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Psychometric Properties of the Brief Resilience Scale in Honduran University Students

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Título: Propiedades psicométricas de la Brief Resilience Scale en estudiantes universitarios hondureños.

Resumen: Los estudiantes universitarios enfrentan desafíos que pueden generar altos niveles de estrés, lo que puede tener consecuencias negativas tanto para su salud como para su desempeño académico. La resiliencia desempeña un papel clave en la capacidad de los estudiantes para afrontar y superar las dificultades de esta etapa educativa. Una de las herramientas más utilizadas para evaluar la resiliencia es la Brief Resilience Scale (BRS). El presente estudio investigó las propiedades psicométricas de la BRS en una muestra de estudiantes universitarios hondureños. La muestra incluyó a 791 estudiantes (M_{edad} = 26.29 años, *DT* = 8.02). Se evaluaron la consistencia interna, la validez de constructo, así como la validez concurrente y divergente de la BRS. Además, se analizó la invarianza de la medida por sexo y los efectos de suelo y techo. Los análisis factoriales exploratorio y confirmatorio respaldaron la estructura de dos factores de la BRS, y los resultados mostraron índices de consistencia interna aceptables. Se observó invarianza entre hombres y mujeres. Este estudio aporta evidencia preliminar de que la versión en español de la BRS es un instrumento fiable y válido para evaluar la resiliencia en estudiantes universitarios de Honduras.
Palabras clave: Propiedades psicométricas. Educación superior. Resiliencia. Validez. Fiabilidad.

Abstract: University students face various challenges that can generate high levels of stress, which may have negative consequences for their health as well as their academic performance. Resilience plays a key role in students' ability to cope with and overcome the difficulties of this educational stage. One of the most common means of assessing resilience is the Brief Resilience Scale (BRS). This study examined the psychometric properties of the BRS among a sample of Honduran university students. The sample comprised 791 students (M_{age} = 26.29 years, *SD* = 8.02). The reliability, construct validity, and concurrent and divergent validity of the BRS were evaluated. Moreover, measurement invariance by sex, floor effects, and ceiling effects were analyzed. Exploratory and confirmatory factor analyses supported the two-factor structure of the BRS, and the results exhibited acceptable reliability indices. Measurement invariance was observed between men and women. This study provides preliminary evidence of the Spanish version of the BRS being a reliable and valid instrument with which to assess resilience among university students in Honduras.
Keywords: Psychometric properties. Higher education. Resilience. Validity. Reliability.

Introduction

Research on resilience has garnered considerable interest in recent decades due to its high degree of relevance across multiple domains of human functioning, ranging from physical health (Norris, 2010) to personal well-being (Windle et al., 2011). Despite there being no consensus regarding its conceptualization, resilience may be defined as an individual's capacity to confront and overcome adverse situations, giving way to the development of internal strength. Thus, it facilitates effective recovery, adaptation, and transformation while preventing psychological, social, and emotional maladjustment (Rodríguez-Fernández et al., 2018).

Resilience has been associated with several positive indicators of psychological adjustment, including self-esteem (Arslan, 2019; Vilca-Pareja et al., 2022), subjective well-being (Riepenhausen et al., 2022), sense of coherence (Konaszewski et al., 2021), and emotional regulation (Polizzi & Lynn, 2021). Evidently, resilience plays a valuable role in the promotion of positive psychological adaptation as well as protection against a range of mental health disorders and problematic behaviors, such as anxiety (Setiawati et al., 2021), depression (Zhang et al., 2020), stress (Smith & Yang, 2017), alcohol consumption (Van Gils et al., 2022), substance abuse (Yang et al., 2019), problematic internet use (Hidalgo-Fuentes et al., 2023), and video game addiction (Lin et al., 2021).

Relatedly, several studies have shown that resilience is negatively associated with levels of depression, anxiety, and stress while positively associated with self-esteem, making it a protective factor against psychological distress. This reinforces the role of resilience as a key psychological resource when it comes to emotional coping in demanding contexts, such as a university setting (Hu et al., 2015; Lee et al., 2013).

