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Psychology of Health

Cross-Cultural Adaptation of the Psychosomatic Symptoms Scale into Brazilian Portuguese (PSS-BRA)

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Abstract: The psychosomatic approach requires valid instruments to assess physical symptoms influenced by psychological factors. This study aimed to cross-culturally adapt and examine the validity evidence of the Brazilian version of the Psychosomatic Symptoms Scale (PSS-BRA). A total of 546 Brazilian adults participated (age range: 18–76 years, M = 38.7; SD = 13.5). Confirmatory Factor Analysis indicated that a seven-factor oblique structure provided the best fit for both frequency and severity scales, with satisfactory internal consistency (α and ω = .52–.93). The scale demonstrated sex invariance and positive correlations with anxiety symptoms, clinical diagnoses, and self-reported pain levels. These findings provide evidence of factorial validity, convergent validity, and reliability of the PSS-BRA. Overall, the instrument is psychometrically robust and suitable for clinical screening and preventive health interventions in Brazil.

Keywords: psychometrics, statistical validity, psychosomatic medicine

Adaptação Transcultural da Psychosomatic Symptoms Scale para o Português Brasileiro (PSS-BRA)

Resumo: A abordagem psicossomática requer instrumentos válidos para rastrear sintomas físicos mediados por fatores psicológicos. Este estudo teve como objetivo adaptar transculturalmente e investigar evidências de validade da versão brasileira da *Psychosomatic Symptoms Scale* (PSS-BRA). Participaram 546 adultos brasileiros (18 a 76 anos, M = 38,7; DP = 13,5). A Análise Fatorial Confirmatória indicou melhor ajuste para o modelo de sete fatores oblíquos em ambas as escalas (frequência e gravidade), com índices satisfatórios de consistência interna (α e ω = .52–.93). A escala demonstrou invariância entre sexos e correlações positivas com sintomas de ansiedade, presença de diagnóstico clínico e níveis de dor. Os resultados apoiam a validade fatorial, convergente e de consistência interna da PSS-BRA. Conclui-se que o instrumento é psicometricamente robusto e útil para rastreamento clínico e intervenções preventivas em saúde no Brasil.

Palavras-chave: psicometria, validade estatística, medicina psicossomática

Adaptación Transcultural de la Psychosomatic Symptoms Scale al Portugués Brasileño (PSS-BRA)

Resumen: El enfoque psicosomático requiere instrumentos válidos para evaluar síntomas físicos mediados por factores psicológicos. El objetivo de este estudio fue realizar la adaptación transcultural y examinar la evidencia de validez de la versión brasileña de la *Psychosomatic Symptoms Scale* (PSS-BRA). Participaron 546 adultos brasileños (edad entre 18 y 76 años, M = 38,7; DE = 13,5). El Análisis Factorial Confirmatorio indicó que una estructura oblicua de siete factores ofrecía el mejor ajuste para ambas escalas (frecuencia y gravedad), con consistencia interna satisfactoria (α y ω = .52–.93). La escala mostró invariancia por sexo y correlaciones positivas con síntomas de ansiedad, presencia de diagnóstico clínico y nivel de dolor autoinformado. Estos hallazgos aportan evidencia de validez factorial, validez convergente y fiabilidad de la PSS-BRA. En conjunto, el instrumento se presenta como psicométricamente robusto y adecuado para el tamizaje clínico y las intervenciones preventivas en salud en Brasil.

Palabras clave: psicometría, validación estadística, medicina psicosomática

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The psychosomatic approach recognizes the interplay of psychological, social, and biological factors in the manifestation of diseases and physical symptoms. It views mind and body as an integrated unit, analyzing their mutual influence on disease processes, while also aiming to support both prevention and treatment (Rodrigues, 2022). From this perspective, symptoms are understood as clues that provide access to the primary causes of illness.

Approximately 30% to 40% of somatic symptoms reported in medical consultations lack a complete and adequate explanation from test results, leading to the belief that they may represent manifestations of psychological distress (Hinz et al., 2017). In this context, assessment instruments are a valuable resource to help healthcare professionals understand the complexity of psychosomatic processes, identify risk factors, and develop more effective therapeutic strategies (Vulić-Prtorić, 2021).

