Social Physique Anxiety Scale: a psychometric investigation of the factorial model in Brazilian adults

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ABSTRACT

Background. Due to the different factorial models available for the Social Physique Anxiety Scale (SPAS), a psychometric study is needed to identify the most appropriate structure of the scale for a Brazilian sample. **Objectives**: to estimate the psychometric properties of the SPAS when applied to a sample of Brazilian adults and to explore a factorial model for the instrument. **Methods.** First, the original SPAS single-factor model was assessed for the total sample through confirmatory factor analysis (CFA). The total sample was randomly divided into two groups. Exploratory factor analysis was carried out in one of the subsamples to identify underlying factors. The new structure was submitted to CFA using the other subsample. Estimates of convergent validity, discriminant validity, and reliability were also calculated. **Results**: 979 adults with a mean age of 26.09 (SD = 6.37) years participated in the study, 70.5% of whom were women. A two-factor model was found in the exploratory analysis with adequate validity indexes and good reliability. **Discussion/Conclusion**: A two-factor model of the SPAS presented good indicators of validity and reliability for young Brazilian adults.

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Introduction

Social anxiety is the fear of being judged by other people [1]. This type of anxiety can occur in different contexts such as academic presentations, job interviews, leisure activities in public places, etc [2-4]. Thus, social anxiety is a broad concept that can involve several aspects of a person's life and have a negative impact, such as social anxiety from body appearance, a construct that has been called social physique anxiety [5,6].

Social physique anxiety started to be investigated when researchers observed changes in the behavior of people under a physical evaluation by others [6]. The relevance that social anxiety with physical appearance can have on self-perception of one's body and the possible negative influence on the person's life, encouraged the investigation of this concept through psychological variables. The Social Physique Anxiety Scale (SPAS) was thus developed to assess dysfunctional behaviors regarding physical appearance in a social context [6,7].

The SPAS was originally developed in English for an American population by Hart et al., [6]. Its items were constructed by specialists from the report of individuals who experienced distress and nervousness when their physical appearance was evaluated by others. The original scale was presented as a single-factor model composed of 12 items based on a theoretical model established *a priori*. However, some studies conducted exploratory analyzes and identified other dimensions for the instrument's factorial model [8-10]. Currently, there is a lack of consensus on the factorial structure of the SPAS and, therefore, its validity and reliability are often under question, suggesting an absence of stability.

Several studies evaluated the original SPAS scale using confirmatory factor analysis, confirming its validity in different contexts and proposing different factorial structures for the scale [11-17]. Versions of the scale are available for different countries such as the United States [6], England, Estonia, Spain, Sweden, Turkey [11], Portugal [18], Japan, China, South Korea [16] and Brazil [8]. One study has verified the SPAS validity and reliability in a Brazilian sample of men and women from the community [13], and further studies should compare the psychometric properties of the scale in different Brazilian samples.

Studies have emphasized that young people experience constant pressures related to social physical anxiety, being vulnerable to appearance issues. Thus, the evaluation of this concept in young adults may help the development of healthcare strategies for this population [19-21].

Thus, the aim of this study was to estimate the psychometric properties of the SPAS when applied to a sample of young adults in Brazil.

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Methods

Study design and sampling

This was cross-sectional study with non-probabilistic convenience sampling. The minimum sample size was calculated considering 10 respondents per parameter of the model [22]. As the scale has 24 parameters (items of the instrument and their respective errors), added by a 20% increase to compensate for losses, the final sample size was calculated to be 300 individuals.

The sample consisted of men and women aged between 18 and 40 years. Exclusion criteria were being pregnant or lactating, or under treatment for eating disorders at the time of data collection. Students, technical-administrative employees, and professors of the Universidade Estadual Paulista (UNESP, Araraquara campus) were first invited to participate and asked to advertise the study to other people, establishing a snowball sampling process.

Sample characterization and study variables

Data on sex, age, marital status, use of substances / medications or dietary supplements for body change, being on diets for body change, self-perception about the eating quality, practice of physical activity, education level of the head of household and economic level were collected. Body weight (kg) and height (m) were reported by the participants and used to calculate the body mass index (BMI) and determine the anthropometric nutritional status [23]. The economic level was estimated using the Brazil Criteria [24].