Resilience takes on particular importance within the university context, as students consistently face stressful situations that can negatively impact both their physical and mental health (Li et al., 2022). Various studies have demonstrated that resilience represents a protective factor against such challenges by fostering effective stress-management techniques and, consequently, reducing the adverse effects of stress (Brewer et al., 2019). Furthermore, resilience has been linked to stronger academic performance (Ahmed & Julius, 2015; Montas et al., 2021; Sakız & Aftab, 2019) and lower dropout rates (López-Aguilar et al., 2023; Pertegal-Felices et al., 2022), highlighting its fundamental role in students' well-being and academic success.

The mounting interest in resilience research has underscored the need for assessment instruments capable of accurately measuring the extent to which individuals possess this capacity. Among these instruments, the Brief Resilience

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Scale (BRS; Smith et al., 2008) is one of the most commonly used on account of its practical applicability and robust psychometric properties (Windle et al., 2011). The BRS consists of six items rated along a five-item Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Three of these items are positively worded to reflect the construct of resilience, while the remaining three are negatively worded, framed in opposition to it. This combination of both positive and negative wording facilitates a more comprehensive and nuanced evaluation of resilience, capturing both the affirmation of resilience-related capacities and potential vulnerabilities. The inclusion of both positively and negatively worded items in psychological scales is often employed to mitigate acquiescence bias, or the tendency of respondents to agree with statements regardless of their content. While this approach broadens the range of potential responses and helps to mitigate response bias (Mayerl & Giehl, 2018), it also introduces notable methodological challenges. Mixed item wording can distort factor structures, reduce internal consistency, and weaken correlations between oppositely worded items (Dodeen, 2023; Mayerl & Giehl, 2018; Salazar, 2015). In unidimensional scales, where all items are expected to load onto a single factor, negatively worded items often form a separate factor, complicating the interpretation of results (Dodeen, 2023; Lindwall et al., 2012).

The factorial structure of the BRS (Smith et al., 2008) was originally tested using four different samples, all of which supported a unidimensional structure explaining between 57% and 67% of observed variance. As with its original development, several validation studies have since determined that the one-factor model provides the best fit (Coelho et al., 2016; De Holanda-Coelho et al., 2016; Haktanir et al., 2016; Jacobs & Horsch, 2019; Lai & Yue, 2014). However, alternative factorial solutions have also been raised. Some studies have proposed a two-factor model made up of one factor that consists of positively worded items reflecting resilience and another factor that consists of negatively worded items reflecting vulnerability (Baattaiah et al., 2023; Fung, 2020; Hidalgo-Rasmussen & González-Betanzos, 2019; Konaszewski et al., 2021; Kyriazos et al., 2018; Peña-Contreras et al., 2020; Tansey et al., 2016). Additionally, certain validations have identified a unidimensional structure alongside a method factor associated with the negatively worded items (Chmitorz et al., 2018; Furstova et al., 2022; McKay et al., 2019; Rodríguez-Rey et al., 2016). This method factor is considered to be useful for controlling response bias, particularly in contexts where differences in response style may impact the construct validity of resilience (Fung, 2020). Thus, alternative models, such as the unidimensional model with a method factor and the bifactor model, offer more nuanced approaches to understanding how individuals experience and manage stress, highlighting the importance of adapting the scale to the specific characteristics of each population.

In terms of internal consistency, the original BRS exhibited high reliability, with Cronbach's alpha coefficients ranging from .80 to .91 across different samples (Smith et al., 2008). Regarding temporal stability, two test–retest studies reported moderate to good reliability, with an intraclass correlation coefficient (ICC) of .69 after one month in a sample of 48 participants and one of .62 after three months in a sample of 61 participants, supporting the measure's stability over time. Recent adaptations in Spanish-speaking contexts have also yielded adequate internal consistency indices (e.g., Calderón et al., 2022; Hidalgo-Rasmussen et al., 2021; Rodríguez-Rey et al., 2016). Finally, in terms of criterion validity, the scale's initial development showed it to be positively correlated with other measures of resilience, including the Connor-Davidson Resilience Scale (Connor & Davidson, 2003) and various related constructs, such as optimism, perceived social support, and active coping strategies. Negative correlations were identified with variables like pessimism, alexithymia, anxiety, and stress (Smith et al., 2008).

