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Psychometric Properties of the Porges Body Perception Questionnaire (BPQ-sf) in a Sample of Chilean Adults

Propiedades psicométricas del cuestionario de percepción corporal de Porges (BPQ-sf) en una muestra de adultos para población chilena

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Abstract.
Interoceptive sensitivity involves focusing an individual's attention on internal bodily processes, such as gastrointestinal, cardiac, and respiratory sensations. This process is significant for both physical and mental health, as it relates to adaptive and emotional processes. Various questionnaires are available to assess interoceptive sensitivity, and the aim of this study was to analyze the psychometric properties of the short form of the Body Perception Questionnaire (BPQ-sf). A total of 276 adults aged between 18 and 77 years participated. The BPQ-sf, adapted by Cabrera and colleagues (2018), was used in an online version. The results demonstrate a second-order factor model with adequate fit indices ($\chi^2 = 1568.90[985]$; $\chi^2/df = 1.59$; RMSEA = $.046[.042, .051]$, CFI = $.96$, TLI = $.96$) and satisfactory Cronbach's alpha ($\alpha > .80$) and McDonald's omega ($\omega > .80$) coefficients, considering the dimension of body awareness and autonomic reactivity, subdivided into supra-diaphragmatic and sub-diaphragmatic reactivity. These findings suggest that the BPQ-sf has valid and reliable psychometric properties, making it suitable for use in the Chilean context. It facilitates access to internal bodily states and allows the study of interoceptive sensitivity in relation to other cognitive and affective processes, such as anxiety, depression, and pain. Furthermore, it provides a foundation for developing instruments that could be useful in clinical settings.

Resumen.
La sensibilidad interoceptiva consiste en focalizar la atención de la persona en sus procesos corporales internos, como las sensaciones gastrointestinales, cardiacas y respiratorias. Este proceso es relevante en lo que a salud física y mental se refiere, dado que está relacionado a procesos adaptativos y emocionales. Existen diferentes cuestionarios para evaluar la sensibilidad interoceptiva y el objetivo de este estudio fue analizar las propiedades psicométricas del Cuestionario de Percepción Corporal en su versión corta (BPQ-sf). Participaron 276 adultos entre los 18 y 77 años. Se utilizó el BPQ-sf, adaptado por Cabrera y colaboradores (2018), en una versión online. Los resultados demuestran un modelo de factores de segundo orden con adecuados índices de ajuste ($\chi^2 = 1568.90[985]$; $\chi^2/gl = 1.59$; RMSEA = $.046[.042, .051]$, CFI = $.96$, TLI = $.96$) y satisfactorios coeficientes alfa de Cronbach ($\alpha > .80$) y omega de McDonald ($\omega > .80$), considerando la dimensión de conciencia corporal y reactividad autonómica, subdividida en reactividad supra-diafragmática y sub-diafragmática. Estos resultados permiten concluir que el BPQ-sf cuenta con propiedades psicométricas de validez y confiabilidad que permiten su uso en el contexto chileno. Esto facilita el acceso a los estados corporales internos, relacionar la sensibilidad interoceptiva con otros procesos cognitivos y afectivos, como la ansiedad, depresión y el dolor, así como también ser un pie de inicio para generar instrumentos que puedan ser de ayuda en el campo clínico.

Keywords.
Interoception, Interoceptive Sensitivity, Psychometric Properties, Body Awareness, BPQ-sf.

Palabras Clave.
Interocepción, sensibilidad interoceptiva, propiedades psicométricas, conciencia corporal, BPQ-sf.

1. Introduction

The concept used to refer to the perception of the bodily state has varied over time. In the 19th century, the term "cenesthesia" was used to describe body perception. In the second half of the 20th century, the term "somesthesia" emerged, and now in the 21st century, the concept used is interoception (Ceunen et al., 2016). Interoception refers to the process by which the central nervous system detects, interprets, and integrates signals originating within the body, providing an internal mapping of the body through both conscious and unconscious levels (Khalsa et al., 2018). Interoceptive information involves focusing the person's attention on their internal bodily processes, such as gastrointestinal, cardiac, and respiratory sensations (Crow et al., 2019). These signals are interpreted by the brain and play a critical role in emotional processing, decision-making, risk perception, among other cognitive functions (Khalsa et al., 2018).

In recent years, interoception has gained considerable interest, leading to the creation of various terms to operationalize it, such as interoceptive awareness, interoceptive accuracy, and interoceptive sensitivity (Crow et al., 2019). However, it is important to clearly differentiate between these terms, as they are sometimes used interchangeably, despite evidence showing that they refer to distinct ways of measuring the same process.

Garfinkel et al. (2015) define interoceptive accuracy as the individual's performance on behavioral and objective tasks that evaluate internal signals, with the most common being the heartbeat detection task proposed by Schandry in 1981. On the other hand, interoceptive awareness is described as a measure of metacognitive awareness of interoceptive accuracy, meaning the degree of correspondence between confidence and interoceptive accuracy, calculated through various mathematical formulas (Crow et al., 2019; Wang et al., 2019). Finally, interoceptive sensitivity is conceptualized as the self-assessment of one's internal states, which can be evaluated through an interview or questionnaires. Using these measures separately has its disadvantages, so Garfinkel et al. (2015) recommend that studies include more than one measure of interoception.

