the development of positive body image over the lifespan (Tiggemann, 2015). In other words, it can clarify when and how positive body image among children develops, how can it be maintained, and the trend of change over time (Halliwell et al., 2017; Webb et al., 2015). It may also help to establish causal relationships and potential protective factors of positive body image. This understanding would assist the implementation of programs to promote positive body image in early stages, which is of major interest to prevent a spectrum of emotional and psychosocial problems (Carrard et al., 2019).

We therefore aimed to test the psychometric properties of a Portuguese version of the BAS-2C, specifically assessing measurement invariance across sex, factorial and construct validity, and reliability in a sample of children between 9 and 11 years old. Predictions were made based on previous research with the BAS-2C, but also considering findings with the BAS-2 in adolescents, whenever information regarding the children's version was not available. Thus, we hypothesized that the BAS-2C would yield a unidimensional factor structure and its items would be internally consistent (Halliwell et al., 2017; Namatame et al., 2020). We expected that the BAS-2C would be invariant across sex (Namatame et al., 2020) and boys would have significantly higher body appreciation than girls (Halliwell et al., 2017). Regarding to convergent validity, we predicted that the Portuguese BAS-2C would be significantly and positively correlated with quality of life (Namatame et al., 2020) and healthy eating habits (based on the association of the BAS-2 with healthy and intuitive eating found in adolescents; Lemoine et al., 2018). In addition, we expected to find a significant and negative correlation with body size dissatisfaction (Namatame et al., 2020) and body mass index (BMI; as reported in BAS-2 studies with adolescents; Alcaraz-Ibáñez et al., 2017; Góngora et al., 2020).

2. Method

2.1. Participants

The sample of this study was recruited through a non-probabilistic sampling method (convenience sample). Five participants were removed from the sample due to the presence of cognitive impairment ($n = 1$) and multivariate outliers (maximum or minimum rates in all items of the assessment protocol; $n = 4$). The final sample was composed of 328 children (167 girls, 50.90%; 161 boys, 49.10%) aged between 9 and 11 ($M = 9.20$, $SD = 0.45$) who were recruited from several Portuguese primary schools of the district of Porto and Madeira Island. BMI ranged from 12.30 to 30.60 kg/m² ($M = 18.64$, $SD = 3.42$) and participants' distribution for weight status category based on BMI percentile (Centers for Disease Control and Prevention [CDC], 2018, 2019) was as follows: underweight ($n = 14$; 4.30%), healthy weight ($n = 204$; 62.20%), overweight ($n = 55$; 16.80%) and obesity ($n = 54$; 16.50%).

2.2. Measures

Body Mass Index (BMI). The BMI of children was calculated based on height and weight obtained by direct measurement with a stadiometer (Seca®) and a bio-impedance scale (Tanita Segmental Body Composition BC601®), respectively. Sex-specific BMI-for-age percentiles were obtained using the CDC BMI percentile calculator for child and teen (CDC, 2019) and corresponding weight categorization was assigned (underweight: < 5%; healthy weight: $\geq 5\%$ but < 85%; overweight: $\geq 85\%$ but < 95%; obese: $\geq 95\%$; CDC, 2018, 2019).

Body Appreciation. Body appreciation was measured by the BAS-2C (Halliwell et al., 2017). The BAS-2C is an adaptation of the BAS-2 (Tylka & Wood-Barcalow, 2015a) for children and aims to measure body appreciation and other facets of positive body image such as body acceptance and love, broadly conceptualizing beauty, rejection of media-promoted appearance ideals, and inner positivity. The BAS-2C is composed by 10 items rated on a 5-point Likert-type scale, ranging from 1 (*Never*) to 5 (*Always*). It revealed a unidimensional factor structure, good internal consistency, test-retest reliability, and validity among British and Japanese children (Halliwell et al., 2017; Namatame et al., 2020).