In-depth research on resilience and the design of interventions to promote it require valid, reliable, and readily available measures. Therefore, it is essential to conduct psychometric studies on existing instruments, such as the BRS. In the case of Honduras, the lack of consistent empirical evidence in this area hinders the selection of appropriate instruments with which to assess resilience among the population. Based on this framework, the aim of this study was to evaluate the psychometric properties of the Spanish version of the BRS among a sample of Honduran university students. More specifically, the study examined its factorial structure, internal consistency, and measurement invariance by gender. Additionally, the BRS's convergent validity was assessed through its relationship with self-esteem, and its divergent validity was assessed through its relationship with stress, depression, and anxiety.

Method

Participants

The sample consisted of 791 undergraduate students (611 women and 180 men) from the Universidad Pedagógica Nacional Francisco Morazán in Honduras. Participants ranged in age from 17 to 61 (M = 26.29, SD = 8.02). The study aligned with the recommendations of Lloret-Segura et al. (2014), who emphasize the importance of conducting exploratory and confirmatory factor analyses on separate samples to avoid biased conclusions. Thus, the total sample was randomly divided into two approximately equal subsamples. The subsample for the exploratory factor analysis (EFA) comprised 390 students, exceeding the well-established criterion of five participants per item (Costello & Osborne, 2005). The subsample for the confirmatory factor analysis (CFA) featured 401 students, surpassing the minimum recommended sample size of 200 for this type of analysis (Kline, 2016).

Instruments

Brief Resilience Scale (Smith et al., 2008). This scale consists of six items answered along a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores on the scale indicate higher levels of resilience. For this study, the Spanish version of the BRS developed by Rodríguez-Rey et al. (2016) was used.

Depression, Anxiety, and Stress Scale–21 (DASS-21; Lovibond & Lovibond, 1995). This study assessed depression and anxiety using the DASS-21, a self-report instrument designed to measure the negative emotional states of depression, anxiety, and stress. Each construct is evaluated through a seven-item subscale, with participants responding based on their emotional state over the past week along a four-point Likert scale ranging from 1 (did not apply to me at all) to 4 (applied to me very much or most of the time). Higher scores indicate greater levels of depression, anxiety, and stress. For this study, the Spanish version developed by Daza et al. (2002) was used. The internal consistency for the depression subscale was ω = .91, while that for the anxiety and stress subscales was ω = .89 and ω = .90, respectively.

Rosenberg Self-Esteem Scale (Rosenberg, 1965). This scale assesses overall self-esteem by gauging the positive and negative feelings that an individual has about themself. It consists of ten items (e.g., "I have a positive attitude toward myself") rated along a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Total scores range from 10 to 40, with higher scores indicating higher self-esteem. For this study, the Spanish version developed by Gómez-Lugo et al. (2016) was used, and this adapted version demonstrated excellent internal consistency (ω = .87).

Procedure

First, the Honduran co-author of this study reviewed the content of the instruments to ensure their clarity and to determine whether any cultural adaptations to the Honduran context were necessary. After confirming that no such modifications needed to be made, an online survey was created using Google Forms to collect data for the study. The survey was distributed among students enrolled in general education courses at the Universidad Pedagógica Nacional Francisco Morazán. The first page of the questionnaire provided participants with information regarding the study's objectives and informed them of its anonymous and voluntary nature. Informed consent was obtained through a specific item that participants needed to accept before proceeding with the questionnaire. To ensure that missing data did not constitute a problem, all items were set as mandatory.

The study was approved by the Research Ethics Committee of the Universidad Pedagógica Nacional Francisco Morazán under reference number 2023-003.

Data Analysis

Preliminary Item Analysis

First, a preliminary screening of inappropriate items was conducted using Gulliksen's pool based on the following indices: Relative Difficulty Index, Item Consistency Index, and measure of sampling adequacy (Ferrando et al., 2023). Univariate normality of the BRS items was also assessed by analyzing skewness and kurtosis values for each item and adhering to the criterion proposed by Gravetter and Wallnau (2014): Values between ±2 are indicative of normal distribution. Multivariate normality was evaluated using Mardia's test (1970). Finally, item-total correlations were examined to verify that items exceeded the recommended threshold of .30 (Streiner et al., 2024).

Exploratory Factor Analysis

Prior to conducting the exploratory factor analysis (EFA), the suitability of the data was assessed using the Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy (MSA) and Bartlett's test of sphericity. A significant Bartlett result alongside a KMO value between .60 and 1 indicates that the data are appropriate for EFA (Tabachnick & Fidell, 2014). Due to the lack of multivariate normality, the EFA was performed using the minimum residual extraction method with promax rotation (Zygmont & Smith, 2014). Factor loadings greater than .40 were taken to mean that the item warrants inclusion (Hair et al., 2010). The number of factors to retain was determined through parallel analysis (Hayton et al., 2004).