Measuring instrument

The original SPAS model [6] has a single-factor structure with 12 items and a 5-point Likert-type response scale (1 = not at all characteristic of me, 5 = extremely characteristic of me), with 5 items (1, 2, 5, 8, 11) formulated in the opposite direction to the others. In the present study, the Portuguese version of the SPAS showed by Souza and Fernandes [8] was applied.

Analysis of psychometric indicators

The psychometric sensitivity of the SPAS items was estimated from summary measures (mean, median and standard deviation) and distribution [skewness (Sk) and kurtosis (Ku)]. Items with absolute values of Sk <3 and Ku <7 were considered as having psychometric sensitivity, i.e., without severe violation of the assumption of normality.

First, a confirmatory factor analysis (CFA) was carried out to verify the fit of the single-factor model to the total sample and the Weighted Least Squares Mean and Variance Adjusted (WLSMV) was used as the estimation method. The chi-square for degrees of freedom ratio (χ^2/df), comparative fit index (CFI), Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA) were used to evaluate the quality of the fit of the model to the data [25,26]. The fit was considered acceptable when χ^2/df ≤5.0, CFI and TLI ≥0.90, and RMSEA ≤0.10 [26]. In addition, the factor weight (λ) of each SPAS item was calculated and considered adequate when ≥0.40. When the fit of the model was not acceptable, the modification indices greater than 11, calculated using the method of Lagrange Multiplier (LM), was analyzed.

As the polychoric matrix did not converge in the SPAS single-factor model, an exploratory factor analysis (EFA) was carried out to verify whether the theoretical proposal of two factors [10,15,27], based on the content of the items used in the development of the instrument, could be considered adequate for the study sample. The total sample (n = 979) was randomly divided into two subsamples [subsample 1 for exploratory analysis (n = 506) and subsample 2 for confirmatory analysis (n = 473)]. The factors underlying the data were estimated in a subsample and, based on this result, a theoretical evaluation of the items' content grouped by factor was carried out to verify their adequacy. The principal component estimation method was used followed by Varimax rotation. The adequacy of subsample 1 for the EFA was assessed using the Kaiser-Meyer-Olkin index (KMO), being considered adequate if >0.70. Common factors with eigenvalues >1 were retained. Items with factor loading ≥0.40 were maintained [28].

CFA was then performed using the subsample 2 to confirm the adequacy of the proposal obtained from the EFA, and the fit indices were estimated.

Convergent validity was assessed by the variance average extracted (AVE) to verify whether items that are a reflection of the factor strongly saturate this factor [26]. AVE was calculated using the proposal by Fornell and Larcker [30] and was considered adequate if ≥0.50. The discriminant construct validity indicates whether the items that converge to a given factor do not correlate strongly with other factors. This assessment was performed based on a correlational analysis between factors, being considered adequate if AVE_i and $AVE_j \geq r^2_{ij}$ [30].

Factorial invariance

To assess whether the adjusted factorial proposal was maintained in independent subsamples, the subsample 2 was randomly divided into two subgroups (test group: n = 235; validation group: n = 238). Factorial invariance was assessed using multi-group analysis. The CFI difference (ΔCFI) was used to compare factor weights (λ), thresholds (t), and variance/covariance ratio of residuals (Cov/Res). The CFI values of the configurational models (M0), factor weights (M1), thresholds (M2), and residuals (M3) were considered. In addition, factorial invariance according to sex was investigated (men: n = 141 vs. women: n = 332). Invariance was confirmed when the CFI reduction was less than 0.01 [31].

SPSS Statistics (v.22, SPSS An IMB Company, Chicago, IL) and MPLUS v.7.2 (Muthén and Muthén, Los Angeles, CA) were used to perform the above analyzes.

Reliability

The reliability of the instrument was estimated from the composite reliability (CR) [30], the omega coefficient (ω), and the ordinal alpha coefficient (α). To calculate the coefficients, the R program (R Core Team, 2019) was used with the "lavaan" [32] and "semTools" [33] packages.

