

Factor structure and reliability of the Personality Belief Questionnaire in Argentina

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Summary

Aim: To examine the validity and reliability of the Personality Belief Questionnaire (PBO) in Argentina.

Methods: A forward translation of PBO from English to Spanish was carried out by two independent bilingual translators. An expert committee subsequently compared the translations with the original PBO and a final version was produced by consensus. Then, internal structure and internal consistency of the Argentinean version of the PBO were evaluated, using a convenience sample of 402 individuals from a clinical (25%) and the general (75%) population of Cordoba, Argentina. To test the questionnaire's internal structure, a Procrustes rotation with target matrices and Tucker's congruence coefficients were used. Cronbach's alpha and confidence intervals were calculated to estimate internal consistency.

Results: Findings showed that seven of the nine PBO scales were replicable: avoidant, dependent, obsessive-compulsive, histrionic, paranoid, schizoid and schizotypal. Antisocial and narcissistic scales revealed little discrimination between them. A reliability analysis indicated acceptable to high internal consistency for all PBO scales, with Cronbach's alpha ranging from 0.75 for avoidant and antisocial to 0.90 for paranoid scales.

Discussion: The study supports the validity and reliability of the PBO in Argentina, making it a practical assessment tool for dysfunctional beliefs associated with personality disorders that can be applied both for clinical purposes and in research.

Conclusion: The psychometric properties of the PBO in Argentina are satisfactory. However, additional studies assessing its external validity are warranted.

dysfunctional beliefs, personality disorders, Personality Belief Questionnaire, validation

INTRODUCTION

Dysfunctional beliefs constitute cognitions that are distorted, inaccurate or irrational, and that influence how individuals usually perceive

themselves, others and the world [1]. According to the cognitive theory of personality disorders [2], dysfunctional beliefs are a central cognitive feature of a personality disorder (PD) and play a primary role in its etiology and maintenance. Consequently, they are a major focus in cognitive therapy of PD [3].

Drawing on clinical experience and theoretical considerations, Beck, Freeman and associates [4] published an extensive list of dysfunctional beliefs. They stated that each PD is characterized

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by a particular set of dysfunctional beliefs that underlie a patient's maladaptive behaviors and emotions. Using these sets of beliefs, Beck and Beck [5] developed the Personality Belief Questionnaire (PBQ) with the intent to assess dysfunctional beliefs associated with each PD, and to provide valuable information for differential diagnosis, cognitive case conceptualization and intervention target [3,6].

The original PBQ is a 126-question self-report measure that assesses dysfunctional beliefs theoretically corresponding to 9 out of 11 Axis II PDs of DSM-III-R: avoidant, dependent, histrionic, obsessive-compulsive, narcissistic, paranoid, passive-aggressive, schizoid and antisocial. Each scale contains 14 items reflecting dysfunctional beliefs typically endorsed by patients with a given type of PD. Items for borderline and schizotypal PDs were not included in the PBQ because these two disorders were not considered to be characterized by a unique set of dysfunctional beliefs [7]. Indeed, it was suggested that patients with a borderline PD endorse a mixture of beliefs associated with different PDs, while those with a schizotypal personality profile are best described by dysfunction in the process of thinking rather than by idiosyncratic content of their thoughts [4].

Although initially PBQ items did not tap beliefs central to borderline PD, a further study conducted by Butler et al. [8] showed that 14 PBQ items drawn from paranoid, dependent, histrionic and avoidant scales discriminated borderline patients from patients with other PDs. Thus, a composite scale was constructed based on a subset of PBQ items. A subsequent analysis in a separate sample demonstrated that patients diagnosed with borderline PD scored significantly higher on the borderline PBQ scale than on the remaining scales. Hereafter, the PBQ was operationalized by 126 items and 10 scales corresponding to ten PDs.