Body Size Dissatisfaction. The CBIS - Children's Body Image Scale (Truby & Paxton, 2002) is a pictorial body-image measure for children which allows to assess perceived and

ideal body image and, therefore, body size dissatisfaction (Truby & Paxton, 2002). Children is asked to select the body figure most like their own (perceived body image) and the one they would most like to have (ideal body image). Body size dissatisfaction is determined by subtracting the category number of their perceived and ideal figures. Thus, a positive score means that the child wants to be thinner and a negative score that the child wants to be larger. The absolute value of the perceived-ideal discrepancy determines the extent of body size dissatisfaction (Truby & Paxton, 2002). Children BMI is also calculated and then categorized into one of the seven categories that match the seven pictures of the scale. Subtracting the category number of their real figure and perceived figure, provides a value of discrepancy between real-perceived figure, which allows to assess if children is capable of matching their own body size with the body figure of similar BMI (Truby & Paxton, 2002).

Findings from construct validity analysis (Truby & Paxton, 2002) and test-retest reliability after 3 weeks (Truby & Paxton, 2008) provided by previous studies indicated that the CBIS is a psychometrically sound instrument to assess body size dissatisfaction and body size perception in children.

Quality of Life. To assess quality of life it was applied the KIDSCREEN-10 (The KIDSCREEN Group Europe, 2006) – a 10-item generic health related quality of life (HRQoL) measure for children and adolescents. In the KIDSCREEN-10 items are rated in a 5-point Likert-type scale, ranging from 1 (*Never/ Not at all*) to 5 (*Always*). The items explore physical (e.g., “Have you felt fit and well?”), psychological (e.g., “Have you felt sad?”) and social (e.g., “Have you had fun with your friends?”) facets of HRQoL. This instrument provides a singular index of global HRQoL, with low scores indicating feelings of unhappiness and dissatisfaction in relation to family, peers, leisure and free time, and school.

The KIDSCREEN-10 has displayed a unidimensional factor structure, good internal consistency, and good test-retest reliability in several countries (The KIDSCREEN Group Europe, 2006). The Portuguese version of the KIDSCREEN-10 was validated with 8072 children and adolescents between 10 and 16 years old and showed a good internal consistency (Cronbach’s Alpha = .78; Matos et al., 2012). In the present study, the McDonald’s Omega reliability coefficient was .69 in the full sample and .72 and .66 for girls and boys, respectively.

Healthy Eating Habits. To assess food behavior participants were asked to answer the KIDMED – Mediterranean Diet Quality Index (Serra-Majem et al., 2004). The KIDMED scale consists in 16 items related with behaviors that support or weaken the Mediterranean dietary patterns in children and adolescents between 2 and 24 years old. Considering that the Mediterranean diet is regarded as one of the healthiest dietary models currently existing (Serra-Majem et al., 2004), the KIDMED was used in this study as an indicator of healthy eating habits. The sum of the items allows to obtain an index ranged from 0 and 12. These values are grouped in three levels that indicate the degree of adherence to the Mediterranean diet: ≥ 8 indicates a high level of adherence; 4-7 indicates an average level of adherence; ≤ 3 indicates a very low level of adherence and then an unhealthy diet (Serra-Majem et al., 2004). In this study we only used the KIDMED total score of the adapted Portuguese version of Marques et al. (in press). In this version the item “Skips breakfast”, that was originally negative, was positively reversed. This item’s score was adjusted in order to keep the range of the total score between 0-12.

2.3. Procedures

This study was carried out in the scope of the project “Por Mais Saúde [For More Health]”, promoted by Santa Maria Health School (ESSSM). The project was approved by the Ethics Committee of the Regional Health Administration and the National Data Protection Commission (Reference NDPC n°1704/2015).