Procedures and ethical aspects

The research was advertised through different means (e-mails, personal invitations, and social networks, among others). The instrument was filled out on paper by the participants individually. Participants signed the Informed Consent Form before the start of the study. The research was approved by the Human Research Ethics Committee of the Faculty of Dentistry of Araraquara (UNESP) (C.A.A.E. 88600318.3.0000.5416).

Results

The SPAS was filled out by 979 subjects. The other participants were excluded from the study (16.33%). The average age of the participants was 26.09 (SD = 6.37) years and 70.5% were female. The demographic information for the sample is shown in Table 1.

The descriptive statistics of the SPAS responses are shown in Table 2.

As no violation of normality was found, the psychometric sensitivity of the items was confirmed. The SPAS single-factor model did not fit properly to the total sample (n = 979; λ = 0.41-0.88; CFI = 0.97; TLI = 0.96; χ^2/df = 18.55; RMSEA = 0.13; AVE =

Table 1. Demographic characteristics of the study participants

Characteristic	n (%)
Sex	
Male	289 (29.5)
Female	690 (70.5)
Marital Status	
Single	749 (76.5)
Married	203 (20.7)
Separate	25 (2.6)
Widower	2 (0.2)
Use of substances to body change	
Never	559 (57.1)
Once in lifetime	99 (10.1)
Sometimes	273 (27.9)
Often	48 (4.9)
Use of supplement to body change	
Never	450 (46.0)
Once in lifetime	105 (10.7)
Sometimes	307 (31.3)
Often	117 (12.0)
Practice of physical activity	
Yes	581 (59.3)
No	398 (40.7)
Weight loss diets	
Never	341 (34.8)
Rarely	146 (14.9)
Sometimes	288 (29.4)
Often	136 (13.9)
Ever	68 (6.9)
Self-perceived eating quality	
Poor	68 (6.9)
Fair	255 (26.0)
Normal	350 (35.8)
Good	270 (27.6)
Excellent	36 (3.7)
Anthropometric Nutritional Status	
Low weight	348 (35.5)
Eutrophy	498 (50.9)
Overweight	109 (11.1)
Obesity	24 (2.5)
Economic Stratum (average household income)*	
A (R$ 25.554,33)	245 (25.0)
B (R$ 8.460,39)	521 (53.2)
C (R$ 2.417,03)	206 (21.0)
D-E (R$ 719,81)	7 (0.7)

* Values based on the Brazil Economic Classification Criteria 2019.

0.48), while the reliability estimates were adequate (CR = 0.93; α = 0.90; ω = 0.90).

Table 3 shows the factorial weights obtained for subsample 1 in the EFA. The KMO index (0.897) and Bartlett's Sphericity Test = 37.735 (p <0.001) supported the adequacy of the sample for the EFA. No item was eliminated, since items were distributed in two domains with factor loading >0.40. Two factors emerged from this procedure, with Eigenvalues equal to or greater than 1. The first factor (F1) was named "Negative physical assessment expectations" and was composed of items 3, 4, 6, 7, 9, 10, and 12 with an explained variance of 44.79%. The second factor (F2) was named "Comfort about body presentation" and was composed of items 1, 2, 5, 8, and 11 with an explained variance of 11.54%.

The two-factor model was submitted to CFA using subsample 2 (n = 473), showing factorial validity (χ^2/df = 4.27; CFI = 0.97; TLI = 0.96; RMSEA = 0.08), factor weights greater than 0.50 (Figure 1); convergent (AVE = 0.48 / 0.61) and discriminant (r^2 = 0.49) borderline validity, and good reliability (CR = 0.82/0.91; α = 0.81 / 0.90; ω = 0.78 / 0.89).

The borderline values of χ^2/df may have occurred due to the large sample size, indicating that the index should not be considered alone to accept or reject the fit of the model [26].

