





Validation of Body-related Self-Conscious Emotions Fitness instrument for Brazilian university students

Validação do Body-related Self-Conscious Emotions Fitness Instrument para estudantes universitários brasileiros

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ABSTRACT

Objective: To evaluate the psychometric properties of the Brazilian Portuguese version of Body-related Self-Conscious Emotions Fitness instrument. **Method:** To verify validity, structural validity, comparison between known groups, and convergent validity were used. Reliability was analyzed using an internal consistency assessment by Cronbach's alpha, while stability was analyzed by test-retest. **Results:** 719 students participated in the study, with a mean age of 21.20 ± 3.66 years. Confirmatory factor analysis revealed four factors and confirmed the structure of the original instrument. The Brazilian Portuguese version of Body-related Self-Conscious Emotions Fitness instrument presented construct validity by known groups, convergent validity, good reliability and test-retest stability. **Conclusion:** Body-related Self-Conscious Emotions Fitness instrument is the first valid and reliable instrument that can be used in Brazil for research and clinical practice to evaluate self-conscious emotions related to the physical preparation and fitness of university students.

Descriptors: Body Image; Physical Fitness; Universities; Students; Validation Study.

RESUMO

Objetivo: Avaliar as propriedades psicométricas da versão adaptada para a língua portuguesa brasileira do *Body-related Self-Conscious Emotions Fitness Instrument*. **Método:** Para verificar a validade utilizou-se a validade estrutural, comparação entre grupos conhecidos e validade convergente. Analisou-se a confiabilidade por meio da avaliação da consistência interna, mediante o Alfa de Cronbach, e pela estabilidade por meio do teste-reteste. **Resultados:** Participaram da pesquisa 719 estudantes, com idade média de $21,20 \pm 3,66$ anos. A Análise Fatorial Confirmatória evidenciou quatro fatores e confirmou a estrutura do instrumento original. A versão adaptada do *Body-related Self-Conscious Emotions Fitness Instrument* apresentou validade de construto por grupos conhecidos, validade convergente, boa confiabilidade, e estabilidade teste-reteste. **Conclusão:** O *Body-related Self-Conscious Emotions Fitness Instrument* é o primeiro instrumento válido e confiável, que poderá ser utilizado no Brasil na prática clínica e de pesquisa para avaliar as emoções autoconscientes relacionadas ao preparo físico e à forma física de estudantes universitários.

Descritores: Imagem Corporal; Aptidão Física; Universidades; Estudantes; Estudos de Validação.

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INTRODUCTION

One of the factors that increases social acceptance is physical fitness, which triggers the pursuit of the perfect body, often referred to as “healthy” based on the ideal of a body without fat. Therefore, achieving a healthy body can be a way of achieving success and satisfaction as well as social recognition⁽¹⁾.

In this context, the cult of the ideal body can involve negative feelings, such as shame and guilt, or positive feelings, such as pride. These feelings are called self-conscious emotions and comprise the social relationships through which people interact, evaluate and judge themselves and others, and can interfere with emotional experiences and well-being^(2,3).

Body-related Self-Conscious Emotions Fitness instrument (BSE-FIT) was created in Canada, in 2016. It is the first instrument created to assess self-conscious emotions in the domains of body self-image and physical preparation. The instrument can be used to collect data regarding shame, guilt, and emotional experiences of authentic pride and hubristic pride among adolescents and young adults. During elaboration of the instrument, factors related to general self-conscious emotions, physical self-perceptions, self-esteem, depression, positive and negative affections, personality, and physical activity were observed⁽²⁾.

The BSE-FIT is short and easy to use and consists of 16 items in four domains (guilt, shame, authentic pride, and hubristic pride). The instrument score is obtained through the mean of the responses, grouped according to the factors, in which each item is scored from one to five (1 never; 2 = rarely; 3 = occasionally; 4 = frequently; 5 = always). Moreover, the items are scored positively as the higher the scores, the greater the feelings associated with the domains^(2,4).

Evidence of the validity and reliability of the BSE-FIT has been provided in studies from China⁽⁵⁾ and Spain⁽⁶⁾, with additional proof of internal consistency and confirmation of the four-factor structure of the original instrument. However, in the Spanish study, item 16 was excluded since it was not considered an indicator of the hubristic pride domain.

When addressing the spectrum of overvaluing body image, feelings arising from concerns with physical fitness must be measured, especially in university students since their behavior puts their health at risk⁽⁷⁾, and they have high body dissatisfaction rates⁽⁸⁾. Despite the wide range of instruments that evaluate body image, there is no instrument in Brazilian literature to assess self-conscious emotions of university students.

In this regard, the BSE-FIT cross-culturally adapted to Brazilian Portuguese in a previous study⁽⁴⁾ can assess self-conscious emotions related to the physical form and physical preparation of university students. Moreover, the instrument is easy to use and short, which increases its potential for response. Therefore, it is critical to assess the psychometric

properties of the instrument given its possible use for diagnoses and the health promotion of this population and its feasible use in clinical practice.