To obtain the degree of interoceptive accuracy or awareness, experimental situations combined with interviews or specific questions are required. To measure interoceptive sensitivity, instruments that are adapted to different cultures and have psychometric properties that demonstrate their reliability and validity are needed. Among the most commonly used scales in scientific literature are the Multidimensional Assessment of Interoceptive Awareness (MAIA, Mehling et al., 2012) and the Body Perception Questionnaire in its short form (BPQ-sf, Cabrera, 2018).

The MAIA scale assesses both adaptive and maladaptive aspects of interoceptive sensitivity, while the BPQ focuses on this variable from a biological perspective of bodily sensations (Pearson & Pfeifer, 2020). Both measures capture interoceptive sensitivity from different approaches. In Chile, only one study has analyzed the psychometric properties of the MAIA, obtaining favorable results (Valenzuela-Moguillansky & Reyes-Reyes, 2015). However, despite its relevance, a psychometric analysis of the BPQ-sf in Chile has not yet been conducted.

The BPQ (Body Perception Questionnaire; Porges, 1993) consists of 122 items addressing the following dimensions: a) body awareness; b) autonomic nervous system reactivity; c) response to cognitive-emotional-somatic stress; d) styles of response to cognitive-emotional-somatic stress; and e) health history. As noted by Cabrera et al. (2018), the dimensions most frequently used in research are body awareness and autonomic reactivity. They also argue that there are already questionnaires with strong psychometric properties that address the remaining dimensions, which led the research group to develop a short version, the BPQ-sf.

To analyze the psychometric properties, Cabrera et al. (2018) used data collected both online and via pencil-and-paper formats from university students residing in Spain and the United States. The resulting analysis concluded with three factors. The first factor corresponds to the body awareness dimension. The items corresponding to the original autonomic nervous system reactivity dimension were grouped into two new factors: supra-diaphragmatic reactivity and sub-diaphragmatic reactivity. These results align with the polyvagal theory proposed by Porges (2009), in which the body awareness factor is related to the convergent afferent pathways. Meanwhile, the supra- and sub-diaphragmatic factors are associated with the ventral vagal complex and dorsal vagal complex nerves, respectively.

Since the creation of this short version, various adaptations have been made to different languages and cultures. In the Chinese-language adaptation (Wang et al., 2020), a three-factor structure was found with acceptable fit indices (CFI = .90, TLI = .90, RMSEA = .06, 90% CI [.055, .059]) and factor loadings ranging from .34 to .82. Meanwhile, the Italian-language adaptation obtained a three-factor structure with acceptable fit indices ($\chi^2[817] = 1496.322$, $p < .001$; CFI = .942, TLI = .933, RMSEA = .035 [.032, .038]). However, the composition of the items differed from the factorial structure proposed by Cabrera et al. (2018). In the Italian adaptation, the first factor included items from the body awareness scale. The second factor was composed of items from the sub-diaphragmatic reactivity scale, along with some items from the body awareness scale, particularly those related to bloating and digestive issues. Finally, the third factor consisted of items from the supra-diaphragmatic reactivity scale (Poli et al., 2021).

In both the psychometric analysis conducted by Cabrera et al. (2018) and the analyses conducted in the Chinese (Wang et al., 2020) and Italian (Poli et al., 2021) adaptations, it is noted that the generation and/or validation of scales for measuring interoceptive sensitivity has allowed for deeper investigations into the understanding of internal bodily changes and their impact on specific emotions and feelings. In this regard, research on interoceptive sensitivity is not only growing, but it has also become an increasingly relevant area of study.

Interoception is considered fundamental to processes such as emotion recognition and emotional regulation (Kever et al., 2015; Barrett & Simmons, 2015), especially because various authors suggest that overlapping cortical structures (such as the insula and anterior cingulate cortex) are responsible for processing interoceptive and emotional information (Craig, 2008; Ernst et al., 2014). In this sense, instruments like the BPQ-sf enable research that deepens our understanding of the relationship between the body's internal signals and emotional and cognitive experiences. Alterations in interoception have also been observed to be associated with the symptomatic expression of developmental, neurodegenerative, and neurological disorders, such as autism (Williams et al., 2023), attention deficit hyperactivity disorder (ADHD), and eating disorders (Kaisari et al., 2018). Moreover, studies have linked difficulties in interoceptive perception with the pathophysiology of anxiety and depression (Barrett et al., 2016; Martorell, 2020).

In this context, it is important to highlight that the BPQ-sf not only allows for the evaluation of interoceptive sensitivity levels but also contributes to a better understanding of the relationship between internal bodily states and other cognitive, emotional, and social processes, which are crucial for mental health and general well-being.

Given its relevance, the present study aimed to analyze the psychometric properties of the Body Perception Questionnaire in its short form (BPQ-sf). This analysis expands the range of instruments that could be used in clinical and research settings where the evaluation of body perception and interoceptive sensitivity is of interest.