Table 2. Descriptive statistics of the Social Physique Anxiety Scale (SPAS) responses by the participants

Item	Mean	Median	Mode	Standard deviation	Skewness	Kurtosis
1*	2.91	3.00	3.00	1.19	0.00	-0.76
2*	2.49	2.00	1.00	1.33	0.46	-0.94
3	2.60	2.00	1.00	1.38	0.43	-1.02
4	2.53	2.00	1.00	1.51	0.44	-1.27
5*	2.89	3.00	3.00	1.19	-0.01	-0.81
6	2.55	2.00	1.00	1.43	0.44	-1.16
7	2.27	2.00	1.00	1.33	0.75	-0.62
8*	2.89	3.00	3.00	1.33	0.10	-1.12
9	2.98	3.00	1.00	1.50	0.03	-1.41
10	3.23	2.00	5.00	1.44	-0.20	-1.30
11*	2.11	3.00	1.00	1.22	0.89	-0.20
12	2.84	3.00	1.00	1.50	0.18	-1.38

*Items with responses in a reversed order.

Table 3. Exploratory factor analysis of the Social Physique Anxiety Scale (SPAS) for subsample 1 (n = 506)

Items	F1	F2
1*- Eu estou tranquilo com a aparência de meu corpo		0.730
2*- Eu nunca iria me preocupar em vestir roupas que pudessem me fazer parecer muito acima do peso		0.699
3- Eu queria não ser tão tenso com relação ao meu corpo	0.601	
4- Fico chateado por pensar que outras pessoas estão avaliando meu peso ou meu desenvolvimento muscular negativamente	0.732	
5*- Eu me sinto bem quando vejo meu corpo no espelho		0.747
6- As feições não-atrativas do meu corpo me deixam nervoso em certos ambientes sociais	0.822	
7- Na presença dos outros, eu me sinto apreensivo quanto ao meu corpo	0.817	
8*- Eu estou tranquilo em relação ao que os outros acham do meu corpo		0.673
9- Eu ficaria aflito se soubesse que outras pessoas estão avaliando meu corpo	0.734	
10- Quando vou exibir meu corpo para os outros, eu sou uma pessoa tímida	0.684	
11*- Eu normalmente me sinto relaxado quando percebo que os outros estão olhando meu corpo		0.575
12- Quando estou de roupa de banho, eu normalmente me sinto nervoso sobre a proporcionalidade do meu corpo	0.712	
Eingenvalue	5.375	1.385
Explained Variance	44.794	11.539

*inverted item

The multi-group analysis of the two-factor model showed strong invariance for the independent subsamples (ΔCFI_{M1-M0} = -0.002; ΔCFI_{M2-M1} = -0.004; ΔCFI_{M3-M2} = 0.006). There was also a strong invariance of the two-factor model according to sex (ΔCFI_{M1-M0} = -0.002; ΔCFI_{M2-M1} = -0.001; ΔCFI_{M3-M2} = 0.001). The fit of the SPAS was also adequate for men and women subgroups (men: n = 141, λ = 0.46–0.96, χ^2/df = 1.90, CFI = 0.98, TLI = 0.98, RMSEA = 0.08; women: n = 332, λ = 0.52–0.89, χ^2/df = 3.94, CFI = 0.96, TLI = 0.95, RMSEA = 0.09).

Discussion

The validity and reliability of the SPAS were estimated in a sample of Brazilian adults, and a two-factor model presented the best fit for the sample. Our findings contribute to the scientific and clinical community by presenting an alternative model for the tool, which presented good psychometric indicators and can be used in studies and clinical protocols.

The fit of the two-factor model to the data corroborated the results presented for samples in other contexts [7,8,11,13,16,34,35]. However, the two-domain structure is questioned by some authors, because of the separation of positive and negative items. As this might be a methodological artifact [36], and the two-factor structure does not have a theoretical basis, more studies should be carried out using different samples to verify the fit of the SPAS [12,37].