Thus, the aim of this study was to evaluate the psychometric properties of the Brazilian Portuguese version of Body-related Self-Conscious Emotions Fitness Instrument (BSE-FIT).

MATERIAL AND METHODS

This is a methodological study for the validation of the BSE-FIT in Brazilian Portuguese for university students, conducted between November 2016 and July 2017. Before assessing the psychometric properties of the BSE-FIT, it was cross-cultural adapted for the Brazilian population. The semantic, idiomatic, conceptual, and cultural equivalences of the original instrument were maintained in the adapted version, as well as face and content validity⁽⁴⁾.

The psychometric properties were assessed at a university in the state of Minas Gerais, Brazil, with undergraduate students between 18 and 59 years old, of both sexes, enrolled in the university's ten programs, namely, business management, agronomy, food science and technology, biological sciences, accounting, civil engineering, production engineering, nutrition, chemistry, and information systems. Students who did not agree to participate or who were absent during data collection were excluded. The students were recruited and initially approached individually in the classrooms. Data were collected by six trained students of the nutrition program using questionnaires.

The literature⁽⁹⁾ indicates the participation of 20 individuals for each parameter to be estimated in the confirmatory factor analysis (CFA) of the instrument. The results of the pre-test, conducted with 36 participants, revealed that the minimum number of parameters to be estimated would be 34; thus, a sample of at least 680 students was calculated with 20 individuals per parameter. Based on a 20% sample loss, a desired simple random sample of 816 students was obtained.

The sample size for the test-retest reliability analysis was calculated according to an expected intraclass correlation coefficient (ICC) of 0.7 for the BSE-FIT scores, not allowing for it to be less than ICC=0.5 for a power of 90% and considering a significance level of $\alpha=0.05$. The Power Analysis and Sample Size 2013 (PASS) app was used with these a priori values and a minimum sample size of $n=87$ students was obtained.

The psychometric properties of the adapted BSE-FIT were evaluated by validity and reliability. Validity was verified using three methods, namely, structural validity, comparison between known groups, and convergent validity.

Structural validity was tested by CFA to verify model fit, proposed by the authors of the instrument, which

contains four factors: shame, guilt, authentic pride, and hubristic pride⁽²⁾. The parameters in the CFA were estimated using the maximum likelihood method and the multivariate normality requirements of this method were also appropriately checked.

The fit of the model to the proposed structure was measured using adjustment criteria, such as the following absolute fit measures:

- chi-square test: the value that, when compared with a critical value, indicates an appropriate fit or not. In CFA, the desired goal is not to reject the hypothesis of nullity (the tested model does not differ from the observed data). However, the chi-square value is influenced by the sample size, that is, in large samples, it is highly probable that the researcher will reject the null hypothesis even in situations where the tested model does not differ from the data matrix, which is why this indicator is not used without comparison with others⁽⁹⁾;
- root mean square error of approximation (RMSEA), a fit considered suitable for values between 0.05 and 0.08⁽¹⁰⁾;
- (c) Goodness of Fit Index (GFI), which ranges from 0 (no fit) to 1 (perfect fit), with no proposed cutoff point⁽⁹⁾.

The following incremental fit measures were also used:

- Tucker-Lewis index (TLI) and comparative fit index (CFI), which range from 0 (no fit) to 1 (perfect fit), where a value above 0.9 for each index indicates an acceptable fit for a tested model⁽⁹⁾.

The validity of known groups was based on the principle that specific groups can, in advance, differ from others since the instrument is sensitive to predict such differences⁽¹¹⁾. This validity was performed through groups defined by the variables sex, practicing physical activity and undergraduate program. Thus, the hypothesis of the study was determined, namely that there are significant differences regarding the scores of the BSE-FIT dimensions (shame, guilt, authentic pride, and hubristic pride) for the variable sex. A variation was also assumed between the active and insufficiently active students, as well as between the undergraduate nutrition students and the students of the other programs.

For the convergent validity of the adapted version, the correlation of the BSE-FIT measurement was tested with the self-esteem measurements using the Rosenberg Self-Esteem Scale⁽¹²⁾ and perception of body image using Body Shape Questionnaire (BSQ)⁽¹³⁾ and body mass index (BMI)⁽¹⁴⁾.

For reliability analysis, internal consistency and test-retest stability were used. Internal consistency was evaluated using Cronbach's alpha, which measures the degree of covariance or correlation between the items of the same domain. In the stability analysis through the test-retest, 92 students responded

to the adapted version of the BSE-FIT, in two moments, with an interval of two weeks

For data collection, after signing an informed consent form, the students participated in the nutritional assessment and completed the instruments.