2. Method

2.1 Design

The present research was part of a project on interoception and post-pandemic physical and mental health. The project employed a predictive cross-sectional design (Ato et al., 2013), in which a sample size of at least 115 people was calculated, considering a medium effect size $f^2(.15)$, a significance level of .05, and a power of .95. This statistical power was set due to the limitations of online forms and the low response rate. Additionally, since one of the project's objectives was to analyze the psychometric properties of the BPQ-sf, it was decided to exceed the minimum number suggested by the G*Power v. 3.1.9.7 software (Faul et al., 2009). In this regard, Kline's (2015) recommendation of obtaining a minimum of 200 participants for such statistical analysis was followed.

2.2 Participants

The participants were recruited using the snowball sampling method, through social media and email. The final sample consisted of 276 adults living in Chile, aged between 18 and 77 years, with a mean age of 32.9 years (SD = 11.8 years). Similar to the studies by Cabrera et al. (2018) and Campos et al. (2021), the sample was predominantly female (70.7%). Additionally, 53.3% had a university-level education.

As inclusion criteria, participants had to be 18 years or older, reside in Chile, and be able to respond to the questionnaire in a digital format. Participants who did not reside in Chile were excluded.

2.3 Ethics Considerations

This study was approved by the Institutional Ethics Committee of the Universidad del Desarrollo and was formulated in accordance with the Declaration of Helsinki. All participants signed informed consent before completing the online questionnaire, which emphasized the voluntary, anonymous, and confidential nature of their participation.

2.4 Instruments and Procedures

2.4.1 Body Perception Questionnaire short form (BPQ-sf)

The present questionnaire was created by Porges (1993; Kolacz et al., 2018) and adapted into its short form by Cabrera and colleagues (2018). The short form consists of 46 questions with responses on a 5-point Likert scale ranging from never (1) to always (5). It includes two main dimensions: Body Awareness (26 items), which can be used as a self-report measure of interoceptive attention (Kolacz et al., 2018; Wang et al., 2020), and Autonomic Reactivity (20 items), which assesses the responses of autonomically innervated organs (Kolacz et al., 2018). The validation of its original short version suggested a two-factor structure for autonomic reactivity, differentiating responses from organs above the diaphragm (supradiaphragmatic reactivity, 15 items) and responses from gastrointestinal organs below the diaphragm (subdiaphragmatic reactivity, 6 items). Thus, the instrument comprises 3 factors with acceptable fit indices for both the online format (RMSEA = .035 [90% CI: .032, .038], CFI = .98, TLI = .98) and the pencil-and-paper format (RMSEA = .029 [90% CI: .023, .034], CFI = .94, TLI = .94), with a significant correlation between the supra and subdiaphragmatic factors in both samples (r online sample = .78; r pencil-and-paper sample = .65). This correlation may be related to the cross-loading of item 41 on both factors. Internal consistency analyses were conducted using the categorical omega coefficient, with results ranging from .77 to .96 for the online sample and from .78 to .92 for the pencil-and-paper sample. Additionally, the reliability analysis using the test-retest method showed acceptable results (body awareness = .99; supradiaphragmatic reactivity = .97; subdiaphragmatic reactivity = .96).

This research was conducted through an online survey using a Google Forms, between September and November 2021, distributed via social media and email. First, Cabrera et al. (2018) performed a translation and back-translation to adapt the instrument. For this study, a semantic review was conducted by four expert judges from different fields related to the subject area. Following this, an analysis of the frequency of technical terms used in various items of the questionnaire in Spanish was carried out, to ensure that these terms were commonly used in Chile. Both instances revealed no issues or concerns with the questionnaire's semantics.

3. Data Analysis

The data were analyzed using R software v. 4.0.0 (R Core Team, 2021), utilizing the tidyverse (Wickham et al., 2019) and data.table (Dowle & Srinivasan, 2021) packages for data manipulation and cleaning. The jmv package (Selker et al., 2021) was used for descriptive analyses, and the psych package (Revelle, 2021) along with MPlus software v. 6.11 (Muthén & Muthén, 2007) were used for psychometric property analyses.

A confirmatory factor analysis (CFA) was conducted to evaluate the factorial structure of the instrument in the Chilean population. First, the original factorial structure proposed by Porges (1993) and the modified structure by Cabrera et al. (2018) were tested. The full scoring system was considered, as per the manual by Kolacz et al. (2018), which has greater sensitivity to individual differences compared to binary scoring. To confirm this factorial structure, the Weighted Least Squares Mean and Variance (WLSMV) estimator was used, since the BPQ-sf has 5 response options that were not normally distributed (Mardia's skewness $< .001$; Mardia's kurtosis $< .001$). Fit indices considered were the χ^2 test, the χ^2/df ratio (where values less than 2 indicate good fit), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI), with values above .90 considered acceptable and ideally above .95. The Root Mean Square Error of Approximation (RMSEA) was considered moderate for values below .08 and ideal for values below .05 (Byrne, 2012; Hooper et al., 2008; Hu & Bentler, 1999). Similarly, .30 was considered the minimum threshold for factor loadings, as suggested by Furr (2021) and Hu and Bentler (1999). Additionally, a comparison between the three proposed models was made using a chi-square difference test for the WLSMV estimator, employing the DIFFTEST function in MPlus (Muthén & Muthén, 2007).