Moltl and Conroy [12] report that the two-factor model ("Negative physical assessment expectations" and "Comfort with body presentation") suggested by Eklund Eklund [10] for the SPAS, represented a methodological artifact, as previously reported by Marsh [38] and Tomás and Oliver [39] when examining a global measure of self-esteem with items containing positive and negative statements. Thus, the investigation of the factorial validity of scales with positive and negative items can result in variations of the concept. Perhaps a more important question is whether the content

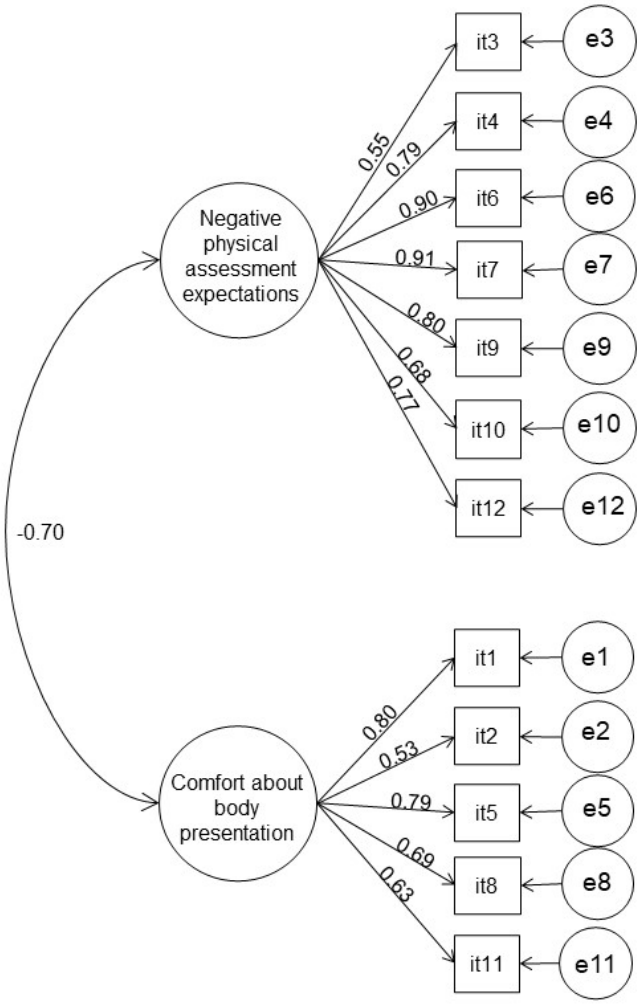

Figure 1. Factorial model of the Social Physique Anxiety Scale (SPAS) adjusted for a sample of Brazilian adults

of the SPAS, and not its number of items and structure, is effective for measuring social anxiety with physical appearance, which should be addressed in future studies to support or confront the findings of the present study.

Studies should also verify the content validity of the scale, with comparisons of psychometric data, considering the format and writing of the items and the theoretical basis of the SPAS construct, along with statistical techniques to confirm to the validity and reliability of the data [36].

The invariance of the SPAS fitted model was confirmed in independent samples and according to sex. This result is in line with those presented by Motl and Conroy [12], Saenz-Alvarez, Sicilia, Gonzalez-Cutre and Ferriz [40] and Ullrich-French, Cox, and Cooper [41] who verified the SPAS invariance between men and women. This confirms that comparisons between sexes are valid. However, the validation process should be redone whenever the instrument will be used in a sample with different characteristics, as validity and reliability are properties related to the data considering different contexts and samples, and not of the instrument per se.

This study has some limitations, including the cross-sectional study design, which is useful for identifying characteristics that should be considered in intervention studies, but does not allow the establishment of a temporal cause and effect relationship. In addition, the non-probabilistic sample selection affects the generalizability of the results; however, the use of a large sample size might have minimized the issue.

Conclusion

The SPAS model with two domains showed adequate validity, reliability, and invariance between independent subsamples and according to sex. This structure can be useful for the investigation of social anxiety towards physical appearance in young Brazilian adults. However, we emphasize the need for further studies with different Brazilian samples to verify the existence of a methodological artifact in the two-factor model due to the separation of positive and negative items.

Disclosure

The authors report no conflicts of interest.

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Conflicts of interest/competing interests

The authors declare that they have no conflict of interest.

Ethics approval

All procedures performed in this study were approved by the Human Research Ethics Committee of the School of Dentistry Sciences of UNESP (C.A.A.E. 88600318.3.0000.5416).

