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Validation of the Spanish version of the body vigilance scale

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ARTICLE INFO	ABSTRACT
	Introduction: This study investigated the psychometric properties of the Spanish version of the body vigilance scale (BVS). The recruitment has been performed through an online survey launched through common social media. **Material and Methods**: All subjects were older than 18 years and affected by panic disorder as a self-reported diagnosis. 367 individuals were rated for the validation analysis. BVS has been translated into Spanish and validated through confirmatory factor analysis. Participants have been also scored with the self-report panic disorder severity scale (PDSS-SR). Kaiser-Meyer-Olkin (KMO) test was adequate (KMO=0.0887) and sphericity tested significantly (p<0.001). The confirmatory analysis confirmed that the scale is one-dimensional. **Results**: The model adjustment was good, according to all fit indices. Cronbach's alpha also confirmed an excellent internal consistency (α=0.985). Scores between the two scales (BVS and PDSS-SR) have shown a good convergence (r=0.898; p<0.001). **Conclusion**: The Spanish version of the BVS has shown good psychometric properties and adequately reproduce the one-dimensional model of the original English version. **Keywords:** anxiety, body vigilance, validity, reliability, factor analysis

INTRODUCTION

Anxiety disorders are common psychiatric conditions in the general population [1] and the sixth leading cause of disability, in terms of disability-adjusted life years (DALYs), in both high-income (HI) and low- and middle-income (LMI) countries [2]. Within anxiety disorders, panic disorder (PD) shows a lifetime prevalence in the general population ranging from 2.1 to 4.7% [2,3].

PD onset usually occurs in the early/middle childhood. It is more common among females and often associated with depression and increased suicidal ideation. Hereditary factors and stressful life events, especially in early childhood, may play a role in the onset of PD [4].

Patients with PD frequently access to the emergency department with chest pain or dyspnea, tachycardia suspected of cardiac conditions such as heart attack. Patients also report a sudden and spontaneous onset of symptoms of fear or discomfort, which peak within minutes [5,6].

Panic attacks are associated to a set of systemic symptoms like palpitations, sweating, tremors or shaking, shortness of breath or choking, chest pain, nausea or abdominal discomfort, feeling dizzy, unsteadiness or fainting, derealization or depersonalization, fear of losing control or "going crazy", fear of dying, paresthesia, chills or sensations of warmth [6].

The fifth edition of the diagnostic and statistical manual of mental disorders (DSM-5) has proposed a list of symptoms for greater clinical utility beyond the categorical concept of PD. A diagnosis of PD is defined as the presence of both recurrent unexpected panic attacks and the existence of one or more related conditions for at least one month: concern, worry, and behavioral change [7].

Bodily sensations are central to the experience of anxiety and are relevant symptoms in various anxiety disorders, as seen in PD [7-10].

In recent years it has been suggested that the perception of bodily sensations (body vigilance) is important in the anxious experience, especially in PD [11]. It has been reported that the awareness of bodily sensations may contribute to panic attacks since related to anxiety sensitivity [12].

In this regard, the body vigilance scale (BVS) was developed a self-report instrument that allows the assessment of patients'

conscious attention to internal bodily sensations [11]. Originally developed in English, the one-factor scale presented good psychometric properties and adequate internal consistency. It proved to be useful in both clinical and non-clinical populations [7,9].

Although the estimated prevalence of anxiety disorders in the general population of Paraguay is 16.7% [13], poor clinical and research evidences are available. We aimed to propose validated Spanish version of the BVS testing its psychometric properties through the Paraguayan population.

MATERIAL AND METHODS

Participants

Participants were recruited through an online survey, launched through common social networks (*Facebook* and *Twitter*) from 15th October to 15th November, 2021. All participants received full information about the purpose of the study, privacy and data processing. No payment was provided for completing the survey. Subjects included were individuals ≥18 years old of age, who self-reported a diagnosis meeting American Psychiatric Association criteria for PD [7], and agreed to participate in the study.

The sample size was calculated using the *Epidat* epidemiological package. Assuming an expected frequency of anxiety disorders of 16.7% in the Paraguayan general population [13] with a confidence level of 95% and a precision of 4%, the minimum sample was established in 335 participants [14]. Finally, 672 subjects were surveyed. Of them, 367 subjects were selected as (self-)reporting current symptoms of PD.

Current symptoms of PD were detected as the presence of positive answers to the following two questions:

1. During the past month, have you experienced recurrent and unexpected panic attacks?
2. During the past month, have you had one or more of the following symptoms: worry, restlessness, and change in behavior?