Confirmatory Factor Analysis

In the confirmatory factor analysis (CFA), the fit of three models was compared based on the factorial structure observed in both the original version and various adaptations of the BRS: a one-factor model, a one-factor model including a method factor associated with the negatively worded items, and a two-correlated-factor model (one comprising the positively worded items and the other comprising the negatively worded items). The robust maximum likelihood estimator was employed due to the violation of multivariate normality in the data. The following goodness-of-fit indices were used to evaluate the different models: normalized chi-square (χ^2/df), standardized root mean squared residual (SRMR), comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean squared error of approximation (RMSEA). In line with Brown's (2015) recommendations, a structural model is considered adequate when the indices meet the following cut-off criteria: a normalized chi-square below 3; CFI and TLI values above .95 (with values close to .90 deemed acceptable); RMSEA value below .08 to indicate reasonable fit and one below .05 to indicate good fit; and SRMR value below .08.

Measurement Invariance Analysis

A multigroup confirmatory factor analysis was conducted to gauge measurement invariance with respect to sex, comparing nested models representing progressively restrictive levels of invariance. The analysis began with an evaluation of configural invariance followed by the imposition of equality constraints to test for metric, scalar, and strict invariance (Putnick & Bornstein, 2016). Invariance at a given level was supported if adding equality constraints did not significantly worsen the model fit. The determination of the invariance level was based on Chen's (2007) criteria, which consider changes in CFI less than -.01 and increases in RMSEA less than .015 relative to the less restrictive invariance model to be acceptable.

Internal Consistency and Additional Analyses

The internal consistency of the BRS was examined using both Cronbach's alpha and McDonald's omega (ω) coefficients. Due to the numerous limitations of Cronbach's Alpha when it comes to assessing internal consistency, several authors recommend using ω as a more accurate alternative (e.g., Crutzen & Peters, 2017; Hayes & Coutts, 2020; McNeish, 2018; Revelle & Zinbarg, 2009; Trizano-Hermosilla & Alvarado, 2016). Alpha coefficients above .70 are considered acceptable (DeVellis, 2016), whereas, according to Kalkbrenner's (2021) criterion, omega coefficients of .65 or higher are deemed acceptable, while those of .80 or higher are deemed high.

Floor and ceiling effects were evaluated by calculating the percentage of participants who obtained the minimum and maximum possible scores, respectively. A floor or ceiling effect is considered to be present if more than 15% of participants score at either extreme of the scale (McHorney & Tarlov, 1995).

Finally, convergent validity of the BRS was assessed through its relationship with the Rosenberg Self-Esteem Scale, while divergent validity was examined via correlations with the depression, anxiety, and stress subscales of the DASS-21. Since the scores of all instruments followed a normal distribution, as indicated by skewness and kurtosis values within ±2 (Gravetter & Wallnau, 2014), Pearson's bivariate correlations were used to examine these relationships. Correlations were interpreted in line with Gignac and Szodorai (2016), who deem coefficients of .10 to be small, .20 to be moderate, and .30 or higher to be strong.

Analyses were conducted in RStudio using the psych, MVN, nFactors, and Lavaan packages alongside Jamovi and Factor software (Lorenzo-Seva & Ferrando, 2013).

Results

Preliminary Item Analysis

Preliminary efforts to detect any inappropriate items based on Gulliksen's pool did not identify any items in need of removal according to the Relative Difficulty Index and Item Consistency Index values. Meanwhile, the MSA values for the six items ranged between .665 and .715 (see Table 1), indicating that none should be eliminated given that, for an item to be considered uninformative or unrelated to the rest of the scale, the threshold is a value below .500 (Ferrando et al., 2023; Lorenzo-Seva & Ferrando, 2021).

Item normality was assessed through skewness and kurtosis indices, all of which fell within the ±2 range, thus leading them to be considered normally distributed. Regarding multivariate normality, the results of Mardia's test indicated that the data did not follow a normal distribution (skewness = 276.976, $p < .001$; kurtosis = 21.127, $p < .001$).