Consent to participate

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

Data availability

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

References

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Arlington, VA; 2013. 947 p.
2. Simon NM, Hollander E, Rothbaum BO, Stein DJ. The American Psychiatric Association Publishing Textbook of Anxiety, Trauma, and OCD-Related Disorders. 3rd ed. American Psychiatric Publishing; 2020. 754 p.
3. Caballo MVE, Salazar IC, Arias V, Hofmann SG, Curtiss J. Psychometric properties of the Liebowitz Social Anxiety Scale in a large cross-cultural Spanish and Portuguese speaking sample. Brazilian Journal of Psychiatry. 2019; 41(2):122-30.
4. Delgado B, García-Fernández JM, Martínez-Monteagudo MC, Inglés CJ, Marzo JC, La Greca AM, et al. Social anxiety scale for adolescents and school anxiety inventory: psychometric properties in French adolescents. Child Psychiatry & Human Development. 2019;50(1):13-26.
5. Alcaraz-Ibáñez M, Sicilia A, Díez-Fernández DM, Paterna A. Physical appearance comparisons and symptoms of disordered eating: The mediating role of social physique anxiety in Spanish adolescents. Body Image. 2020;32:145-9.
6. Hart EA, Leary MR, Rejesk WJ. The Measurement of Social Physique Anxiety. Journal of Sport and Exercise Psychology. 1989;11(1):94-104.
7. Alcaraz-Ibáñez M, Sicilia A. Analysis of the dynamic relationship between social physique anxiety and depressive symptoms in young adults. Journal of Applied Developmental Psychology. 2020;66:101085.
8. Souza V, Fernandes S. Adaptação da Social Physique Anxiety Scale ao Contexto Brasileiro. Ciências & Cognição. 2009;14(3):16-23.
9. Park J. Emotional reactions to the 3D virtual body and future willingness: the effects of self-esteem and social physique anxiety. Virtual Reality. 2018;22(1):1-11.
10. Eklund RC, Kelley B, Wilson P. The Social Physique Anxiety Scale: Men, women, and the effects of modifying item 2. Journal of Sport and Exercise Psychology. 1997;19(2):188-96.
11. Hagger MS, Asci FH, Lindwall M, Hein V, Mulazimoglu-Balli O, Tarrant M, et al. Cross-cultural validity and measurement invariance of the social physique anxiety scale in five European nations. Scandinavian Journal of Medicine & Science in Sports. 2007;17(6):703-19.
12. Motl RW, Conroy DE. Validity and factorial invariance of the Social Physique Anxiety Scale. Medicine & Science in Sports & Exercise. 2000;32(5):1007-17.
13. Neves AB, Neves AN, Zanetti MC, Brandão MRF, Ferreira L. Validação Psicométrica da Social Physique Anxiety Scale. Revista Iberoamericana de Psicología del Ejercicio y el Deporte. 2018;13(2):193-202.
14. Eklund RC, Crawford S. Active women, social physique anxiety, and exercise. Journal of Sport and Exercise Psychology. 1994;16(4):431-48.
15. Fletcher RB, Crocker P. A polytomous item response theory analysis of social physique anxiety scale. Measurement in Physical Education and Exercise Science. 2014;18(3):153-67.
16. Isogai H, Brewer BW, Cornelius AE, Komiya S, Tokunaga M, Tokushima S. Cross-cultural validation of the Social Physique Anxiety Scale. International Journal of Sport Psychology. 2001;32(1):76-87.
17. Eklund RC, Mack D, Hart EA. Factorial validity of the social physique anxiety scale for females. Journal of Sport and Exercise Psychology. 1998;20(3):281-95.
18. Malheiro AS, Gouveia MJ. Ansiedade física social e comportamentos alimentares de risco em contexto desportivo. Análise Psicológica. 2001;19(1):143-55.
19. McComb SE, Mills JS. A systematic review on the effects of media disclaimers on young women's body image and mood. Body image. 2020;32:34-52.
20. Neumark-Sztainer D, MacLehose RF, Watts AW, Pacanowski CR, Eisenberg ME. Yoga and body image: findings from a large population-based study of young adults. Body image. 2018;24:69-75.