Permission for translation and validation of a Portuguese version of the BAS-2C was granted by the original authors (Tracy Tylka). The translation process was based on the TRAPD method, an acronym to Translation, Review, Adjudication, Pretesting, and Documentation, which are the five subsequent (but interrelated) phases of this method (Harkness, 2003). Two translators, with proficiency in both languages, worked independently in translating the English version of the BAS-2C to Portuguese. After it, at a review meeting, the translators and a reviewer compare the two translations with a view to their suitability for the original questionnaire. Then, the adjudicator took the final decision using its own expertise and considering the analyses of the translations and the comments by the reviewer. A pretest of the adjudicated translation of the scale was made and the findings were taking into account to finish the translation. The whole process (draft translations, exchange of comments between the translators, the reviewer and the adjudicator, feedback from the pretest) was documented. This method aims for the translation to be not only equivalent at the linguistic level, but also at a sociocultural level.

Written informed consent was obtained by the child's legal representative. Participants completed the questionnaires in the classroom, with the presence of members of the research team.

2.4. Statistical Analyses

Statistical analyses to examine validity and reliability were performed using SPSS version 26. The confirmatory factor analysis (CFA) and test for measurement invariance were conducted using AMOS version 26 and McDonald's Omega reliability coefficient by using Jamovi 1.1.9.

The psychometric sensitivity of the items was assessed according to Kline's (2011) values of skewness and kurtosis (absolute values below 3 and 8, respectively, are considered adequate and within acceptable limits for normal distribution).

In order to determine if the BAS-2C was invariant among girls and boys, measurement invariance was examined at four different levels: (a) configural invariance (i.e., the model configuration is the same for the different groups); (b) factor loading invariance (i.e., the magnitude of the factor loadings are equivalent for the different groups); (c) intercept invariance (i.e., the intercepts of the items are equivalent for the different groups); (d) strict invariance (i.e., measurement errors are the same for the different groups; Chen, 2007; Putnick & Bornstein, 2016). To assess the significance of the different invariance levels, chi-square differences ($\Delta\chi^2$) were used, as well as Δ CFI, Δ RMSEA, and Δ SRMR. Chen (2007) suggest that changes $< -.010$ in CFI, $< .015$ in RMSEA, and $< .030$ (for factor loading invariance) or $< .010$ (for intercept invariance or strict invariance) in SRMR are supportive of measurement invariance.

CFA was performed to examine the fit of a single-factor model, where all items loaded onto a single latent variable. The factor loadings were used as local indices of goodness-of-fit as well as the ratio of Chi-square to degrees of freedom (χ^2/df), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Parsimony Comparative Fit Index (PCFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). The model's fit was considered to be good if χ^2/df values are < 3.00 , CFI $\geq .95$, IFI $> .90$, PCFI $> .60$ or $.80$, RMSEA $\leq .07$, and SRMR $< .08$, whereas CFI values $\geq .90$ and RMSEA and SRMR values $\leq .10$ indicate an adequate fit (Byrne, 2016; Hair et al., 2010; Hu & Bentler, 1999; Steiger, 2007). Factor loadings were interpreted using Tabachnick and Fidell's (2013) recommendations, with loadings $\geq .32$ considered acceptable.

Internal consistency reliability of the BAS-2C was assessed using the McDonald's Omega reliability coefficient. This coefficient was chosen instead of Cronbach's Alpha, once this tends to underestimate the true reliability of the items when they do not meet the criteria of the tau-equivalent model (a restrictive model; Deng & Chan, 2017). On the other side, McDonald's Omega seems to be a more sensitive coefficient, presenting a lower risk of overestimation or underestimation, and it is a practical alternative to Alpha in estimating measurement reliability of the total score (Deng & Chan, 2017; Dunn et al., 2014). A value $\geq .70$ of Omega coefficient is considered satisfactory (Gadermann et al., 2012).

Pearson correlation coefficients (r) between body appreciation and body size dissatisfaction, quality of life, healthy eating habits and BMI were used to assess the convergent validity of the BAS-2C. Correlations of $\pm .10$ are considered small, correlations of $\pm .30$ are considered moderate, and correlations of $\pm .50$ are considered large (Cohen, 1992). BMI's linear and quadratic function (BMI^2) were analyzed to establish the amount of variance of the BAS-2C scores explained by each of these terms. The BMI quadratic was tested based on a recent meta-analysis that hypothesizes that the association between body appreciation and BMI might be better explained by a curvilinear relationship, in particular in males (adolescents and adults; He, Sun, Lin, & Fan, 2020).