Assessment instruments are designed to collect data on the relationship between patients' psychological factors and physical symptoms (Husain & Chalder, 2021; Hybelius et al., 2024). They help healthcare professionals understand the emotional, cognitive, and behavioral aspects that may influence the clinical condition. Additionally, they support differential diagnosis and the development of an appropriate therapeutic plan (Terluin et al., 2022). As tools for clinical investigation, they allow for a more comprehensive patient evaluation, help define suitable therapeutic approaches, and facilitate treatment monitoring by enabling the assessment of therapeutic intervention effectiveness and adjustments as needed, thereby ensuring a personalized and efficient approach (Fortes & Araújo, 2019).

Since the 1980s, several scales have been developed to investigate somatic symptoms, such as the Patient Health Questionnaire-15 (PHQ-15) (Kroenke et al., 2002), which assesses pain in different body parts, fatigue, dizziness, gastrointestinal discomfort, and breathing difficulties. Other instruments have since been introduced for assessing psychosomatic symptoms, differing in the number and type of symptoms, number of items, scale format, dimensionality, reliability, validity, and populations studied (Löwe et al., 2024). Examples include the Psychosomatic Symptoms Questionnaire (PSQ-39) (Heidari et al., 2021), the Somatic Symptom Scale–8 (SSS-8) (Gierk et al., 2014), and the Bodily Distress Syndrome (BDS) (Budtz-Lilly et al., 2015). Currently, only one scale has been validated in Brazilian Portuguese—the Somatic Symptom Scale-8 (SSS-8-BRA) (Pollo et al., 2022)—which underscores the importance of this study for advancing clinical investigations by healthcare professionals using the psychosomatic approach in their practice.

Given that the psychometric performance of health measures may vary across populations, instruments developed in different cultural contexts require rigorous processes of translation, cross-cultural adaptation, and validation (Bandeira et al., 2021; Fortes & Araújo, 2019). In this context, the Psychosomatic Symptoms Scale (PSS) (Vulić-Prtorić, 2021) was created to capture a broad spectrum of symptoms and provide detailed information about their frequency and, in particular, the degree of impairment caused in daily life. The scale is distinguished by its clarity, ease of administration, and comprehensibility, making it suitable for both clinical and research settings, including among populations with varying levels of education and health literacy.

One of the advantages of the PSS is its ease of administration and accessible response format, suitable even for children, which enables its use in clinical evaluations, treatment planning, monitoring, psychological treatment assessment, and scientific research. Despite its relatively short application time of 10 to 15 minutes, the PSS yields extensive information on the number and frequency of somatic symptoms, their nature and interference in daily life, symptom severity, and overall health status (Vulić-Prtorić, 2021).

The construct validity of the original version of the PSS was tested through factor analysis of a sample of 1,637 participants. Principal component factor analysis with Varimax rotation was performed, following procedures used in previous factorial studies of somatic symptom questionnaires. The results indicated a two-factor, first-order oblique solution comprising severity and frequency. These dimensions were correlated at .73, suggesting that although related, they represent distinct factors. The PSS demonstrated high internal consistency, with Cronbach's alpha of .89 for the frequency scale and .91 for the severity scale (Vulić-Prtorić, 2021).

Accordingly, the evidence indicates that the PSS is a valuable investigative tool, capable of identifying target organs to be addressed in psychosomatic clinical interventions through experiential therapeutic techniques (Vulić-Prtorić, 2021). Therefore, this study aimed to cross-culturally adapt and evaluate the evidence of validity of the Brazilian version of the Psychosomatic Symptoms Scale (PSS-BRA).

Method

To achieve its objectives, this study employed a correlational design with a quantitative, cross-sectional approach.

Participants

The study included 546 participants, aged 18 to 76, literate in Brazilian Portuguese, and from all regions of Brazil, with the majority being women (85.5%). Sample size was determined according to the recommendations of Hair et al. (2019), which suggest including 5 to 10 participants per instrument item to ensure a 5% significance level and 80% power. Inclusion criteria were: being Brazilian, at least 18 years old, and literate in Brazilian Portuguese. Exclusion criteria were: individuals under 18, those who were illiterate or functionally illiterate, and nonnative residents or foreigners.

Instruments

Sociodemographic Questionnaire was used to collect information on place of residence, sex, age, marital status, religion, income, and educational background.

Psychosomatic Symptoms Scale (PSS) (Vulić-Prtorić, 2021) is a self-report instrument designed to assess psychosomatic manifestations in children, adolescents, and adults aged 10 years or older. It consists of 35 items evaluating somatic symptoms across seven functional systems: pseudoneurological (9 items), cardiovascular (3 items), musculoskeletal (2 items), respiratory (3 items), gastrointestinal (8 items), dermatological (5 items), and pain/weakness (5 items). It also includes general health questions and items related to pain experiences.