Finally, internal consistency was analyzed using Cronbach's alpha and McDonald's omega coefficients. Item-scale correlation matrices were also added to identify the change in coefficients if any items were removed.

4. Results

In the first step, the structure proposed by Porges (1993) was modeled, which includes the dimensions of body awareness and autonomic reactivity (Figure 1). In the linguistic review, it was identified that items 27 (I have trouble coordinating my breathing when eating) and 33 (When I eat, I have trouble coordinating my breathing with swallowing, chewing, or sipping) were phrased similarly, prompting a review of the modification indices. It was observed that the covariance between these two items yielded a modification index of 48.195. For this reason, in Porges' model and subsequent models, the errors of both items were covaried. Porges' bifactorial model obtained adequate fit indices (Table 1). As shown in Figure 1, the factor loadings for the body awareness dimension ranged from .62 to .87, and those for the autonomic reactivity dimension ranged from .45 to .77, all of which were significant ($p < .001$) and above the minimum threshold (Furr, 2021; Hu & Bentler, 1999).

Next, the three-factor model (body awareness, supradiaphragmatic reactivity, and subdiaphragmatic reactivity) proposed by Cabrera et al. (2018) was analyzed, in which item 41 (I feel like I'm going to vomit) is suggested to have a cross-loading on both the supradiaphragmatic reactivity factor and the subdiaphragmatic reactivity factor (.45 and .32, respectively; see Cabrera et al., 2018). The results of the three-factor model also showed adequate fit indices (Table 1), with factor loadings ranging from .62 to .87 for body awareness, from .23 to .78 for supradiaphragmatic reactivity, and from .47 to .86 for subdiaphragmatic reactivity (Figure 2). Upon reviewing the item with a factor loading of .23, it was observed that it was item 41, the same item that Cabrera et al. (2018) modeled with a cross-loading. Since it presented a loading below the recommended threshold of .30 (Furr, 2021; Hu & Bentler, 1999) on the supradiaphragmatic reactivity dimension, but an adequate loading (.47) on the subdiaphragmatic reactivity factor, it was decided to recreate the same three-factor model without the cross-loading.

When testing the new three-factor model without the cross-loading, the fit indices were also adequate (Table 1). Additionally, the factor loadings (Figure 3) for the three dimensions exceeded the .30 threshold, with loadings ranging from .62 to .87 for the body awareness dimension, from .48 to .78 for supradiaphragmatic reactivity, and from .57 to .85 for subdiaphragmatic reactivity. In this model, item 41 achieved a factor loading of .69, satisfactorily surpassing the minimum threshold. Subsequently, a model comparison was conducted using the chi-square difference test for WLSMV and WLSM estimators (Muthén & Muthén, 2007), between the structural model of Porges (1993), the model of Cabrera et al. (2018), and the current three-factor model.

Figure 1

Porges' Structural Model (1993)