The researchers evaluated the nutritional status of the students by measuring weight and height in an individual room and determined their BMI⁽¹⁴⁾ according to the equipment measurement and calibration techniques specified in the current literature. Weight was measured using a Marte[®] digital field scale, with minimum capacity of 1 kg, maximum capacity of 199.95 kg, and graduation of 50 g. It was calibrated and positioned on a flat, smooth, and firm surface at a certain distance from the wall. Height was obtained using a Alturaexata[®] stadiometer with a maximum height of 213 cm and a resolution of 1 mm.

Concern with body image was assessed using Body Shape Questionnaire (BSQ) validated for the Brazilian population⁽¹³⁾. This questionnaire contains 34 questions with a six-point Likert scale; the higher the score, the greater the concern with body image.

The frequent practice of physical activities was analyzed using the International Physical Activity Questionnaire (IPAQ) short version, validated in Brazil⁽¹⁵⁾. The recommendation of the World Health Organization⁽¹⁶⁾ was observed. According to this recommendation, to be classified as active individuals, adults aged between 18 and 64 years should perform at least 150 minutes of moderate-intensity physical activity during the week or at least 75 minutes of vigorous-intensity aerobic physical activity.

The Rosenberg Self-Esteem Scale, validated for use in Brazil⁽¹²⁾, was used to determine the self-esteem of the participants. The final score varies between 10 and 40 points; the higher the results, the higher the self-esteem of the participants⁽¹²⁾.

The collected data were entered into a spreadsheet in Microsoft Office Excel for Windows[®] 2013 using double entry and validated for spreadsheet consistency. Subsequently, they were imported into the IBM Statistical Package for the Social Sciences[®] (SPSS) software version 22.0 for data processing. The IBM SPSS AMOS[®] (Analysis of Moment Structures) software version 16 was used to run the CFA. For all analyses, the significance of 0.05 was adopted. The requirements of linearity, normality, and homoscedasticity for the use of parametric tests were validated.

Structural validity was verified by CFA. Construct validity by known groups was analyzed by comparing the BSE-FIT scores through the Student's t-test for independent samples (2 groups).

Convergent validity was analyzed by Pearson's correlation among the BSE-FIT scores and BMI, BSQ, and Rosenberg Self-Esteem Scale scores. The correlations

were classified as weak= $0 < r < 0.3$; moderate= $0.3 \leq r < 0.5$, and strong= $r \geq 0.5$ ⁽¹⁷⁾.

Reliability of the BSE-FIT was evaluated by the internal consistency of its items, measured by Cronbach's alpha. Only values above 0.7 were considered adequate to indicate reliability of the BSE-FIT⁽¹¹⁾.

To assess reliability through test-retest, the adapted version of the BSE-FIT was applied twice by the same data collector, two weeks apart, to randomly selected students. The Spearman correlation coefficient was used for the items and the intraclass correlation coefficient for the factor scores. To discriminate between the groups, the reliability, represented by the ICC values, should exceed 0.70, although some authors suggest that values of 0.60 or even 0.50 are acceptable⁽¹¹⁾.

The authors of the original instrument authorize the use of the instrument and research was approved by the Ethics Committee of the Universidade Federal do Triângulo Mineiro, opinion No. 1.824.277.

RESULTS

Study participants

The sample participating in the validation of the psychometric properties of the BSE-FIT was composed of 725 university students. Six students were excluded from the sample because their answers were incomplete; moreover, no data imputation was performed, resulting in 719 students being included.

Most of the participants were male (50.6%; $n=364$), aged between 20 and 24 years old (53.8%; $n=387$), single (95.3%; $n=685$), self-declared white (54.6%, $n=393$) and from Minas Gerais (79.5%, $n=572$).

Structural validity

Figure 1 shows the CFA results for determining the structural validity of Body-related Self-Conscious Emotions Fitness instrument (BSE-FIT) applied to 719 students.

The tested model included a four-factor structure containing the following latent variables indicated by the ellipses in Figure 1: shame (factor 1, with 4 items, indicated by rectangles), guilt (factor 2, with 4 items), authentic pride (factor 3, with 4 items), and hubristic pride (factor 4, with 4 items). The final model was obtained by subsequently adding covariances, or correlations, between the factors and some errors, as indicated in Figure 1. However, the original theoretical factorial structure proposed by the authors of the BSE-FIT instrument was not changed⁽²⁾.

Regarding the model fit indicators, the following should be highlighted:

Absolute measures of fit: the chi-square value was $\chi^2(97)=394.51$, $p < 0.001$; whereas RMSEA=0.065 (90%CI

0.059–0.072). Although the hypothesis of equal variance-covariance matrices (predicted by the model and obtained with the data) has to be rejected based on the chi-square value, the RMSEA value is within the limits considered indicative of a model fit to the factorial structure proposed as appropriate.

Incremental fit measures: GFI=0.94; TLI=0.95; CFI=0.96; values are above the cutoff point (0.90) recommended for goodness of fit.