The original psychometric validation of the PSS employed principal component factor analysis with Varimax rotation and identified a two-factor, first-order oblique solution, distinguishing between symptom frequency and severity. These two dimensions were moderately correlated (r = .73), indicating that they are related but distinct constructs. The scale also demonstrated high internal consistency, with Cronbach's alpha coefficients of .89 for the frequency scale and .91 for the severity scale.

Anxiety Symptoms Questionnaire (ASQ) (Ujihara & Rodrigues, 2024) is a self-administered, 17-item questionnaire designed to measure anxiety symptoms, with both the intensity and frequency of each symptom rated on a 10-point scale. The original version showed high reliability, with Cronbach's alpha values of .94 and .96 for the general scale, .89 and .93 for intensity, and .90 and .93 for frequency.

Procedure

Data Collection. For the cross-cultural adaptation of the PSS, we followed the guidelines outlined by Borsa et al. (2012), which comprise seven stages: translation of the instrument from the source language to the target language, reconciliation of the translated versions, evaluation of the reconciled version by expert judges, assessment of the instrument by the target audience, back-translation, review by the original author, and a pilot study.

The first stage involved translating the PSS from English into Brazilian Portuguese by two independent translators, with the aim of preserving item comprehension while considering cultural and linguistic specificities of the target language. In the second stage, the translated versions were reconciled into a single version, integrating the translations item by item. The third stage, evaluation by expert judges, was conducted by professionals with expertise in the construct. They assessed the clarity and scope of the items and suggested improvements to address potential issues not previously identified by the researchers.

Once the first translated version of the instrument was finalized, the fourth stage involved administering it to the target audience to evaluate item adequacy and comprehension. At this stage, participants could suggest modifications, which were analyzed and incorporated before proceeding further. Data collection was conducted online through an electronic form, and recruitment occurred via a public call on social media.

Subsequently, the fifth stage, back-translation, was carried out by two professionals—different from the initial translators—fluent in English, who translated the instrument back into the source language. Based on the two back-translations, a reconciled version was then produced. In the sixth stage, the author of the original instrument reviewed both the back-translations and did not request any modifications.

Finally, a pilot study was conducted in which the final version of the instrument was applied to a group of participants with characteristics similar to those of the target audience. At this stage, participants assessed the alignment of the items with the original version in terms of meaning and comprehension, and no adjustments were deemed necessary. Data collection was conducted online using an electronic form on the *Qualtrics* platform, and recruitment occurred via a public call on the research group's social media.

Data Analysis. Analyses were conducted using the R software (version 4.3.3) via *R Studio*. Evidence of internal structure validity of the PSS-BRA was examined by identifying the scale's dimensionality, assessing its psychometric properties, and evaluating its reliability. Considering the complexity of the data, an imputation strategy was applied for the Weighted Least Squares Mean and Variance-Adjusted (WLSMV) estimation method using a polychoric correlation matrix. This procedure was applied to participants with up to 10% missing data per questionnaire (Enders, 2022), resulting in imputed data for 81 participants (15% of the sample).

Exploratory Graph Analysis (EGA) (version 2.0.1) was performed using the EGAnet package to estimate factor dimensionality. EGA is a framework for estimating the number of dimensions in multivariate data using network analysis and community detection algorithms. A bootstrap method with 10,000 iterations was applied to assess the stability of dimensions and items, and model fit is evaluated using the Entropy Fit Index family. Additionally, the Single Variable Analysis was used to examine the extent to which items were locally dependent (or redundant). Network loadings, which provide information comparable to factor loadings, were also used to calculate network scores.

After identifying the scale's dimensionality, Confirmatory Factor Analyses (CFA) were conducted using the *lavaan* package to validate the results and assess the fit of the theoretical PSS-BRA model, which included two first-order factors and seven oblique first-order factors. The Weighted Least Squares Mean and Variance Adjusted (WLSMV) estimation method was employed due to the ordinal nature of the variables. Model fit was evaluated using the Comparative Fit Index (CFI ≥ .90), Tucker-Lewis Index (TLI ≥ .90), and Root Mean Square Error of Approximation (RMSEA ≤ .08, with a 95% confidence interval). Model comparisons were carried out with scaled chi-square difference tests (Satorra-Bentler correction) to determine whether more complex models provided significantly better fit than more parsimonious alternatives. Reliability of the dimensions was assessed using Ordinal Cronbach's Alpha and McDonald's Omega.