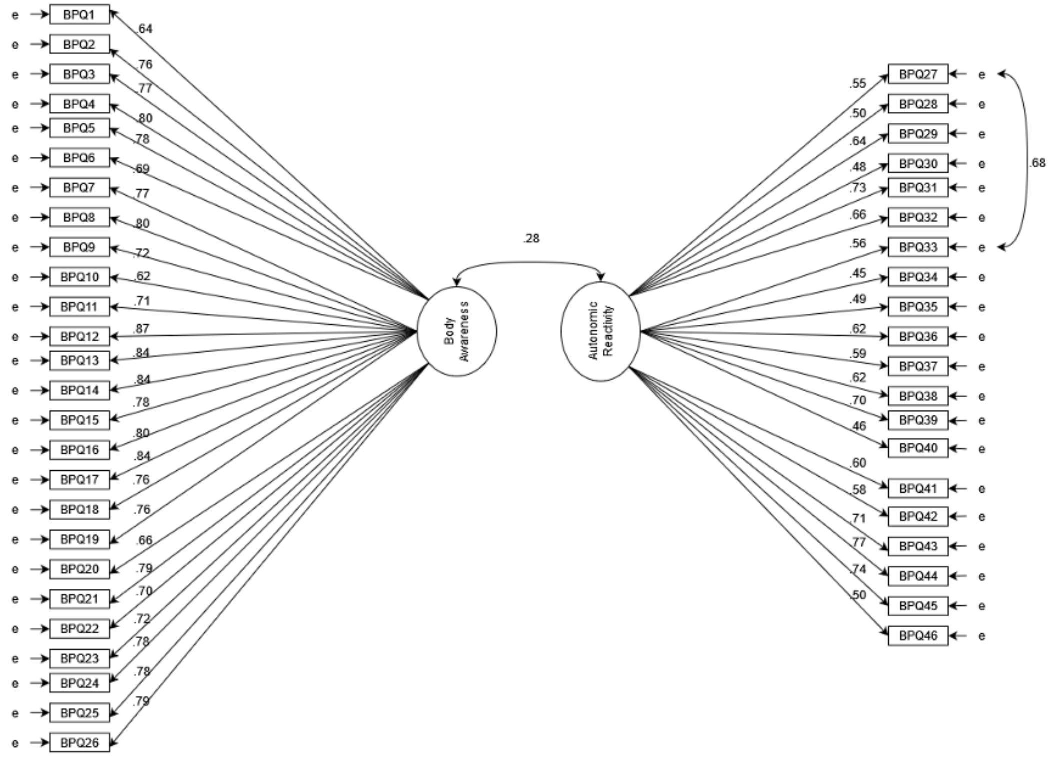

Figure 2

Current Structural Model

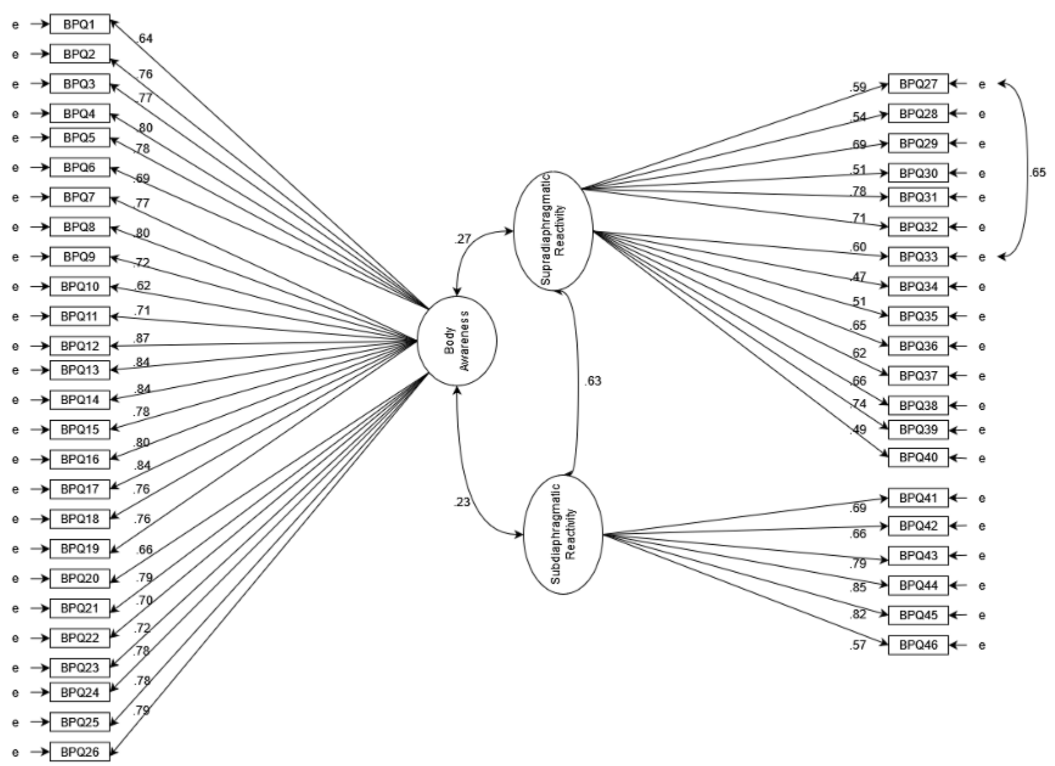

Figure 3

Cabrera's et al. Structural Model (2018)