The online survey approach was employed on the base of evidences suggesting that responses to online surveys can provide similar results to those reported through "in-person" samples [15] and that, furthermore, this Internet-based approach may be especially useful in times of social distancing such as those experienced during the COVID-19 pandemic.

Measures

Body vigilance scale

The BVS [11] measures the tendency to pay attention to panic-related bodily sensations. The measure consists of four items. Three items assess the degree of attention, the perceived sensitivity to changes in bodily sensations, and the average amount of time spent on bodily sensations, respectively. The fourth item consists of separately rating attention to 15 bodily sensations (e.g., palpitations) that include all the physical symptoms for panic attacks according to the DSM-IV [16]. The scores on item 3 are divided by 10. The scores for the 15 sensations are averaged to obtain an overall score for item 4. The total BVS score is the sum of items 1-4. As noted previously, the initial validation study of the English version of the scale [11] reported that the BVS has good internal consistency and adequate test-retest reliability and it is useful for both clinical and non-clinical samples [9].

Self-report panic disorder severity scale

The PDSS-SR is a brief self-administered scale designed to assess the global severity of PD. It consists of seven items that are scored on a Likert-type scale from 0 to 4 (with "0" being the minimum and "4" being the maximum severity of symptomatology). In this research, we used the Spanish self-report version of the PDSS-SR. This version shows acceptable internal consistency (α=0.74) and excellent test-retest reliability [17]. Cut-off scores are as follow [17]:

1. 0-16: Absence of panic attack symptomatology.
2. 17-28: Presence of panic attack symptomatology.

Translation Process and Validation

The translation of the BVS from English to Spanish was performed following the procedures suggested for cross-cultural adaptation of self-report measures, using the back-translation method [18]. First, the original English version was translated into Spanish; second, a bilingual expert back-translated the Spanish version into English; third, a native English speaker compared, sentence by sentence, the back translation with the original English version, in order to verify if they were equivalent in meaning. Finally, minor changes were made after the comparison and the Spanish version was administered to 20 individuals, as a pilot test, in order to verify if the questionnaire was comprehensible. After the pilot test, the final Spanish version was approved (available by request to the corresponding author).

Statistical Analysis

The Kaiser-Meyer-Olkin (KMO) test for sample adequacy and the Bartlett's test of sphericity were used to assess the pertinence of performing a factor analysis (SPSS software version 23). Confirmatory factor analysis (CFA) was performed using Jeffrey's amazing statistics program [19]. Diagonally weighted least squares (DWLS) estimation procedure was used for CFA, taking into consideration the sample size. Model fit was tested through Chi-square (χ^2), the comparative fit index (CFI), the normed fit index (NFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMSR). These indices detect if the fit model is good (RMSEA and SRMSR <0.05 and CFI and TLI >0.95) or acceptable (RMSEA and SRMSR between 0.05 and 0.08, and CFI and TLI between 0.90 and 0.95) [20].

Reliability was measured with Cronbach's alpha. Alpha values are described as excellent (0.93-0.94), strong (0.91-0.93), reliable (0.84-0.90), robust (0.81), fairly high (0.76-0.95), high (0.73-0.95), good (0.71-0.91), relatively high (0.70-0.77), slightly low (0.68), reasonable (0.67-0.87), adequate (0.64-0.85), moderate (0.61-0.65), satisfactory (0.58-0.97), acceptable (0.45-0.98), sufficient (0.45-0.96), not satisfactory (0.4-0.55), and low (0.11) [21].

Convergent validity was measured via the correlations of the BVS with the PDSS-SR using Pearson's correlations in SPSS. These correlations are defined as strong (r ≥0.50), moderate (r values between 0.30 and 0.49), and weak (r values between 0.10 and 0.29) [22]. T-test and Pearson's correlation were conducted to assess differences between participants' demographics (gender, age) on the BVS scores.

Table 1. BVS: Items-means and standard deviations, factor loadings, and communalities

BVS item	Mean	SD	Factor loading	h^2
1	4.199	2.424	0.975	0.950
2	4.185	2.463	0.968	0.937
3	4.275	2.503	0.983	0.967
4	4.196	2.423	0.955	0.911

Note. SD: Standard deviation; h^2: Communalities

Ethical Considerations

The study was approved by the Department of Medical Psychology of the National University of Asuncion, School of Medical Sciences (Paraguay). Data were treated with confidentiality, equality, and justice, respecting the Helsinki principles. Participants who required feedback from the survey were invited to write down their email address and received information or specific helpful suggestions. Informed consent was obtained from all individual participants included in study.