Construct validity by known groups

Table 1 shows that women have higher statistically significant scores in the domains of shame and guilt than men. Moreover, men had higher scores in the domain of authentic pride than women. However, for the domain hubristic pride, no significant statistical difference was observed.

Regarding the practice of physical activities, insufficiently active individuals scored higher for shame and guilt. Regarding authentic pride and hubristic pride, however, active participants scored higher. In all domains, the differences found were statistically significant.

Convergent validity

The analysis of Pearson's correlation coefficients (Table 2) showed weak and moderate correlations between the BSE-FIT domains and the Rosenberg Self-Esteem Scale, all of which were statistically significant correlations. A negative correlation was observed between the domains of shame and guilt, since the higher the scores of shame and guilt, the lower the self-esteem scores. In contrast, positive correlations were observed for authentic and hubristic pride, which indicates that the variables vary in the same direction.

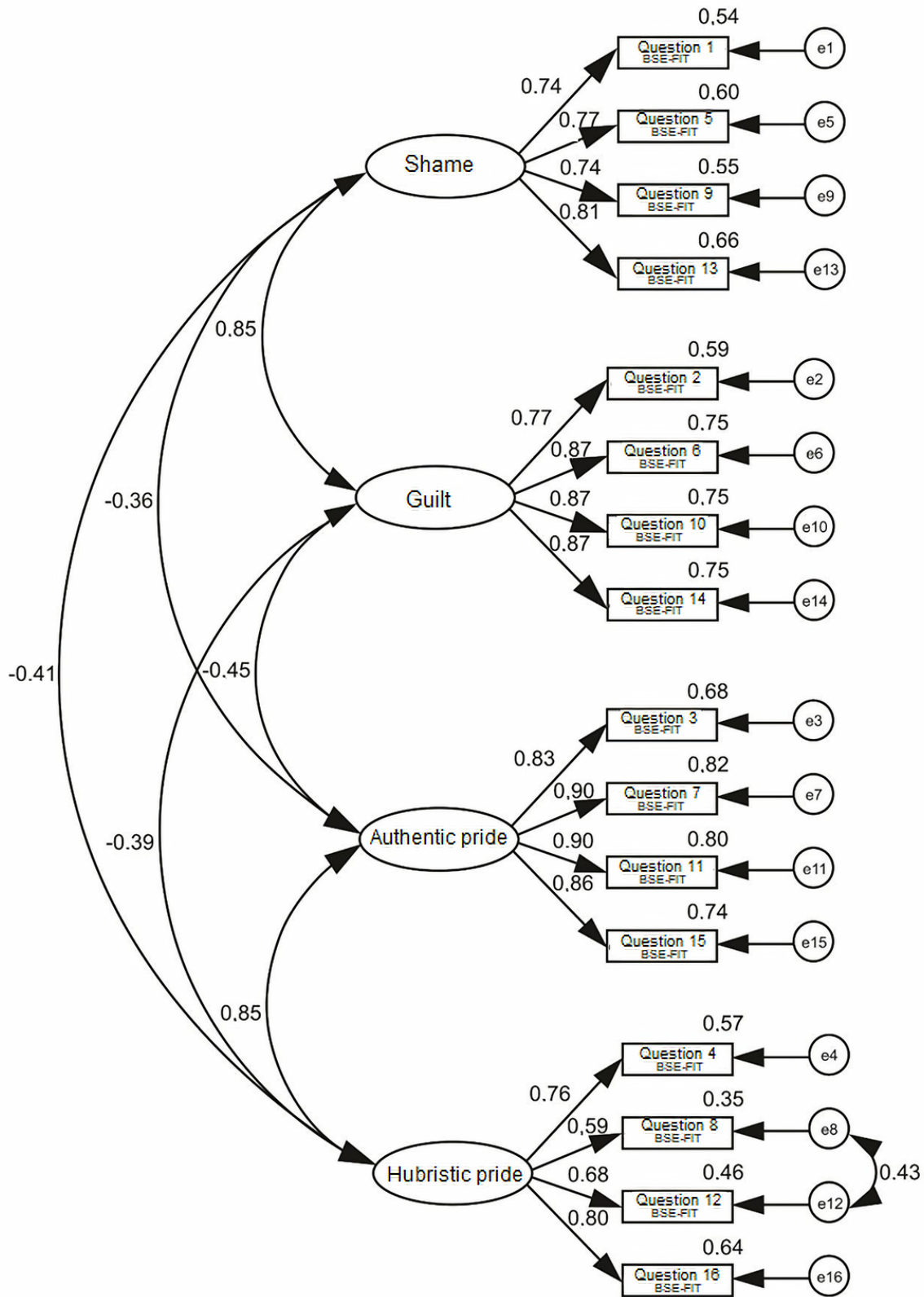
Internal consistency

The following values were obtained for Cronbach's alpha: 0.85 for the domain shame; 0.91 for the domain guilt; 0.93 for the domain authentic pride; and 0.83 for the domain hubristic pride. The values were greater than 0.7 in all domains, thus indicating good internal consistency and suitability to confirm reliability of the BSE-FIT⁽¹²⁾.