Lastly, independent-samples t -tests were used to examine weight status and sex differences in body appreciation using the BAS-2C total score. According to Cohen (1992), effects size for the difference (d) of .20, .50 and .80 are considered small, moderate, and large, respectively.

3. Results

3.1. Preliminary Analyses

Considering that missing data accounted for 0.90% of the main dataset, less than 10%, which it is no prone to bias statistical analysis (Bennet, 2001), and these data were missing completely at random, as determined by Little's MCAR analysis, $\chi^2(775) = 628.93, p > .99$, our option was to replace the five missing values in the BAS-2C scale and the two missing values in the KIDSCREEN-10 scale (by the mean of the item according to the participant's sex). Also, four multivariate outliers were deleted.

Descriptive statistics for BAS-2C items are presented in Table 1. With exception to item 9 (“I am comfortable in my body”), which did not present a normal distribution and adequate sensitivity, all items showed skewness and kurtosis within normal parameters (Kline, 2011).

Table 1

Descriptive Statistics for Body Appreciation Scale-2 for Children (BAS-2C) Items

BAS-2C items	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Item 1	4.582	0.733	-1.646	1.745
Item 2	4.750	0.557	-2.255	4.469
Item 3	4.137	1.113	-1.252	0.851
Item 4	4.436	0.940	-1.795	2.830
Item 5	4.500	0.754	-1.377	1.290
Item 6	4.689	0.722	-2.647	7.425
Item 7	4.393	1.005	-1.724	2.252
Item 8	4.290	0.960	-1.213	0.722
Item 9	4.799	0.603	-3.680	15.688
Item 10	4.616	0.804	-2.350	5.502

3.2. Measurement Invariance Across Sex

The unconstrained model had adequate fit in both female ($n = 167$) and male ($n = 161$) sub-samples, suggesting configural invariance between girls and boys: $\chi^2 (64) = 102.829$; $\chi^2/df = 1.607$; CFI = .908; IFI = .913; PCFI = .645; RMSEA = .043, $p = .760$, C.I. 90% [.027, .058]; and SRMR = .059. There were no significant differences between the unconstrained and fully constrained model, providing evidence for factor loading invariance across sex, $\Delta\chi^2 (9) = 11.845$, $p = .222$, $\Delta CFI = -.007$, $\Delta RMSEA = -.001$, $\Delta SRMR = .008$. Intercept invariance was also upheld, $\Delta\chi^2 (10) = 10.127$, $p = .429$, $\Delta CFI = -.001$, $\Delta RMSEA = -.003$, $\Delta SRMR = .001$. Strict invariance was not achieved, $\Delta\chi^2 (14) = 78.112$, $p < .001$, $\Delta CFI = -.152$, $\Delta RMSEA = .019$, $\Delta SRMR = -.001$. Collectively, these findings provide acceptable evidence for measurement invariance of the BAS-2C across sex (see Table 2). Usually, strict invariance is difficult to achieve and for this reason it is considered an optional procedure to assess measurement invariance and it is not a prerequisite for testing mean differences (Chen, 2007; Putnick & Bornstein, 2016; Schroeders & Gnambs, 2020).

Table 2

Model Fit Indices and Tests of Measurement Invariance for the One-factor Body Appreciation Scale-2 for Children (BAS-2C) Model Across Participant Sex

	χ^2	<i>df</i>	χ^2 normed	CFI	RMSEA [90% CI]	SRMR
Boys (<i>n</i> = 161)	53.701	32	1.678	.894	.065 [.032, .095]	.063
Girls (<i>n</i> = 167)	49.127	32	1.535	.920	.057 [.020, .087]	.059
Configural invariance	102.829	64	1.607	.908	.043 [.027, .058]	.059
Factor loading invariance	114.674	73	1.571	.901	.042 [.026, .056]	.067
Intercept invariance	124.801	83	1.504	.900	.039 [.024, .053]	.067
Strict invariance	202.913	97	2.092	.748	.058 [.047, .069]	.067