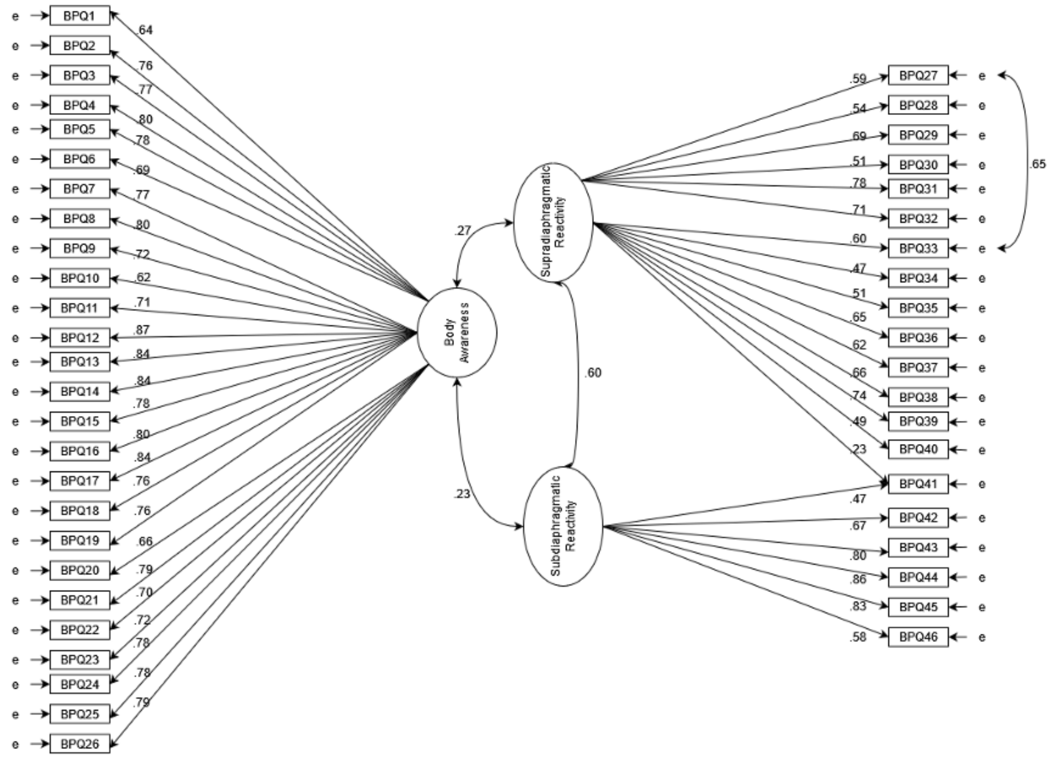

Table 1

Models' Fit Indices

	χ^2	*df*	χ^2/df	**CFI**	**TLI**	**RMSEA**	**CI RMSEA 95%**	
							LL	**UL**
Cabrera's et al.	1562.15***	984	1.59	.96	.96	.046	.041	.050
Current Model	1568.90***	985	1.59	.96	.96	.046	.042	.051
Porges' Model	1697.83***	987	1.72	.95	.95	.051	.047	.055
Second Order Model	1568.90***	985	1.59	.96	.96	.046	.042	.051

Note. CFI = Comparative Fit Index, TLI = Tucker-Lewis Index, RMSEA = Root Mean Square Error of Approximation, CI = Confidence Interval, LL = Lower Limit, UL = Upper Limit, SRMR = Standardized Root Mean Square Residual.

With the three-factor model free of cross-loadings, a second-order factor model (autonomic reactivity) was tested, given that in Porges' original model, the structure had two factors, and from the second factor, the supra- and subdiaphragmatic dimensions were divided. The second-order factor model showed the same factor loadings as the current three-factor first-order model. For the body awareness dimension, loadings ranged from .62 to .87, from .48 to .78 for supradiaphragmatic reactivity, and from .57 to .85 for subdiaphragmatic reactivity (Figure 4). Adequate fit indices were observed, identical to those of the three-factor first-order structural model (Table 2), indicating that both structural models fit adequately.

A comparison was made between the models of Porges (1993), Cabrera et al. (2018), and the second-order factor model from the present study (Table 2). The second-order model was selected over the three-factor first-order model because both have the same fit indices. Using the chi-square difference test corrected for models estimated with WLSMV, it was observed that, at the chi-square level, the model by Cabrera et al. had a better fit ($p = .005$) than the second-order factor model. On the other hand, the currently presented model showed a significantly better fit ($p < .001$) than Porges' two-factor model.

Finally, an internal consistency analysis was conducted using Cronbach's alpha and McDonald's omega coefficients. For the body awareness factor, satisfactory