To provide a viable alternative to traditional methods, a Rasch Analysis (Rasch, 1980) was conducted to estimate item difficulty parameters. Instruments calibrated with this model allow for determining the extent to which items

consistently measure a single variable along a continuum from easy to difficult in a monotonically increasing manner. The following fit measures were evaluated: reliability (> 7.0), infit (information-weighted fit statistic), and outfit (outlier-sensitive fit statistic) (acceptable values between 0.5 and 1.5), as well as discrimination (fixed standard at 1) and difficulty (location parameter, or beta) (Tennant & Küçükdeveci, 2023).

The invariance of the PSS-BRA across participants' sex was also investigated. Sex invariance was evaluated using Multigroup Confirmatory Factor Analysis (MGCFA), with five models tested to assess configural, metric, scalar, variance, and residual invariance. For this analysis, the Maximum Likelihood Robust (MLR) estimator was employed, as the WLSMV estimator showed evidence of overfitting. The models were evaluated hierarchically, with each model compared to the preceding, less restrictive one (Putnick & Bornstein, 2016). It is important to note that, given the smaller proportion of men (14.5%) in the sample, the procedure used was appropriate for unequal group sizes. The absolute number of male participants was sufficient to support parameter estimation, and the group imbalance did not compromise the validity of the MGCFA (Putnick & Bornstein, 2016).

Finally, evidence of validity based on external relations was assessed through convergent validation, defined as the process of examining whether the instrument demonstrates relationships of the expected direction and magnitude with other measures (Freitas & Damásio, 2017). Frequency and severity scores on the PSS-BRA were expected to show positive associations of moderate to high magnitude with anxiety levels, and low to moderate associations with the presence of a psychosomatic disorder diagnosis and with pain levels. Convergent validity was evaluated using Spearman's rho correlations between the PSS-BRA dimensions, anxiety, and pain levels, as well as point-biserial (r_{p_b}) correlations between the presence and absence of diagnosis and the frequency and severity of psychosomatic symptoms. Convergent relationships with anxiety levels were examined as evidence of validity, given that high levels of anxiety have frequently been associated with psychosomatic symptoms (Groen et al., 2021; Yi et al., 2024). Dimension means were calculated using raw scores. All statistical tests adopted a significance level of $p < .05$.

Ethical Considerations

This study was conducted in compliance with Resolutions No. 466 of December 12, 2012, and No. 510 of April 7, 2016, of the Brazilian National Health Council (CNS). The project was submitted to the Research Ethics Committee (REC) of the Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS) and approved under CAAE 75763723.1.0000.5336. All procedures followed ethical guidelines and recommendations for research involving human participants in Brazil. Informed consent was obtained through an Online Study Consent Form made available to participants via an electronic form.

Results

The Brazilian Portuguese version of the Psychosomatic Symptoms Scale (PSS-BRA) (Basler & Freitas, 2025) preserved the original 35 items distributed across seven organ systems, maintaining conceptual, semantic, and operational equivalence. The translation process included independent direct translations, reconciliation, back-translations, expert committee review, and a pretest with target users. Based on these procedures, the scale's two oblique dimensions—frequency and severity—were retained to capture both the occurrence of symptoms and the perceived degree of impairment.

Based on the Shapiro-Wilk test, the distribution of the dimensions was non-parametric. Central tendency was described using means and standard deviations, while categorical variables were presented as absolute and relative frequencies. Sociodemographic analyses indicated that participants' ages ranged from 18 to 76 years, with a mean of 38.7 years (SD = 13.5). Most participants were women (85%), 51% reported a diagnosis, and 35% held a postgraduate specialization degree.

The EGA results indicated that the Brazilian version of the PSS did not replicate the seven second-order dimensions proposed by Vulić-Prtorić (2021) but instead identified six dimensions for the frequency scale and five dimensions for the severity scale. The bootstrap EGA (10,000 iterations) suggested relative dimensional instability, reducing confidence in the replicability of the extracted empirical structure.