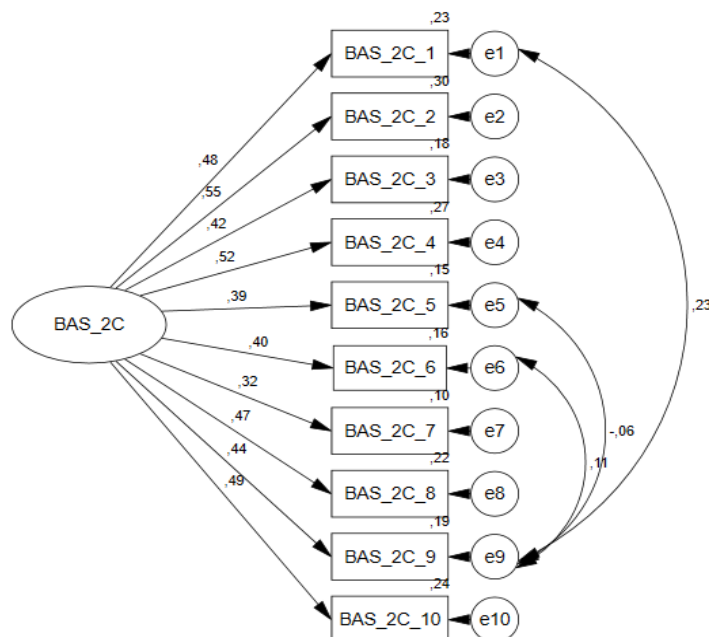
Note. χ^2 = Chi square; *df* = Degrees of freedom; CFI = Comparative Fit Index; RMSEA [90% CI] = Root Mean Square Error of Approximation at 90% Confidence Interval; SRMR = Standardized Root Mean Square.

3.3. Confirmatory Factor Analysis

The 10 item one-factor model showed a good fit to the data for the whole sample (*N* = 328): χ^2 (32) = 44.48; χ^2/df = 1.39; CFI = .97; IFI = .97; PCFI = .69; RMSEA = .04, *p* = .858, C.I. 90% [0, .06]; SRMR = .04. Factor loadings were $\geq .32$, ranging from .32 (*R*² = .10; Item 7) and .55 (*R*² = .30; Item 2), and then considered acceptable (see Figure 1).

Figure 1

Path Diagram and Estimates for the Unidimensional Model of the Body Appreciation Scale-2C (BAS-2C)



Note. The path factor loadings are standardized with significance levels were determined by critical ratios (all *p* < .001).

3.4. Internal Consistency Reliability

The McDonald's Omega reliability coefficient for the BAS-2C was .72 in the full sample, .73 for the girls, and .72 for the boys, supporting the internal consistency.

3.5. Convergent Validity

The BAS-2C was significantly and positively correlated with quality of life ($r = .35$, $p < .001$) and healthy eating habits ($r = .18$, $p = .001$), and significantly and negatively correlated with body size dissatisfaction ($r = -.32$, $p < .001$) and BMI ($r = -.13$, $p = .015$). Table 3 presents these correlations calculated by sex. Except for BMI, which correlates with the BAS-2C in girls only, all other correlations with BAS-2C scores were similar for boys and girls.