Since its development, the PBQ has been studied across different countries and populations. Results have repeatedly shown good internal consistency and test-retest reliability for PBQ scales in clinical [7,9,10] and non-clinical samples [11-13]. Additionally, findings from factor analysis have been fairly consistent and largely supported the intended structure of the PBQ in several studies. For example, Leite et al. [14]

found a nine-factor structure that corresponds to all PBQ scales. The only exception was the borderline scale, which was not recovered by the exploratory factor analysis. Similarly, Fournier et al. [10] found support for all PBQ scales through exploratory and confirmatory factor analyses, except for the borderline scale. The authors also found that beliefs associated with narcissistic and antisocial PDs collapsed into a single factor, as did beliefs associated with avoidant and dependent PDs, suggesting some degree of overlap within each of these disorders. Finally, Beck et al. [7] demonstrated that patients tend to score significantly higher on the PBQ scale that corresponds to their PD diagnoses than on other PBQ scales, and that the highest scores on each scale were generally observed in patients with a corresponding PD, supporting the criterion validity. These results were later replicated by Fournier et al. [10], confirming the validity and clinical utility of the PBQ.

In summary, empirical studies have demonstrated that the PBQ has sound psychometric properties and clinical validity, providing clinicians with a practical assessment tool for identifying relevant dysfunctional beliefs held by patients, which facilitates the conceptualization of the patient's cognitive profile and hence provides entry points for psychological treatment. Despite its considerable clinical utility, to our best knowledge no study has yet systematically investigated the validity of PBQ in Argentina. Therefore, the purpose of the current study was to validate the PBQ by examining its factor structure and internal consistency.

METHODS

Participants

A convenience sample of 402 individuals from the general ($n = 300$) and the clinical ($n = 102$) population was selected for the study. The mean age of the participants was 23.40 years ($SD = 4.38$), ranging from 18 to 51 years. Females accounted for 71.7% of the total sample. The general population subsample was recruited by two well-trained surveyors who administered the PBQ to undergraduates and workers. Inclusion criteria were: 18 years of age or old-

er and not currently undergoing psychological treatment. The clinical subsample was recruited from among patients currently receiving psychological therapy. Of the patient sample, 24% had been diagnosed with depression, 14% with generalized anxiety, 16% with panic disorder, 12% with social anxiety and 30% with other disorders or mental health problems (chronic pain, marital problems, sexual dysfunction and family problems). All participants gave written consent before completing the PBQ. Anonymity and confidentiality were assured and participants were debriefed about the study's objective.

Measure

The Personality Belief Questionnaire [5] is a 126-item self-report measure designed to assess dysfunctional beliefs related to nine PDs: avoidant, dependent, paranoid, obsessive-compulsive, passive-aggressive, histrionic, schizoid, narcissistic and antisocial. Each scale comprises 14 items, and participants are asked to rate each statement on a 4-point Likert-type scale ranging from 0 ('I don't believe it at all') to 4 ('I believe it completely'). Borderline PD - related beliefs are assessed by 14 items belonging to other PBQ scales. All items are scored in the same direction; higher scores are indicative of a higher level of endorsement of the beliefs.

Procedure

PBQ items were first translated into Spanish with the authors' permission. A forward translation was carried out by two independent, well-qualified, bilingual translators: one native speaker of Spanish and the other native speaker of English. This approach generated two Argentinian versions of the PBQ. A committee composed of a psychometrician (member of the research team) and two bilingual expert cognitive psychologists who were familiar with the scale, compared the two translations with the original PBQ regarding their format, wording, grammatical structure of the sentences and semantic equivalence [15]. Any ambiguities and discrepancies concerning meaning and colloquialisms in the instructions, items and the response for-

mat between the two translations and between each translation and the original PBQ were discussed; decisions were made by consensus to derive a pre-final version of PBQ. To conclude the validation processes of PBQ translation, a pilot test ($n = 15$) was performed in order to evaluate the instructions, response format and questionnaire items for clarity. Afterwards, a larger sample of individuals completed the Argentinian version to test its psychometric properties. All subjects from the pilot and the final sample were clearly informed about the purpose of the study and provided written informed consent before completing the PBQ.