Finally, item-total correlations ranged from .53 to .72, further supporting the retention of all items.

Table 1
Preliminary Item Analysis of the BRS.

Item	*M*	*SD*	Skewness	Kurtosis	Item-test correlations	*MSA*
1	3.60	1.17	- .45	- .61	.66	.686
2	3.32	1.21	- .17	- .84	.58	.715
3	3.38	1.22	- .34	- .71	.60	.671
4	2.74	1.29	.20	- .98	.72	.676
5	3.17	1.18	- .18	- .71	.53	.665
6	2.62	1.22	.29	- .75	.67	.678

Notes. *M* = media; *SD* = standard deviation; *MSA* = measure of sampling adequacy

Exploratory Factor Analysis

The Kaiser–Meyer–Olkin measure (.67) and Bartlett's test of sphericity ($p < .001$) confirmed the sample's adequacy for an exploratory factor analysis. The EFA revealed a two-factor model explaining 44.5% of the total variance. Factor 1, which accounted for 31.1% of the variance, consisted of negatively worded items (items 2, 4, and 6), while the positively worded items (items 1, 3, and 5) loaded on Factor 2, which explained 13.4% of the total variance. Table 2 presents the factor loadings following promax rotation for the two-factor solution.

Table 2
Results of the Exploratory Factor Analysis.

Items	Factor 1	Factor 2
1. Tiendo a recuperarme rápidamente después de haberlo pasado mal		.605
2. Lo paso mal cuando tengo que enfrentarme a situaciones estresantes	.539	
3. No tardo mucho en recuperarme después de una situación estresante		.820
4. Es difícil para mí recuperarme cuando me ocurre algo malo	.834	
5. Aunque pase por situaciones difíciles, normalmente no lo paso demasiado mal		.453
6. Suelo tardar mucho tiempo en recuperarme de los contratiempos que me ocurren en mi vida	.609	

Confirmatory Factor Analysis

The single-factor model exhibited poorer fit indices than the other models (see Table 3), with a normalized χ^2 of 11.85, RMSEA of .186, SRMR of .115, CFI of .758, and TLI of .596. These values suggest that the single-factor model fits poorly and fails to optimally capture the data structure. In contrast, both the one-factor model with a method factor associated with the negatively worded items and the two-correlated-factor model demonstrated good fit, with fit indices superior in the latter. Thus, the two-correlated-factor model—with a normalized χ^2 of 2.80, RMSEA of .072, SRMR of .037, CFI of .967, and TLI of .939—was selected as the best-fitting model due to its overall superior fit.

Table 3
Comparison of Goodness-of-Fit Indices Obtained Through CFA.

Model	χ^2	df	χ^2/df	RMSEA (90%IC)	SRMR	CFI	TLI
One-factor model	106.686	9	11.85	.186 [.155; .218]	.115	.758	.596
One-factor model with a method factor	24.482	6	4.08	.088 [.054; .125]	.036	.964	.909
Two correlated factors	22.397	8	2.80	.072 [.038; .109]	.037	.967	.939

Notes. χ^2 = chi-square; df = degrees of freedom; RMSEA = root mean square error of approximation; SRMR = standardized root mean squared residual; CFI = comparative fit index; TLI = Tucker-Lewis index.

Measurement Invariance Analysis

For the measurement invariance analysis, the two-correlated-factor model was used, as it exhibited the best fit indices in the confirmatory factor analysis. As shown in Table 4, the differences observed in CFI and RMSEA values across the different levels of invariance are below the thresholds established by Chen (2007). This suggests that the model maintains invariance at all evaluated levels between men and women, implying that the model structure is comparable and that the scale scores are equivalent across sexes.

Table 4
Results of BRS Measurement Invariance Tests by Sex.

	χ^2	df	*p*	CFI	ΔCFI	RMSEA	Δ RMSEA
Configural	56.874	16	< .001	.948		.089	
Metrix	60.949	20	< .001	.945	-.003	.082	-.007
Scalar	67.474	24	< .001	.943	-.002	.076	-.006
Strict	68.898	30	< .001	.948	.005	.065	-.011

Notes. $\chi 2$ = chi-square; df = degrees of freedom; CFI: comparative fit index; ΔCFI = change in CFI from the previous model; RMSEA = root mean square error of approximation; ΔRMSEA = change in RMSEA from the previous model.