Table 3

Correlations Among Girls and Boys

	1	2	3	4	5
1. Body appreciation	-	.339***	.177*	-.364***	-.087
2. Quality of life	.353***	-	.296***	-.147	-.008
3. Healthy eating habits	.189*	.224**	-	-.057	-.061
4. Body size dissatisfaction	-.276***	-.092	-.161*	-	.224**
5. BMI	-.176*	-.003	-.073	.273***	-

Note. Correlation coefficients above the diagonal relate to boys, and those below the diagonal relate to girls.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

The association between the BAS-2C and BMI was also analyzed using a linear and a quadratic function. Both functions were statistically significant; the linear function explained 2% of the variance of the BAS-2C scores, $F(1, 325) = 5.95$, $p = .015$, $R^2 = .02$, and the quadratic function, expressed in an inverted U shape, explained 4%, $F(2, 324) = 6.62$, $p = .002$, $R^2 = .04$. This analysis performed by sex showed that this function was not significant in boys, $F(2, 158) = 2.67$, $p = .072$, but was significant in girls, $F(2, 163) = 4.54$, $p = .012$, $R^2 = .05$, explaining 5% of the variance of BAS-2C scores. However, considering the small increase in explained variance by the quadratic BMI compared with the linear BMI, the use of the quadratic function might not be justified in these participants.

The comparison between weight status revealed that healthy weight children ($M = 4.57$, $SD = .40$) had significantly higher body appreciation than children with excessive weight ($M = 4.43$, $SD = .48$), $t(191.29) = 2.46$, $p = .015$, $d = .30$.

3.6. Sex Differences

Since configural invariance, factor loading invariance, and intercept invariance were achieved, it is possible to test for sex differences in body appreciation (Putnick & Bornstein, 2016; Schroeders & Gnambs, 2020). The results of an independent-samples t -test showed that there was no significant difference in body appreciation between girls ($M = 4.53$, $SD = 0.45$) and boys ($M = 4.51$, $SD = 0.43$), $t(326) = .25$, $p = .802$, $d = .03$.

4. Discussion

This study aimed to validate the Portuguese version of the BAS-2C in a sample of children between 9 and 11 years old. Using CFA, the unidimensional factor structure was confirmed, as well as internal consistency reliability, which is in line with previous studies performed with the British and Japanese versions of the scale (Halliwell et al., 2017; Namatame et al., 2020). As with the Japanese BAS-2C (Namatame et al., 2020), configural, factor loading, and intercept invariance were also upheld. Strict invariance was not established but, as this indicator may be too stringent and hardly to achieved in practice (Chen, 2007), findings from measurement invariance suggested that accurate sex comparisons can be made with the Portuguese BAS-2C.

The convergent validity of the Portuguese BAS-2C was globally supported: body appreciation was significantly and negatively correlated with body size dissatisfaction, and significantly and positively correlated with quality of life and healthy eating habits, for both girls and boys. The correlation between body appreciation and BMI was negative and significant in the full sample, but not in boys when considered separately.

Previous studies with children (Namatame et al., 2020), adolescents (Góngora et al., 2020) and adults (e.g., Tylka & Wood-Barcalow, 2015a) have supported the notion that body appreciation and body dissatisfaction are distinct but negatively correlated factors of body image, as proposed by Tylka and Wood-Barcalow (2015b). The present study validates this assumption in childhood and stresses that positive body image should not be simply represented as low levels of negative body image.

A positive association between the BAS-2C and quality of life was observed, as expected, and converges with previous research (e.g., Atari, 2016; Lemoine et al., 2018; Namatame et al., 2020) in documenting that positive body image may contribute to a host of psychological and physical health benefits, inclusively in childhood.

In what concerns to healthy eating habits, the association with BAS-2C scores was significant, but low. It was expected to find a higher relationship considering that adaptive investment in body care is a facet of positive body image (Tylka & Wood-Barcalow, 2015b). Additionally, the studies analyzing the association between body appreciation and intuitive eating (Lemoine et al., 2018) and body food choice congruence (Karlsdóttir & Pálmarsdóttir, 2016) in older ages have found associations of greater magnitude. Even considering these constructs are not equivalent to healthy eating habits, they are suggestive of a healthy attitude toward food. Thus, we believe that the results from our study may be explained by the fact that in childhood food choices are essentially managed by parents, limiting the assessment of children's eating decisions. Furthermore, the KIDMED index is related to the Mediterranean dietary patterns and may not be suitable to measure other healthy eating habits unrelated to the Mediterranean Diet.