Stability test-retest

For the test-retest stability analysis, the Spearman correlation coefficient was calculated for the items and the results are shown in Table 3. Most of the coefficient values were acceptable (value equal to or above 0.50), which suggests agreement between the participant responses and showed statistically significant difference.

Stability for all factors was considered adequate since the ICC ranged from 0.72 to 0.77 and a statistically significant difference was observed in all domains (Table 4).



e: error; BSE-FIT: Body-related Self-Conscious Emotions Fitness Instrument.
 Source: Data collected by the authors (2017).

Figure 1. Diagram of confirmatory factor analysis of Body-related Self-Conscious Emotions Fitness Instrument.

Table 1. Mean score comparison of Body-related Self-Conscious Emotions Fitness instrument for the 719 participants according to sex and physical activity. Rio Paranaíba, MG, Brazil, 2017.

Domains	Group	Mean	s	p*
Shame	Female	2.48	0.96	<0.001
	Male	2.06	0.81	
	Insufficiently active	2.49	0.95	0.001
	Active	2.21	0.90	
	Nutrition program	2.42	1.10	0.27
	Other programs	2.25	0.90	
Guilt	Female	2.96	1.12	<0.001
	Male	2.41	0.99	
	Insufficiently active	2.94	1.17	0.001
	Active	2.61	1.06	
	Nutrition program	2.88	1.22	0.14
	Other programs	2.66	1.08	
Authentic pride	Female	2.15	1.01	<0.001
	Male	2.54	1.09	
	Insufficiently active	1.77	0.76	<0.001
	Active	2.51	1.09	
	Nutrition program	2.12	0.99	0.09
	Other programs	2.37	1.08	
Hubristic pride	Female	2.05	0.89	0.08
	Male	2.17	0.94	
	Insufficiently active	1.78	0.76	<0.001
	Active	2.20	0.96	
	Nutrition program	1.95	0.80	0.12
	Other programs	2.12	0.92	

*Student's t-test; s: standard deviation; p: p-value.

Source: Data collected by the authors (2017).

Table 2. Correlation between means of Body-related Self-Conscious Emotions Fitness instrument, Rosenberg Self-Esteem Scale, Body Shape Questionnaire and Body Mass Index of the 719 university students. Rio Paranaíba, MG, Brazil, 2017.

BSE-FIT Domains	Rosenberg Self-Esteem Scale		Body Shape Questionnaire		Body Mass Index	
	r*	p	r*	p	r*	p*
Shame	-0.35	<0.001	0.65	<0.001	0.16	<0.001
Guilt	-0.29	<0.001	0.58	<0.001	0.17	<0.001
Authentic pride	0.27	<0.001	-0.13	0.001	0.00	0.94
Hubristic pride	0.23	<0.001	-0.15	<0.001	-0.15	<0.001

BSE-FIT: Body-related Self-Conscious Emotions Fitness Instrument; \bar{x} : arithmetic mean; s: standard deviation; r: Pearson correlation coefficient; p: p-value; *Pearson correlation coefficient at 5% significance.

Source: Data collected by the author (2017).

DISCUSSION

Although the original instrument was published in 2016⁽²⁾, studies conducted in other countries on the cross-cultural adaptation and validation of the BSE-FIT are still scarce, which limits any discussions. The most recent studies are the validation of the Chinese version⁽⁵⁾, the Spanish version⁽⁶⁾ and the cross-cultural adaptation to Brazilian Portuguese⁽⁴⁾.

Table 3. Test-retest stability analysis of Body-related Self-Conscious Emotions Fitness instrument for each item answered by 719 university students. Rio Paranaíba, MG, Brazil, 2017.

Dimensions	Item	r_s	p
Dimension 1	Item 1	0.63	<0.001
	Item 5	0.52	<0.001
	Item 9	0.65	<0.001
	Item 13	0.51	<0.001
Dimension 2	Item 2	0.68	<0.001
	Item 6	0.62	<0.001
	Item 10	0.60	<0.001
	Item 14	0.61	<0.001
Dimension 3	Item 3	0.68	<0.001
	Item 7	0.57	<0.001
	Item 11	0.54	<0.001
	Item 15	0.52	<0.001
Dimension 4	Item 4	0.60	<0.001
	Item 8	0.46	<0.001
	Item 12	0.64	<0.001
	Item 16	0.64	<0.001

r_s : Spearman's correlation coefficient; p: p-value.
Source: Data collected by the author (2017).

In all, 719 students participated in the validation of the adapted version of the BSE-FIT, which is relevant since 435 students participated in the validation for the Canadian population⁽²⁾, and 396 students participated in the study to validate the instrument in China⁽⁵⁾. Furthermore, this sample exceeds the recommendations of the literature of 20 participants per parameter⁽⁹⁾. However, in the validation of the Spanish version, the number of participants was 955 individuals⁽⁶⁾.