The results showed that a substantial number of items had low factor loadings (< .30) and cross-loadings on multiple factors with similar magnitudes, indicating a lack of interpretative convergence between the extracted groupings and the theoretical domains of the scale, thereby weakening the structural validity of the solution suggested by the EGA. In addition, theoretically coherent factors, such as dermatological or gastrointestinal symptoms, were dispersed across factor clusters, compromising the clinical-functional logic of the original PSS structure and making it incompatible with the aim of preserving the scale as a screening tool organized by organic systems. Given the inconsistencies found in the EGA, the results of the Confirmatory Factor Analyses (CFA), grounded in theoretical foundations (Vulić-Prtorić, 2021), were used to examine the structure of the scale.

Three solutions were analyzed using CFA (Table 1). The first model was a unidimensional structure, in which the factor loadings exceeded .35 on both scales, ranging from 0.35 to .70 for the frequency scale and from 0.384 to 0.780 for the severity scale. The fit indices for the PSS-BRA were adequate for both the frequency scale ($\chi^2(555) = 1527.099$ ($p < .001$), CFI = .907, TLI = .900, RMSEA (90% CI) = .057 (.053 – .060)), and the severity scale ($\chi^2(531) = 1157.531$ ($p < .001$), CFI = .908, TLI = .901, RMSEA (90% CI) = .055 (.050 – .059)).

The confirmatory factor analyses indicated that the second model, a multifactorial structure, was the best solution for both dimensions of the PSS-BRA. Item factor loadings exceeded

Table 1
Comparison of Confirmatory Factor Analysis Models.

	PSS-BRA Frequency			
	χ^2 (*df*)	CFI	TLI	RMSEA (90 CI)
Unidimensional Model	1527.099 (555)	.907	.900	.057 (.053-.060)
Multifactorial Model	1495.572 (539)	.909	.899	.057 (.054-.061)
Hierarchical Model	1606.000 (553)	.899	.892	.059 (.056-.062)
	PSS-BRA Severity			
	χ^2 (*df*)	CFI	TLI	RMSEA (90 CI)
Unidimensional Model	1157.531 (531)	.908	.901	.055 (.050-.059)
Multifactorial Model	1063.425 (539)	.920	.912	.052 (.047-.056)
Hierarchical Model	1133.185 (553)	.911	.905	.054 (.049-.058)

Note. χ^2 = Chi-square; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

.40 on both scales, ranging from .449 to .936 for the frequency scale and from .455 to .924 for the severity scale. The fit indices for the PSS-BRA were adequate for both the frequency scale ($\chi^2(539) = 1495.572$ ($p < .001$), CFI = .909, TLI = .899, RMSEA (90% C.I.) = .057 (0.054 – .061)), and the severity scale ($\chi^2(539) = 1063.425$ ($p < .001$), CFI = .920, TLI = .912, RMSEA (90% C.I.) = .052 (0.047 – .056)).

The third model, hierarchical, resulted in factor loadings exceeding .40 on both scales, ranging from .449 to 1.012 for the frequency scale and from .451 to .974 for the severity scale. The second order factors, frequency and severity scales, showed positive and moderate associations of moderate to high magnitude (r = .89). The fit indices for the PSS-BRA were adequate for both the frequency scale ($\chi^2(553) = 1606.000$ ($p < .001$), CFI = .899, TLI = .892, RMSEA (90% C.I.) = .059 (.056 – .062)), and the severity scale ($\chi^2(553) = 1133.185$ ($p < .001$), CFI = .911, TLI = .905, RMSEA (90% C.I.) = .054 (.049 – .058)).

The scaled chi-square difference tests indicated that the multifactorial model provided a significantly better fit to the data than both the hierarchical and unifactorial models across the two formats of the instrument. For the frequency scale, the multifactorial model demonstrated superior fit compared to the hierarchical model ($\Delta\chi^2(14) = 116.75$, $p < .001$) and to the unifactorial model ($\Delta\chi^2(16) = 45.67$, $p < .001$). For the severity scale, the multifactorial model also showed significantly better fit than both the hierarchical model ($\Delta\chi^2(14) = 76.18$, $p < .001$) and the unifactorial model ($\Delta\chi^2(21) = 515.27$, $p < .001$). Taken together, these results reinforce the adequacy of the multifactorial structure in capturing the latent dimensions of the construct, supporting the theoretical assumption of multidimensionality over more parsimonious solutions.

The internal consistency indices (Cronbach's alpha and omega) for the dimensions assessed by the PSS-BRA were adequate (Table 2). For the frequency scale and its dimensions, omega ranged from .520 to .919, and alpha from .586 to .919; for the severity scale and its dimensions, omega ranged from .550 to .925, and alpha from .634 to .925.