Internal Consistency and Additional Analyses

The BRS demonstrated internal consistency, with $\alpha = .69$ and $\omega = .70$ for the total score, $\alpha = .65$ and $\omega = .65$ for the positive items scale, and $\alpha = .73$ and $\omega = .73$ for the negative items scale. No floor or ceiling effects were observed in any of the subscales, as only 1.6% and 8.1% of participants obtained the minimum (3) or maximum (15) scores on the positive items subscale, respectively, while just 5.7% and 4.9% obtained them on the negative items subscale. Similarly, no floor or ceiling effects were detected for the total scale, with 0.8% and 2.5% of participants scoring at the minimum and maximum, respectively. Finally, correlation analyses revealed that the positive items subscale scores were significantly negatively correlated with depression, anxiety, and stress scores from the DASS-21 and positively correlated with Rosenberg Self-Esteem Scale scores (see Table 5). Conversely, the negative items subscale exhibited significant positive correlations with depression, anxiety, and stress but negative correlations with self-esteem.

Table 5
Correlation Coefficients Between Total BRS Score and the Scores of the DASS-21 and Rosenberg Self-Esteem Scale.

	Positive Items			*Negative Items*			*Total Score*		
Variables	*r*	CI 95%	*p*	*r*	CI 95%	*p*	*r*	CI 95%	*p*
DASS-21 Depression	-.18	[-.25; -.11]	**	.44	[.39; .50]	**	-.40	[-.46; -.34]	**
DASS-21 Anxiety	-.13	[-.20; -.06]	**	.42	[.36; .48]	**	-.35	[-.41; -.29]	**
DASS-21 Stress	-.15	[-.22; -.08]	**	.44	[.38; .50]	**	-.38	[-.44; -.32]	**
Rosenberg Self-Esteem Scale	.30	[.24; .36]	**	-.40	[-.45; -.34]	**	.43	[.38; .49]	**

Notes. *r* = Pearson coefficient; CI 95% = 95% confidence interval; *p* = significance level; ** = $p < .01$.

Discussion

The primary objective of this study was to examine the psychometric properties of the BRS among a sample of Honduran university students. Although the BRS is widely used to measure individuals' ability to cope with and recover from adverse situations, to our knowledge, its validity and internal consistency had not previously been explored in the Honduran context.

Regarding the structural validity of the BRS, the exploratory factor analysis suggested a two-factor model: one comprising the positively worded items and the other consisting of the negatively worded items. Subsequently, a confirmatory factor analysis compared the unidimensional model from the original version of the scale (Smith et al., 2008) with both the two-factor model and a unidimensional model including a method factor associated with the negatively worded items. Although the unidimensional model has previously been val-

idated in various cultural contexts, exhibiting good fit indices across different populations (McKay et al., 2019), it exhibited poor fit indices in our study. Both the unidimensional model with a method factor and the two-factor model exhibited acceptable fit indices; however, the two-factor model ultimately demonstrated superior fit. This suggests that the bifactorial structure is more appropriate for our sample of Honduran university students. This two-factor model clearly differentiates between students' ability to recover from adversity on the one hand, as represented by the resilience factor (positive items), and their perception of difficulty when faced with adversity on the other hand, as represented by the vulnerability factor (negative items). This finding aligns with other studies that have identified differences in how positive and negative items cluster, suggesting that responses to negatively worded items may be influenced by distinct factors, such as negative affect or pessimism (e.g., Baattaiah et al., 2023; Fung, 2020; Hidalgo-Rasmussen & González-Betanzos, 2019; Konaszewski et al., 2021; Kyriazos et al., 2018; Peña-Contreras et al., 2020; Tansey et al., 2016). Therefore, we opted to adopt the two-factor model, as it more accurately reflects the latent structure of the BRS in this sample; in doing so, we acknowledge that positive and negative items may capture different facets of the resilience construct.

Another significant finding of our study is that the BRS demonstrated adequate invariance across configural, metric, scalar, and strict levels between male and female participants. This result implies that the observed differences in BRS scores between the sexes among this university population reflect true differences in the underlying assessed constructs rather than differences stemming from variations in test interpretations between groups. This suggests that the BRS functions equivalently for both men and women, thereby strengthening the validity of comparisons made between these groups in terms of resilience.