Confirmatory factor analysis revealed four factors and confirmed the structure of the original instrument⁽²⁾, as observed in the Chinese study⁽⁵⁾. The model adequately fits the dimensional structure proposed by the authors of the instrument. Moreover, in the validation of the original version⁽²⁾, the value of RMSEA (≤ 0.04) and the chi-square ($\chi^2(98)=147.69$, $p>0.001$) indicated the goodness of fit of the data. Additionally, the incremental fit measures were above the values suggested for a good fit, and the presented CFI (0.98) is similar to the obtained CFI (0.96). The study conducted in Spain confirmed the four-factor structure; however, the authors noted flaws in item 16 as an indicator of hubristic pride and it was excluded from the adapted instrument⁽⁶⁾. The Spanish study recorded an RMSEA of 0.097, chi-square ($\chi^2(62.276)=224.57$, $p>0.001$) and CFI less than or equal to 0.96, which is equal to the value obtained in the present study, thus suggesting an excellent model fit⁽⁶⁾.

The Student's t-test revealed the construct validity by known groups. In summary, the adapted version of the BSE-FIT was able to distinguish differences between groups defined by sex and physical activity, thus confirming the hypotheses raised in this study. As for the undergraduate program, the formulated hypothesis was refuted since no significant differences were observed. However, descriptively, the nutrition students presented higher scores in the domains of shame and guilt.

As described in the results of this study, other studies support the obtained observations that women have negative

Table 4. Test-retest reliability analysis of Body-related Self-Conscious Emotions Fitness instrument answered at two different times by 92 students, considering the factors. Rio Paranaíba, MG, Brazil, 2017.

	Test		Retest		ICC	p
	Mean	s	Mean	s		
Shame	2.28	0.87	2.18	0.91	0.72	<0.001
Guilt	2.73	1.05	2.56	0.98	0.74	<0.001
Authentic pride	2.19	1.06	2.06	1.02	0.72	<0.001
Hubristic pride	2.04	0.94	2.03	0.90	0.77	<0.001

ICC: intraclass correlation coefficient; s: standard deviation; p: p-value.
Source: Data collected by the author (2017).

feelings regarding their physical fitness. In a 2019 study⁽¹⁸⁾, for example, women were more concerned with body image than men, while in another study from the same year, a relevant number of women were dissatisfied with their body image⁽⁸⁾.

According to the literature, adults practice physical activity for conditioning, aesthetics and to lose weight, which are associated with positive self-conscious emotions, such as authentic and hubristic pride⁽¹⁹⁾. This further supports the higher scores obtained for authentic and hubristic pride among active individuals.

In the context of the nutrition students, another recent study revealed that their attitudes about diet were inadequate in relation to students of other health-related programs and, therefore, put them at greater risk for eating disorders⁽²⁰⁾. Also in this scenario, the inability to achieve the standard body triggers feelings of guilt, especially among nutritionists, who work with physical fitness⁽²¹⁾.

For the convergent validation of the BSE-FIT, the authors of the instrument⁽²⁾ used demographic data, BMI and the Rosenberg Self-Esteem Scale, and assessed the practice of physical activity by the IPAQ short version and body-related emotions through the BSQ. Therefore, the instruments used to validate the Brazilian version of the BSE-FIT are consistent with the original validation, theoretically related to each other, and measure the same factor, according to the obtained results.

In the convergent validity analysis in the Chinese study⁽⁵⁾, only 203 students participated and the results were similar to those of the original study, where the Rosenberg Self-Esteem Scale showed a negative correlation with the factors shame and guilt and positive correlation with the authentic and hubristic pride⁽²⁾.

As for the concern with body image assessed by the BSQ, correlations that vary between weak and strong, significant with all of the BSE-FIT factors, are also identified. Positive correlations were observed between the domains of shame and guilt and negative correlations were observed for authentic and hubristic pride. Thus, it is understood that the scores of the domains shame and guilt increased in the same proportion as the students' concern with body image. In contrast, authentic and hubristic pride scores decreased as the BSQ scores increased.

BMI showed significant weak correlations with all domains, except for authentic pride. For shame and guilt factors, a positive correlation was observed, while for hubristic pride, the correlation was negative, that is, as BMI increases, the feeling of hubristic pride decreases.

As for internal consistency of the instrument, the Canadian authors⁽²⁾ obtained Cronbach's alpha values of 0.84 for shame, 0.91 for guilt, 0.92 for authentic pride, and 0.87 for hubristic pride, which indicated good internal consistency and are similar to those obtained in the validation of the Brazilian version. Studies conducted in China and Spain also showed evidence of internal consistency^(5,6).