RESULTS

Participants

A total of 367 subjects were surveyed, of whom 50.4% were women. Ages ranged from 18 to 69 years with a mean of 34.08±11.2 years and a median of 32 years.

Preliminary Analysis

The mean BVS total score was 16.85±9.6, and the measure demonstrated excellent internal consistency (α=0.985) [21]. Each of the four items reported acceptable corrected item-total correlations (range=0.921 to 0.956) [23]. BVS total scores were correlated with age (r=0.198, p<0.001), whereas women (M=16.8, SD=8.9) and men (M=16.9, SD=10.2) did not significantly differ on BVS scores, t(365)=0.10, p=0.920. The mean PDSS-SR total score was 13.77±8.5. These scores indicate that 45.2% of the participants had symptoms of PD. The measure demonstrated also an excellent internal consistency (α=0.981) [21].

Factorial Analysis

KMO test was adequate (KMO=0.0887) and sphericity tested significantly (p<0.001). The original one-dimensional model was assessed with confirmatory factorial analysis. The model adjustment was good, according to all fit indices (S-B x²=0,006, df=2, p>0,05; RMSEA=0; CFI=1, NFI=1, TLI=1.004, SRMSR=0.001). This confirms that the model of the Spanish version of the BVS may reproduce the same one-factor model of the original version and all items had standardized factor loadings higher than 0.40 (p<0.001). Items- means and standard deviations, factor loadings, and communalities (h^2) for the one-factor model of the BVS are shown in **Table 1**.

Convergent Validity

Convergent validity of the BVS was assessed by evaluating the correlations of the BVS with PDSS-SR. The correlation between C19P-S and FCV-19S was direct and significant (r=0.898; p<0.001), which suggests a good construct validity.

DISCUSSION

Body vigilance refers to "conscious attention focused on internal bodily sensations and disturbances" and reflects the tendency to pay excessive attention to bodily sensations. Body vigilance has been included in cognitive models of PD and may be a response to panic and panic-related concern [11].

The aim of the present study was to assess the psychometric properties of the Spanish version of the BVS in a sample from Paraguayan general population. To the best of our knowledge, this is the first study testing the psychometric properties of the Spanish version of the BVS.

A confirmatory factor analysis was carried out, taking into account that the original one-dimensional structure had demonstrated good psychometric properties. All fit indices indicated that the one-dimensional structure correctly explained the construct analyzed as in the other versions of the scale [9,11].

Factor loadings were high on all items, which means that were equally valid as in the English version. In terms of internal validity, the Spanish version of the BVS reported an excellent Cronbach's alpha value (α=0,981). The Japanese version of the scale exhibited a unidimensional factor structure and strong internal consistency (α=0.79), as well as high convergence with similar scales in Japanese [24] and English [25]. In our study, convergence with PDSS-SR was direct and significant, indicating that the construct was correctly measured, as measured in the Japanese version of the BVS [24].

The mean score on the BVS was 16.85±9.6, in agreement with findings of other investigations [9,11]. BVS scores were directly correlated with age. This indicates that the older the age, the greater the symptomatology is among participants. However, the correlation found was weak and some researchers have even argued that this correlation may be not significant [24]. Gender was not associated with BVS scores, in line with the findings of other reports [24]. One of the limitations of this toll is a missing precise cut-off point informing whether the symptoms are clinically significant. Also, the interpretation of the scale is merely quantitative, the higher the score, the greater the severity of symptoms.

Regarding the frequency of PD, 45.2% of participants reported symptoms on the base of PDSS-SR; however, it should be specified that PDSS-SR is a screening tool and does not replace clinical diagnosis. The level of anxious symptomatology was similar to that detected in the Paraguayan population during the COVID-19 quarantine [26], but higher than that reported in Ukraine [27], Japan [28], or Germany [29]. These differences could be explained by the type of instrument employed to measure symptomatology as well as by the psychological distress related to the COVID-19 pandemic.

A strength point of this research is that the Spanish version of BVS may be a valuable assessment tool for Spanish-speaking patients affected by PD or other anxiety disorders.

Limitations of this research may include the lack of data on sociodemographic factors (e.g., race, ethnicity, education level, employment, etc.) or clinical characteristics (e.g., comorbidity, etc.) that might impact on BVS scores. Furthermore, additional data, e.g., information on discriminant association with other emotional disorders, were missing. Another limitation may include the fact that we completely relied on self-report measures in order to

include/exclude participants. Finally, test-retest reliability was not calculated, since contact-information of recruited subjects were not collected for a second assessment.

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