Lastly, the correlation between body appreciation and BMI found in this study was significant, negative, but small in the full sample, as expected. However, in boys this correlation was smaller and failed to reach significance. According to the He, Sun, Lin, and Fan (2020) meta-analysis, sex differences has been also observed in adolescents and adults, with strong negative correlations between body appreciation and BMI found in women. This difference could be due to different beauty cultural ideals for male and female: whereas men value a muscular body-type (associated with a high BMI), women usually strive for thinness (associated with a low BMI). In children, it is possible that the same phenomenon may underlie, contributing to the significant association between the BAS-2C and BMI in girls. Results from the quadratic function of the association between the BAS-2C and BMI are also congruent, as they suggested that a curvilinear relationship, expressed in an inverted U shape, is more suitable for girls. Put simply, girls in normal-weight range have higher body appreciation than those within underweight and overweight categories. In boys, two points should be taken in mind to interpret the non-significant relationship between body appreciation and BMI. One, at this age, high BMI is not due to muscular bodies. Two, concerns about muscularity may not be yet very prominent. In any case, we should not exclude the possibility that boys are more able to appreciate and express love for their bodies, despite of their weight. However, results regarding the BMI quadratic function should be

interpreted with caution, given the small number of children within the underweight range (4 boys; 9 girls). Further research with more balanced subgroups is needed to confirm these results. Here, we are only able to conclude that healthy weigh children have higher body appreciation than children with excessive weight. The small effect size of this difference is in line with the construct of positive body image, which postulates that individuals can feel comfortable with appearance even if not completely satisfied with all aspects of the body.

Finally, and contrary to the hypothesized, there was no significant difference in body appreciation between girls and boys. Sex differences in body appreciation using the BAS-2C were reported in Halliwell et al.'s (2017) study, despite of small magnitude. In adolescents (using the BAS-2) differences are also documented in the literature (Alcaraz-Ibáñez et al., 2017; Góngora et al., 2020; Lemoine et al., 2018), with moderate to large magnitudes. Sex differences in body appreciation seem to change over the lifespan; they are more pronounced in adolescence and tend to blur with increasing age (He, Sun, Zickgraf et al., 2020; Meneses et al., 2019). In childhood, our findings and those from Halliwell et al.'s (2017) study converge to conclude that sex differences in body appreciation are not expressive in this period and they tend to emerge in adolescence, probably linked to body changes that occur in puberty. Nevertheless, this conclusion must be replicated and tested in different cultures.

This study has some limitations and its results must be interpreted accordingly. The convenience sampling technique prevents the results from being treated as representative of the entire population. The analyses of the association between the BAS-2C and BMI and the differences in BAS-2C scores according to weight status were limited by the small sample size of underweight children, and as such, much remains to be learned about the differences and similarities regarding body appreciation in different weight categories. Regarding the variables and measures, the KIDMED is limited to the assessment of healthy eating habits related to Mediterranean food model. Furthermore, the dimension of positive body image related with taking care of the body is difficult to assess in this age group, because most of healthy behaviors are determined by parents. In addition, the CBIS only measures body size dissatisfaction. Conceptually, body dissatisfaction goes beyond size and, as such, the association between body appreciation and body dissatisfaction cannot be entirely understood from our study findings. Future research should extend the analysis of psychometric properties of the BAS-2C by examining the convergent validity with other facets of positive body image, such as functionality satisfaction and body image flexibility, as well as to establish divergent and incremental validity, and temporal stability.

5. Conclusion

The results of this study provide evidence that the Portuguese BAS-2C is a valid and reliable tool for the assessment of body appreciation in children. Results were similar to the previous studies, suggesting that the one-factor structure of the BAS-2C could be cross-culturally equivalent and can be used to compare body appreciation in boys and girls. This study presents new insights on the association of positive body image with healthy eating and weight status. We are hopeful that the availability of this measure will stimulate further research into body image in childhood and increase knowledge about shifts that can occur in transition to adolescence.

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