The time interval used to assess test-retest stability was similar to that established by the authors of the instrument⁽²⁾ and that of the Spanish study⁽⁶⁾. However, it was different from the interval used in the Chinese study⁽⁵⁾, in which stability was detected over a month. While some authors recommend 10 to 14 days to perform the test-retest⁽²²⁾, which was the interval adopted in the present study, others highlight that there is no consonance regarding the appropriate interval between the evaluations. They emphasize that the indicated period should not be too short or too long⁽²³⁾. Furthermore, the sample participating in the reliability assessment was greater than the sample used in Canada (38 students)⁽²⁾ and in Spain (49 students)⁽⁶⁾, and similar to the sample used in the Chinese study, with 100 students⁽⁵⁾.

Test-retest reliability evaluated by means of the Spearman correlation coefficient indicated agreement between the participant responses, with strong correlations for 15 items of the BSE-FIT and moderate correlation for item eight (proud because my physical form is better than other people's). This is possibly associated with the constant influence of the media and society in what is considered the perfect physical form, which may have interfered in the answers obtained in both moments. The ICC values ranged from 0.72 to 0.77, with a statistically significant difference for all items, which indicates adequate reliability, as well as in the validation of the original version of the BSE-FIT, where the ICC values for all domains were greater than 0.70⁽²⁾.

The instrument can potentially be used both in research and clinical practice since it is a short and easily applicable instrument⁽²⁾.

This study had some limitations. First, the length of the instrument used in the research, as many volunteers decided not to continue when they saw the number of items they had to complete, despite the classroom time provided by professors to fill out the forms. Second, the nutritional assessment led to many students refusing to participate, although it was individual.

Studies in other Brazilian regions may help refine the instrument and identify new evidence of the validity and reliability of the BSE-FIT for different cultural contexts. However, the instrument can already be used for the Brazilian population in the form provided in this study.

CONCLUSION

The psychometric properties of the BSE-FIT version that was cross-culturally adapted in a previous study were maintained after translation and transcultural adaptation. Confirmatory factor analysis revealed the four factors and confirmed the structure of the original instrument.

The adapted version of the BSE-FIT showed convergent validity, construct validity by known groups, good internal consistency, and test-retest stability.

Therefore, the BSE-FIT is the first valid and reliable instrument that can be used in Brazil for research and clinical practice to evaluate self-conscious emotions related to the physical preparation and fitness of university students. By providing the BSE-FIT in Brazilian Portuguese, new fields of research can further investigate feelings of shame, guilt, authentic pride, and hubristic pride in the context of fitness. Furthermore, the instrument can be easily applied and can support assessments and new strategies to promote the physical and mental health of Brazilian university students, given the current panorama of excessive concern with physical form.