The evaluation of item correlations in the frequency and severity dimensions supported the multifactorial model, with magnitudes ranging from negligible to high (*rho* = .27 to *rho* = .90). This pattern indicated no overlap between first-order dimensions but showed stronger associations among items within the same systems in both frequency and severity dimensions. Low-magnitude correlations reflected items from systems with little association between symptoms.

The Rasch analyses showed adequate reliability indices for both the frequency and severity scales (*alpha* = .90), indicating good capacity of the model to discriminate different levels of the two dimensions among participants. Most items on the frequency scale exhibited Infit and Outfit indices within the acceptable range (0.5 to 1.5), indicating good model fit. However, some items showed misfit, such as item 35 (excessive sweating, *Outfit* = 1.533) and item 33 (acne and pimples, *Outfit* = 1.543), with *Outfit* values above 1.5, suggesting these items did not behave as expected. Items such as item 16 (fainting, 0.175), item 5 (fever, 0.278), and item 33 (acne and pimples, 0.318) exhibited low discrimination, indicating poor differentiation across different levels of symptom frequency. For the severity scale, all items had *Infit* (0.765–1.459) and *Outfit* (0.756–1.470) values within the acceptable range (0.5 to 1.5), supporting good model fit.

Item difficulty parameters (beta) varied significantly, reflecting different levels of difficulty among items, interpreted here as the rarity or severity of symptoms. For the frequency scale, values ranged from -1.963 to 2.805. The rarest items were item 16 (fainting, *beta* = 2.805) and item 14 (sudden vision loss, *beta* = 2.220), while the most common were item 4 (lack of energy/fatigue, *beta* = -1.963) and item 7 (pain in arms/legs, *beta* = -0.861). For the severity scale, values ranged from -2.172 to 2.289. The most severe items were item 16 (fainting, *beta* = 2.289) and item 14 (sudden vision loss, *beta* = 1.983), while the most acute items were item 4 (lack of energy/fatigue, *beta* = -2.172) and item 3 (back pain, *beta* = -1.319). Overall, these results suggest that the analyzed items demonstrated good measurement quality, providing consistent responses for individuals with both higher and lower levels of latent traits.

Table 2
Reliability indices.

	Total	PSS-BRA Frequency						
		Pseudon	Cardiov	MuscSkel	Resp	Gastro	Dermat	Pain/Weak
Alpha	.919	.882	.685	.586	.759	.856	.731	.781
Omega	.919	.810	.632	.520	.785	.806	.778	.799
	Total	PSS-BRA Severity						
		Pseudon	Cardiov	MuscSkel	Resp	Gastro	Dermat	Pain/Weak
Alpha	.925	.910	.638	.634	.798	.855	.771	.764
Omega	.925	.841	.609	.550	.785	.805	.783	.730

Note. Pseudon = Pseudoneurological; Cardiov = Cardiovascular; MuscSkel = Musculoskeletal; Resp = Respiratory; Gastro = Gastrointestinal; Dermat = Dermatological; Pain/Weak = Pain/Weakness

The item-person map (Figure 1) for the frequency (top) scale indicated a relatively balanced distribution between items and respondents. However, items were concentrated in the middle range of the scale, with fewer at the extremes, which may reduce measurement precision for individuals with very high or very low symptom frequency. For the severity scale (below), the map also showed a balanced distribution but with some gaps at the extremes, suggesting that the instrument effectively measures median levels of severity but may inadequately capture respondents at the highest or lowest severity levels. In addition, the more dispersed distribution of respondents indicates considerable variability in severity perceptions among participants.

Considering the seven first-order dimensions identified, Multigroup Confirmatory Factor Analysis (MGCFA) was conducted to evaluate the invariance of item parameters between male and female participants (Table 3). The results indicated that the PSS-BRA demonstrated configural, metric, scalar, latent factor variance, and residual invariance across sexes. This finding suggests that the scale measures psychosomatic symptoms equivalently in men and women, ensuring comparability between groups. The fit indices were adequate at all stages, reinforcing the robustness of the model for both sexes.

The convergent validation analysis indicated that the frequency and severity dimensions of psychosomatic symptoms measured by the PSS-BRA showed significant and strong positive correlations with anxiety levels, ranging from moderate to high *(rho* = .596, $p < .001$, to *rho* = .768, $p < .001$). In addition, psychosomatic symptoms were positively correlated with the presence of clinical diagnosis ($r_{p_b} = .201$, $p < .001$ for frequency and $r_{p_b} = .091$, $p = .035$ for severity) and with self-reported pain levels (*rho* = .470 for frequency and *rho* = .231 for severity, both $p < .001$).