Figure 4

Second Order Structural Model

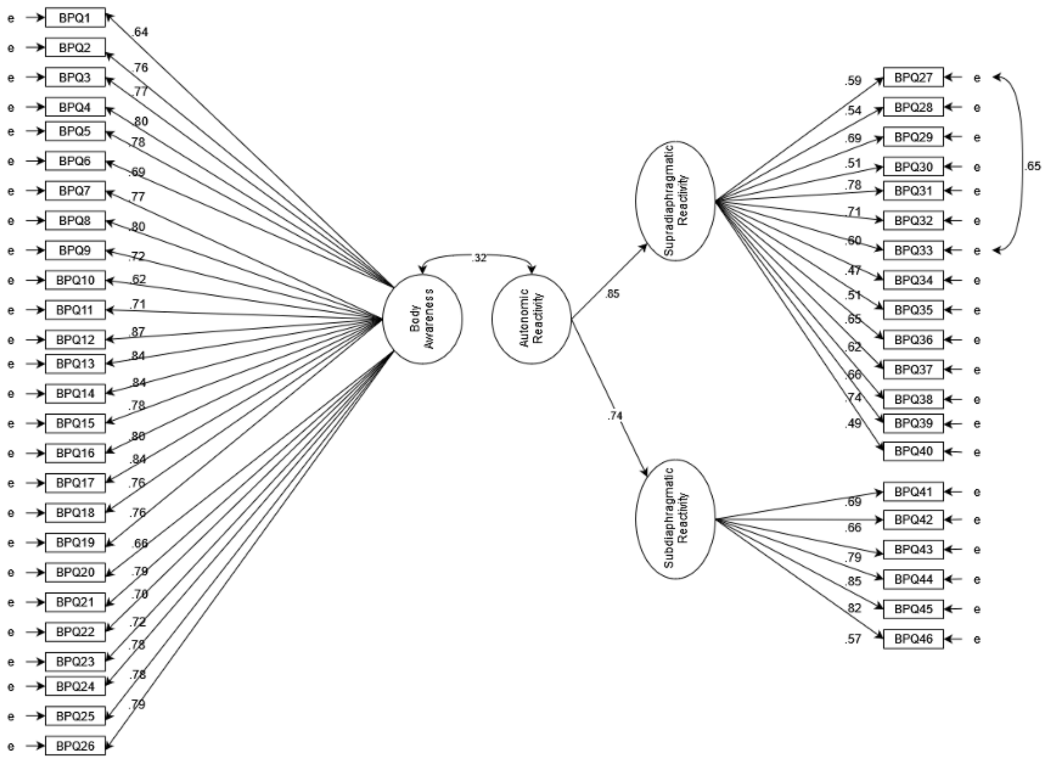

Table 2

Models' Comparisons

	χ^2	*df*	**Diff.** χ^2	**Diff.** *df*	*p*
Cabrera's et al. Model	1562.15	984			
Second Order Model	1568.90	985	7.895	1	.005
Porges' Model	1697.83	987	29.783	2	$< .001$

Note. Diff. χ^2 = Chi-square difference, Diff. *df* = Difference in degrees of freedom.

coefficients were obtained ($\alpha = .963$; $\omega = .964$). Likewise, for the autonomic reactivity factor, the coefficients were .880 for Cronbach's alpha and .882 for McDonald's omega. For the subdimensions of autonomic reactivity, an alpha coefficient of .848 and an omega of .852 were found for supradiaphragmatic reactivity, while for the subdiaphragmatic reactivity subdimension, an alpha of .825 and an omega of .829 were obtained. As shown in Table 3, the dimensions are consistent, and if any items were removed, the coefficients would decrease rather than increase.

5. Discussion

The objective of the present study was to evaluate the psychometric properties of the BPQ-sf in adults residing in Chile. The results suggest two equally adequate factorial structures at a statistical level. One structure is a first-order three-factor model, like that proposed by Cabrera et al. (2018) and in contrast to the structure of Porges (1993), which proposes only two dimensions. The second factorial structure considers a second-order dimension, resulting from two of the dimensions in the previous model (supra- and sub-diaphragmatic reactivity), obtaining a dimension corresponding to the original autonomic reactivity dimension from Porges (1993).

In both cases, items 1 to 26 form the body awareness dimension, as in previous reports on the BPQ-sf (Cabrera et al., 2018; Cerritelli et al., 2021; Porges, 1993). On the other hand, items 27 to 40 make up the supra-diaphragmatic reactivity dimension, and items 41 to 46 constitute the subdiaphragmatic reactivity dimension, which later forms the second-order autonomic reactivity dimension.

The result of the second-order factor structural model obtained the same fit indices as the first-order three-factor model. This is due to the fact that the number of estimated parameters is the same as when placing the three

Table 3

Item-Dimension Correlations

Body Awareness			Autonomic Reactivity		
Item	α	ω	**Item**	α	ω
bpq1	.963	.963	bpq27	.875	.876
bpq2	.961	.962	bpq28	.879	.879
bpq3	.962	.962	bpq29	.872	.874
bpq4	.961	.962	bpq30	.878	.880
bpq5	.961	.962	bpq31	.869	.871
bpq6	.962	.963	bpq32	.872	.874
bpq7	.961	.962	bpq33	.875	.876
bpq8	.961	.962	bpq34	.878	.880
bpq9	.962	.962	bpq35	.876	.877
bpq10	.963	.963	bpq36	.872	.874
bpq11	.962	.962	bpq37	.876	.877
bpq12	.961	.961	bpq38	.875	.877
bpq13	.961	.962	bpq39	.870	.871
bpq14	.961	.962	bpq40	.878	.880
bpq15	.961	.962	bpq41	.874	.876
bpq16	.961	.962	bpq42	.875	.877
bpq17	.961	.962	bpq43	.873	.875
bpq18	.961	.962	bpq44	.871	.873
bpq19	.961	.962	bpq45	.873	.875
bpq20	.962	.963	bpq46	.876	.879
bpq21	.961	.962			
bpq22	.962	.963			
bpq23	.962	.962			
bpq24	.961	.962			
bpq25	.961	.962			
bpq26	.961	.962			
Supradiaphragmatic Reactivity			**Subdiaphragmatic Reactivity**		
Item	α	ω	**Item**	α	ω
bpq27	.837	.840	bpq41	.815	.823
bpq28	.845	.847	bpq42	.806	.812
bpq29	.835	.840	bpq43	.795	.801
bpq30	.844	.847	bpq44	.763	.766
bpq31	.826	.832	bpq45	.772	.779
bpq32	.832	.836	bpq46	.821	.826
bpq33	.837	.838			
bpq34	.845	.849			
bpq35	.844	.847			
bpq36	.837	.841			
bpq37	.842	.846			
bpq38	.839	.843			
bpq39	.830	.835			
bpq40	.846	.850			

correlated factors, resulting in the same fit indices, and therefore, the models cannot be compared. As mentioned by Tomás et al. (2000) and Herrero (2010), when a second-order model and a first-order model show similar fit indices, it indicates that both models capture the studied phenomenon equally, and the decision to use one model over the other depends on theoretical and practical use.