REFERENCES

- Miranda RF, Almeida TS, Oliveira TC, Souza CS, Abranches MV. A estetização da saúde: dieta, atividade física e insatisfação corporal. Invest Qualit Saúde [Internet]. 2017 [cited 2021 Feb. 15];2:502-12. Available from: <https://proceedings.ciaiq.org/index.php/ciaiq2017/article/view/1498>.
- Castonguay AL, Sabiston CM, Kowalski KC, Wilson PM. Introducing an instrument to measure body and fitness-related self-conscious emotions: The BSE-FIT. Psychol Sport Exerc [Internet]. 2016 [cited 2021 Feb 10];23:1-12. Available from: <https://doi.org/10.1016/j.psychsport.2015.10.003>.
- Tylka TL. Positive psychology perspectives on body image. In: Cash TF, Smolak L. Body image: a handbook of science, practice, and prevention. 2^a ed. New York: The Guilford Press; 2011. p. 56-64.
- Santos VS, Carleto CT, Haas VJ, Castonguay AL, Pedrosa LAK. Adaptação transcultural para a língua portuguesa do Body-related Self-Conscious Emotions Fitness Instrument (BSE-FIT). Cien Saude Colet [Internet]. 2019 [cited 2021 Feb 11];24(10):3897-907. Available from: <https://doi.org/10.1590/S1518-812320182410.25582017>.
- Chen GZ, Mei-Yen C. Validation of the Chinese version of Body-related Self-Conscious Emotions Fitness instrument (BSE-FIT). Psychology News [Internet]. 2017 [cited 2021 Feb 11];17(2):49-67. [https://doi.org/10.6497/BSEPT.201711_17\(2\).0003](https://doi.org/10.6497/BSEPT.201711_17(2).0003).
- Alcaraz-Ibáñez M, Sicilia A, Dumitru DC. Psychometrics of the Spanish body-related self-conscious emotions fitness instrument. Curr Psychol [Internet]. 2020 [cited 2021 Feb 13]. Available from: <https://doi.org/10.1007/s12144-020-00999-4>.
- Lima CAG, Maia MFM, Magalhães TA, Oliveira LMM, Reis VMCP, Brito MFSE, et al. Prevalência e fatores associados a comportamentos de risco à saúde em universitários no norte de Minas Gerais. Cad Saude Colet [Internet]. 2017 [cited 2021 Feb 12];25(2):183-91. Available from: <http://doi.org/10.1590/1414-462x201700020223>.
- Silva LPR, Tucan ARO, Rodrigues EL, Del Ré PV, Sanches PMA, Bresan D. Insatisfação da imagem corporal e fatores associados: um estudo em jovens estudantes universitários. Einstein [Internet]. 2019 [cited 2021 Feb 14];17(4):eAO4642. Available from: https://doi.org/10.31744/einstein_journal/2019AO4642.
- Kline RB. Principles and practice of structural equation modeling. 3^a ed. The Guilford Press: New York; 2011. 534 p.
- MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. Psychological Methods [Internet]. 1996 [cited 2020 Mar. 17];1(2):130-49. Available from: <https://doi.org/10.1037/1082-989X.1.2.130>.
- Fayers PM, Machin D. Scores and measurements: validity, reliability and sensitivity. In: Fayers PM, Machin D. Quality of life: the assessment, analysis and interpretation of patient-reported outcomes [Internet]. Chichester: John Wiley & Sons; 2007. p. 77-108. [cited 2020 Mar. 12]. Available from: <https://doi.org/10.1002/9780470024522.ch4>.
- Hutz CS, Zanon C, Vazquez AC. Escala de autoestima de Rosenberg. In: Hutz CS. Avaliação em psicologia positiva. Porto Alegre: Artmed; 2014. p. 85-94.
- Di Pietro M, Silveira DX. Internal validity, dimensionality and performance of Body Shape Questionnaire in a group of Brazilian college students. Rev Bras Psiquiatr [Internet]. 2009 [cited 2020 Mar. 15];31(1):21-4. Available from: <https://doi.org/10.1590/S1516-44462008005000017>.
- Quételet A. Anthropométrie ou mesure des différentes facultés de L'homme [Internet]. Bruxelles: C. Muquardt; 1870. 506 p. [cited 2019 Dec. 01]. Available from: <https://archive.org/details/anthropometrieou00quetgoog>.
- Matsudo S, Araújo T, Matsudo V, Andrade D, Andrade E, Oliveira LC, Bragion G. Questionário Internacional de Atividade Física (IPAQ): estudo de validade e reprodutibilidade no Brasil. Rev Bras Ativ Fís Saúde [Internet]. 2001 [cited 2019 Dec. 02];6(2):5-12. Available from: <https://doi.org/10.12820/rbafs.v.6n2p5-18>.
- World Health Organization. Global Recommendations on Physical Activity for Health [Internet]. Geneva: WHO; 2011. [cited 2020 Jan. 06]. Available from: <http://www.who.int/dietphysicalactivity/physical-activity-recommendations-18-64years.pdf>.
- Cohen J. Statistical Power Analysis for the Behavioral Sciences. 2^a ed. Hillsdale: Lawrence Earlbaum Associates; 1988. 567 p.

18. Santos VS, Patto MV, Cornélio MPM, Carleto CT, Pedrosa LAK. Preocupação com a imagem corporal e a autoestima de universitários do interior de Minas Gerais. *Rebec* [Internet]. 2019 [cited 2021 Feb 15];9(5):95-105. Available from: <https://periodicos.cesg.edu.br/index.php/educacaoecultura/article/view/448/601>.
19. Nascimento CC, Santos DM, Torres S, Martins LT, Silva NOV, Tertuliano IW. Motivação na aderência à prática de atividade física. *Arq Cien Esp* [Internet]. 2019 [cited 2021 Feb 16];7(3):127-30. Available from: <http://seer.uftm.edu.br/revistaeletronica/index.php/aces/article/view/3592>.
20. Costa DG, Tavares CT, Santos VS, Haas VJ, Gonçalves RMDA, Pedrosa LAK. Qualidade de vida e atitudes alimentares de graduandos da área da saúde. *Rev Bras Enferm* [Internet]. 2018 [cited 2021 Feb 11];71(supl. 4):1739-46. Available from: <https://doi.org/10.1590/0034-7167-2017-0224>.
21. Araújo K, Freitas MC, Pena P, Garcia R. Nutricionista com obesidade: sofrimento e estigma. *Invest Qualit Saúde* [Internet]. 2016 [cited 2021 Feb 15];2:1255-61. Available from: <https://proceedings.ciaiq.org/index.php/ciaiq2016/article/view/881/865>.
22. Keszei AP, Novak M, Streiner DL. Introduction to health measurement scales. *J Psychosom Res* [Internet]. 2010 [cited 2021 Feb 16];68(4):319-23. Available from: <https://doi.org/10.1016/j.jpsychores.2010.01.006>.
23. Cunha CM, Almeida Neto OP, Stackfleth R. Principais métodos de avaliação psicométrica da validade de instrumentos de medida. *Rev Aten Saúde* [Internet]. 2016 [cited 2021 Feb 10];14(47):75-83. Available from: <https://doi.org/10.13037/ras.vol14n47.3391>.