In our study, the BRS demonstrated internal consistency coefficients of $\alpha = .69$ and $\omega = .70$ for the total score. Regarding the resilience and vulnerability subscales, both Cronbach's alpha and McDonald's omega coefficients were .65 and .73, respectively. Although these values are lower than those reported in other studies, which have observed higher internal consistency coefficients, they are considered acceptable according to the criteria proposed by Kalkbrenner (2021). The discrepancy between our results and those of other studies highlights the importance of assessing internal consistency within specific contexts, which can contribute to a better understanding of how the BRS performs across different cultural and demographic groups.

Moreover, no floor or ceiling effects were observed, as neither the percentage of participants who obtained the lowest score nor that of those who obtained the highest score on either factor exceeded the 15% threshold established by McHorney and Tarlov (1995). This finding suggests that the BRS is capable of distinguishing between different levels of resilience and vulnerability within the sample, reinforcing its utility as an assessment tool among the student population at the Universidad Pedagógica Nacional Francisco Morazán.

Finally, the correlation analysis revealed significant patterns that provide deeper insight into the relationship between resilience and other psychological constructs. More specifically, the resilience subscale exhibited negative correlations with the depression, anxiety, and stress subscales of the DASS-21, indicating that these emotional problems decline as perceptions of resilience increase. These findings are consistent with those of various meta-analyses pointing to the positive impact of resilience on individuals' mental health (Färber & Rosendahl, 2018; Hu et al., 2015; Imran et al., 2024; Lee et al., 2013; Siriwardhana et al., 2014). Likewise, this subscale exhibited a significant positive correlation with Rosenberg Self-Esteem Scale scores, suggesting that higher levels of resilience are associated with higher self-esteem. This also aligns with the results of previous studies that have uncovered a bidirectional relationship between resilience and self-esteem (Auttama et al., 2021; Baguri et al., 2022; Leiva et al., 2013). Individuals with higher self-esteem tend to be more resilient due to more positive perceptions of their own abilities and capacity to face challenges (Orth & Robins, 2014). Conversely, resilience contributes to the strengthening of self-esteem by empowering individuals to overcome difficulties and achieve their goals, thereby reinforcing their self-perception and self-confidence (Benetti & Kambouropoulos, 2006). In contrast, the vulnerability subscale was found to be significantly positively correlated with depression, anxiety, and stress, suggesting that these emotional factors may be interrelated with resilience-related difficulties. Moreover, it exhibited a negative correlation with self-esteem, supporting the notion that negative experiences and adverse emotions can negatively affect one's self-perception. These results underscore the importance of considering these interrelated constructs when assessing resilience among university populations, as they provide valuable information on the emotional dynamics that can impact overall well-being.

While this study provides significant findings regarding the psychometric properties of the BRS among a Honduran university population, it is important to acknowledge certain limitations that should be considered when interpreting its results. First, participants were selected through convenience sampling from students at a single university, limiting the generalizability of the findings. To enhance findings' external validity, future research should employ probabilistic sampling methods that ensure a more representative sample of the university population. Additionally, expanding the sample to include students from other universities would give way to more generalizable and representative results when it comes to the Honduran higher education student body as a whole. Second, all measures considered in this study were self-reported, raising the possibility of response biases among participants. Although the anonymous and voluntary nature of the survey reduces this risk, it cannot be entirely eliminated. Further research could employ complementary assessment methods to mitigate such biases (Dodou & de

Winter, 2014). Finally, this study did not assess the test–retest reliability of the BRS. This form of reliability is important, as it assures researchers and practitioners that the instrument consistently measures the same construct over time (Berchtold, 2016). Evaluating test–retest reliability in the Honduran population would be a crucial step toward ensuring the temporal stability of the BRS in this context.

In conclusion, the results of this study support the internal consistency and validity of the BRS as a tool for assessing resilience among Honduran university students. To the best of our knowledge, this is the first study in Honduras to investigate the psychometric properties of an instrument specifically designed to measure resilience. The findings of this study represent a significant contribution to the field of psychology in Honduras in the form of a valid and reliable tool for assessing resilience, which has significant implications for the development and, in particular, the evaluation of interventions aimed at promoting the mental well-being of university students. Furthermore, this study may serve as a starting point for future research on resilience among other populations in Honduras or even for cross-cultural studies.

Complementary information

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