Regarding the obtained first-order three-factor model, it is similar to the model by Cabrera et al. (2018). However, Cabrera et al. maintain a cross-loading on item 41, despite both of their confirmatory factor analyses showing loadings below the recommended threshold of .30 (.26 and .29) (Furr, 2021; Hu & Bentler, 1999). This makes their model have a better chi-square fit due to the extra estimated parameter but results in a more complex structure to interpret.

On the other hand, the second proposed factorial structure, modeling a second-order factor (i.e., autonomic reactivity), presents the same fit indices as the first-order three-factor model. This leads to a situation similar to the previously mentioned one, where a slightly higher chi-square is observed compared to the model proposed by Cabrera et al. (2018), but maintaining the simplicity of a model without cross-loadings. When examining other fit indices (RMSEA, CFI, and TLI) between Cabrera et al.'s model (2018) and the currently tested models (i.e., first-order and second-order), the same values are observed, showing that the only difference is the chi-square, which is due to the extra parameter.

According to Bollen (2002) and Kahn (2006), a good CFA model simplifies complex relationships between variables without losing too much information about these relationships. Therefore, the model proposed in this work, which places item 41 as part of the sub-diaphragmatic reactivity subdimension and complies with the criteria outlined by Bollen (2002) and Kahn (2006), would be the model that ensures greater simplicity when reporting and interpreting BPQ-sf results.

Additionally, Bollen (2002) indicates that structural models should aim for factorial simplicity (i.e., without cross-factor loadings), which is met by the model proposed in this study. This suggests that the second-order factor model (autonomic reactivity), composed of supra- and sub-diaphragmatic reactivity and body awareness dimensions, better represents Porges' theoretical model (2009) and provides greater simplicity in future instrument interpretation.

Furthermore, Cabrera et al. (2018), Dale et al. (2022), and Kolacz et al. (2020) suggest that the BPQ-sf can be used separately, employing the body awareness and autonomic reactivity dimensions independently. This supports the second-order factor proposed in this study, as Dale et al. (2022) and Kolacz et al. (2020) have already used the instrument separately with adequate internal consistency.

That said, it is suggested that the structural model that best represents Porges' theoretical model (2009) is the one obtained in this study. This would help researchers and clinicians obtain results that are easier to interpret, both statistically and practically. Likewise, in a future BPQ-sf standardization study, having a simpler factorial structure is crucial for obtaining population norms. Similarly, the need for simple structures is important for the easy clinical application of a measurement instrument.

Clinical application is a key point in the theory and construction of the BPQ-sf, as Porges (1993, 2009) designed the instrument to be used in therapy for various affective psychopathologies and neurological problems. This is due to the fact that identifying interoceptive deficits, as addressed by the BPQ-sf, is recognized as important in the expression and maintenance of psychiatric and neurological disorders (Tsakiris & Critchley, 2016).

In this regard, globally, mental health disorders have become increasingly prominent, especially in the post-pandemic context. Among American countries, mental health disorders account for one-third of the total years lived with disability and one-fifth of the years of life adjusted by disability (WHO, 2017). In Chile, the most recent National Health Survey (2016-2017) estimated that around 15.8% of the national population experienced depressive symptoms. Furthermore, more than one million Chileans suffer from anxiety (WHO, 2017). These statistics saw a considerable increase during the pandemic, with an increase of 27.6% and 25% in severe depression and anxiety, respectively, compared to previous years (IHME, 2021).

Given this context, the relevance of this study's results is emphasized, as the proposed questionnaire is a valuable tool for better understanding the connection between interoceptive sensitivity and mental health in Chile. One of the challenges currently faced is the scarcity of instruments that address interoception, so the results of this study are relevant as they demonstrate that, in the Chilean context, the BPQ-sf is an instrument that measures interoceptive sensitivity under a second-order factorial model consistent with the assumptions of polyvagal theory (Porges, 2009). This also serves as evidence to position it among instruments that measure interoceptive sensitivity more specifically (Calleja & Mason, 2020).

Regarding the internal consistency of the factors, satisfactory Cronbach's alpha and McDonald's omega coefficients were obtained, with alpha values of .963 and omega of .964 for the body awareness factor. The second-order autonomic reactivity factor obtained alpha coefficients of .880 and omega of .882, while the supra- and sub-diaphragmatic dimensions obtained alpha coefficients of .848 and .825 and omega of .852 and .829, respectively. Similar values were found in studies by Cabrera et al. (2018) and Campos et al. (2021) regarding the body awareness, supra-, and sub-diaphragmatic reactivity factors. This demonstrates the adequate internal consistency of the BPQ-sf factors for use in both research and clinical settings. Additionally, it is important to note that item 27, "I have trouble coordinating my breathing when eating", and item 33, "When I eat, I have trouble coordinating my breathing with swallowing, chewing, or sipping", have a covariance of .65. Upon analyzing these items, their similarity in the action they describe is evident, which may explain their correlation due to how the items are worded. Thus, participants' response to item 27 may influence their response to item 33, as it could be interpreted as a confirmation question.

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