Discussion

This investigation into the adaptation of the PSS-BRA provided evidence of its applicability, reliability, and validity in the frequency and severity dimensions. The findings indicated that the scale is appropriate for measuring psychosomatic symptoms, with satisfactory reliability indices: Cronbach's alpha ranged from .58 to .91, and omega coefficients from .52 to .84 (Table 3). These results are consistent with recent studies suggesting that scales with more than five items generally yield more robust internal consistency estimates (Hair et al., 2019).

The exploratory analysis did not align with the theoretical structure of the scale. The inconsistencies observed suggest that the multidimensional structure of the instrument may not consistently conform to the seven distinct factors originally proposed. This deviation may reflect the inherent overlap among symptom domains, as psychosomatic symptoms often co-occur and share underlying physiological or emotional mechanisms. Such shared variance across items can reduce structural differentiation, particularly in culturally diverse populations.

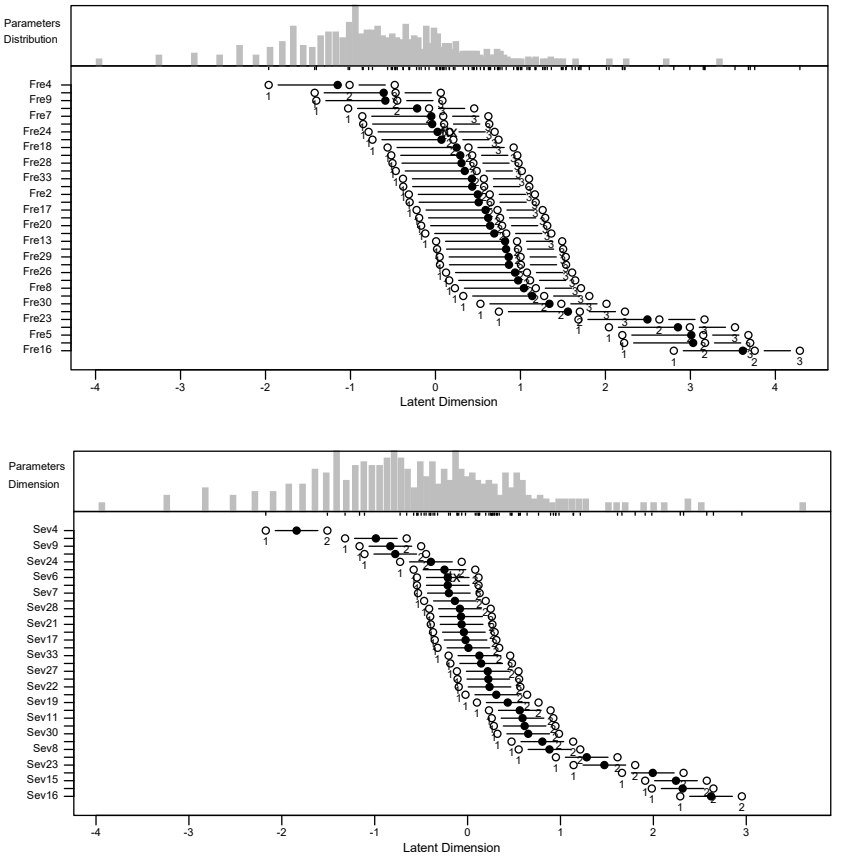
Item analysis showed that although most items exhibited good fit to the Rasch model, some presented issues, such as elevated Outfit values for the items "excessive sweating" and "acne and pimples". These discrepancies may stem from misfit between observed data and the ideal model, which is an inevitable consequence of response variability. The Rasch model accounts for this by providing linear and predictable measures adjusted through parameters like difficulty and ability (Tesio et al., 2024). Such deviations are common, particularly in complex psychosocial scales where achieving uniform response patterns is challenging. Overall, most items demonstrated adequate fit, reinforcing the quality and sensitivity of the scale for assessing complex symptoms like psychosomatic ones.