21. Silva WR, Campos JADB, Marôco J. Impact of inherent aspects of body image, eating behavior and perceived health competence on quality of life of university students. PLoS One. 2018;13(6):e0199480.
22. Hair Jr JF, Black WC, Babin BJ, Anderson RE. Multivariate data analysis. 8th ed. Andover, Hampshire, United Kingdom: Cengage Learning EMEA; 2019. 813 p.
23. World Health Organization. Obesity: preventing and managing the global epidemic. Technical Report Series of the WHO, Geneva; 2000. Available from https://apps.who.int/iris/handle/10665/42330.
24. Brazilian Association of Research Companies (ABEP). Brazilian Economic Classification Criteria. 2019. Available from http://www.abep.org/criterio-brasil.
25. Byrne BM. Structural equation modeling with AMOS: Basic concepts, applications, and programming. 3rd ed. Taylor & Francis/Routledge; 2016. 460 p.
26. Maroco J. Análise de Equações Estruturais: Fundamentos teóricos, Software & Aplicações. 3rd ed. Pero Pinheiro: Report Number; 2021. 432 p.
27. Eklund RC, Mack D, Hart E. Factorial validity of the social physique anxiety scale for females. Journal of Sport and Exercise Psychology. 1996;18(3):281-95.
28. Marôco J. Análise Estatística com o SPSS Statistics. 7th ed. Perô Pinheiro: Report Number; 2018. 1013 p.
29. Damásio BF, Borsa JC. Manual de Desenvolvimento de Instrumentos Psicológicos. 1st ed. Editora Vetor; 2018. 440 p.
30. Fornell C, Larcker DF. Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research. 1981;18(1):39-50.
31. Cheung GW, Rensvold RB. Evaluating goodness-of-fit indexes for testing measurement invariance. Structural Equation Modeling. 2002;9(2):233-55.
32. Rosseel Y. Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). Journal of Statistical Software. 2012;48(2):1-36.
33. Jorgensen TD, Pornprasertmanit S, Schoemann AM, Rosseel Y, Miller P, Quick C, et al. semTools: Useful tools for structural equation modeling 2019. Available from: https://cran.r-project.org/web/packages/semTools/index.html.
34. Calmeiro LMDS, Simões MCR, Matos MGD, Gamito P. Factorial validity and group invariance of the Portuguese short version of the Social Physique Anxiety Scale in adolescents. Revista de Psicologia da Criança e do Adolescente. 2012;3(2):199-213.
35. Sicilia A, Saenz-Alvarez P, González-Cutre D, Ferriz R. Social physique anxiety and intention to be physically active: A self-determination theory approach. Research Quarterly for Exercise and Sport. 2016;87(4):354-64.
36. Maroco J, Maroco AL, Campos JADB. Student's academic efficacy or inefficacy? An example on how to evaluate the psychometric properties of a measuring instrument and evaluate the effects of item wording. Open Journal of Statistics. 2014;2014.
37. Martin KA, Rejeski WJ, Leary MR, McAuley E, Bane S. Is the Social Physique Anxiety Scale really multidimensional? Conceptual and statistical arguments for a unidimensional model. Journal of Sport and Exercise Psychology. 1997;19(4):359-67.
38. Marsh HW. Positive and negative global self-esteem: A substantively meaningful distinction or artifactors? Journal of Personality and Social Psychology. 1996;70(4):810.
39. Tomas JM, Oliver A. Rosenberg's self-esteem scale: Two factors or method effects. Structural Equation Modeling:. 1999;6(1):84-98.
40. Saenz-Alvarez P, Sicilia A, Gonzalez-Cutre D, Ferriz R. Psychometric properties of the Social Physique Anxiety Scale (SPAS-7) in Spanish adolescents. The Spanish Journal of Psychology. 2013;16:E86.
41. Ullrich-French S, Cox AE, Cooper RB. Examining combinations of social physique anxiety and motivation regulations using latent profile analysis. Measurement in Physical Education and Exercise Science. 2016;20(1):63-74.