The reliability analysis of the frequency and severity dimensions suggests that the low internal consistency indices observed for the first-order Musculoskeletal and Cardiovascular factors may be attributed to the reduced number of items, respectively two and three, compared to other dimensions, which include up to nine items and therefore provide greater opportunities for identification and recognition. Regarding the relationship identified between items in the frequency and severity dimensions through modification indices, these appear to reflect both semantic proximity in Portuguese and similarity in the sensory perception of symptoms, particularly in connection with the pain/fatigue dimension, which may be associated with diverse manifestations across different body systems.

Another relevant point is the robustness of the scale in terms of its applicability, as the PSS-BRA proved to be a

Figure 1

Item-person maps for the PSS-BRA frequency and severity scales.



valid tool for assessing psychosomatic symptoms at different levels of frequency and severity, with invariance between men and women. This invariance ensures that the scale measures psychosomatic symptoms equivalently across sexes, allowing for group comparability and reinforcing its clinical applicability, since the absence of invariance can distort the interpretation of observed scores (Svetina et al., 2020).

Furthermore, the theoretical relationship between psychosomatic symptoms and anxiety levels was confirmed through significant positive correlations with the ASQ scale. This finding aligns with the literature indicating that anxiety symptoms, such as constant worry and restlessness, are often associated with the emergence of somatic symptoms like pain and physical discomfort (Groen et al., 2021; Yi et al., 2024). The results also reinforce the convergent validity of the PSS-BRA, demonstrating that higher levels of psychosomatic symptoms are moderately associated with the presence of medical conditions and perceived pain. Together, these findings not only validate the PSS-BRA but also suggest that its use may provide valuable insights into the intersection between psychosomatic manifestations and psychological conditions such as elevated anxiety.

The results of this study provide evidence for the reliability, factorial validity, and construct validity of the PSS-BRA. The scale is a reliable instrument for assessing psychosomatic symptoms in the Brazilian context, as it demonstrates strong psychometric properties, high internal consistency, and a factorial structure aligned with expectations, supporting both its reliability and construct validity. Item analysis further indicated that the PSS-BRA can capture a broad spectrum of symptoms, reinforcing its applicability in the early identification of psychosomatic manifestations.

However, an important limitation of this study was the use of a non-clinical sample, which restricts the generalization of the findings to populations with specific clinical diagnoses. Future studies should therefore test the scale in clinical samples to evaluate its performance in contexts with greater pathological severity. Additionally, further research could investigate the relationships between PSS-BRA dimensions and other health-related constructs, such as depression and quality of life, contributing to a deeper understanding of the intersection between psychosomatic symptoms and well-being.

Moreover, the scale has proven particularly useful for screening in clinical contexts, providing an easy-to-apply tool for the initial identification of psychosomatic symptoms. The PSS-BRA can also be applied in educational, organizational, and healthcare settings as a preventive measure to monitor symptoms in the general population and identify individuals who may require more in-depth follow-up.

Finally, the reliability and validity of the PSS-BRA significantly contribute to the literature on health assessment in Brazil, indicating that the instrument has the potential to

Table 3
Multigroup Confirmatory Factor Analysis (MGCFA) for Sex Variable.

	PSS-BRA Frequency				
	χ^2	*df*	CFI	TLI	*RMSEA* (95% CI)
Configural	2431.244	1078	.779	.756	.070 (.066-.073)
Metric	2457.861	1106	.780	.763	.069 (.065-.072)
Scalar	2537.946	1134	.771	.760	.069 (.066-.073)
Strict	2493.004	1169	.784	.780	.066 (.063-.069)
	PSS-BRA Severity				
	χ^2	*df*	CFI	TLI	*RMSEA* (95%) CI
Configural	2285.294	1078	.728	.700	.079 (.075-.084)
Metric	2297.591	1106	.732	.711	.078 (.073-.082)
Scalar	2373.286	1134	.721	.707	.078 (.074-.083)
Strict	2365.961	1169	.731	.726	.076 (.072-.080)

Note. χ^2 = chi-square; df = degrees of freedom; TLI = Tucker Lewis Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation; Configural = fixed factorial structure between groups; Metric = fixed factorial structure and factor loadings between groups; Scalar = fixed factorial structure, factor loadings, and scalar thresholds between groups; Strict = fixed factorial structure, factor loadings, scalar thresholds, and residual variances between groups.

facilitate early and personalized interventions. This can, in the long term, improve the approach to managing psychosomatic conditions in various contexts.

Data Availability

All data that supports the findings of this study are included in this manuscript or in supplementary material: https://doi.org/10.17605/OSF.IO/TVA5M

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