Data analysis

Data analysis was performed using FACTOR 10.3.01 program [16]. First, a preliminary analysis was conducted to examine assumptions for linearity, normality and multicollinearity [17]. Next, PBQ factor structure was analyzed using a Procrustes rotation. This method allows to determine how well a factor loadings matrix approximates to a 'target' matrix that is constructed in advance. It is performed to rotate factors and minimize the sums of squares of deviation from the target matrix [18]. This approach has outperformed conventional CFA models in testing the internal structure of personality measures [19]. To assess the extent to which the factor structure of real data matches the hypothesized target matrix, Tucker's congruence coefficient was calculated [20]. Following suggestions made by McCrae et al [21], factor-level and item-level between the matrices were examined. Congruence coefficients at each level are often interpreted as good when they exceed 0.95 and fair when they are between 0.85 and 0.94. [22]. Finally, Cronbach's alpha and its confidence intervals were calculated to evaluate the internal consistency of PBQ scales.

RESULTS

Pilot study

Fifteen people were invited to complete the translated version of the PBQ and mark those items that were unclear or incomprehensible, as

well as any other aspect of the scale they deemed relevant. Once this was completed, a focus group was set up to enable individuals to share their comments concerning the scale items, response format, instructions and extension. The groups reported no difficulty in understanding and had no negative comments about the content of the scale.

PRELIMINARY ANALYSIS

Univariate normality was assessed using a standardized skewness index [23]. Most of the items showed elevated skewness (SSI >0.5). In addition, Mardia's coefficient was high (>0.70), indicating a significant deviation from multivariate normality of data [24]. Thus, a polychoric correlation matrix was used for model estimation. A multicollinearity analysis yielded tolerance values higher than 0.10 and variance inflation factor (VIF) values lower than 0.10, suggesting no problem of multicollinearity between items [25].

INTERNAL STRUCTURE

We used three fully specified target matrices (TM) to test the internal structure of the PBQ. The first target matrix (TM1) hypothesized that all PBQ items load in the intended factor and have no secondary loadings. Therefore, item loadings were fixed to 1 in a single factor and their loading on the other factors were fixed to 0. Such model assumes that dysfunctional beliefs are differentially and exclusively explained by specific hypothesized factors. Items from PBQ borderline scale were not assumed to load on a single and differentiated factor, as beliefs endorsed by patients with borderline PD are non-specific (i.e. they overlap with those from a wide variety of PDs) [7]. Moreover, although Butler et al. [8] found that some PBQ items discriminated patients with borderline PD from patients with other PDs, factor analytic studies failed to identify a specific factor underlying borderline PD-

related beliefs [10,14]. Therefore, we did not expect that beliefs associated with borderline PD would correspond to any specific factor. The second target matrix (TM2) consisted of a loading matrix in which PBQ items' loadings were set to 0.80 in the expected factor and secondary loadings on the remaining factors were set to 0.10. In the third target matrix (TM3) we made more allowances by increasing the values of secondary factor loadings to 0.20. There are statistical reasons for the proposed loading pattern matrix in TM2 and TM3. As noted by Goldberg and Velicer [26], 'pure' or unidimensional items rarely occur in practice as most items have minor or even substantial cross-loading. More importantly, these cross-loadings in personality-related inventories may not reflect measurement problems but rather relevant aspects of personality [27]. Despite some authors reasonably arguing that it is quite difficult to specify the full range of secondary loadings on a prior basis [19], the rationale for the specified primary and secondary factor loadings values in the target matrix derives from empirical findings which showed that dysfunctional beliefs associated with a certain PD are highly endorsed by patients with corresponding PD, but they are *also* held, to a lesser extent, by patients with another form of PD [7,28]. Accordingly, we expect that each PBQ item would have salient factor loadings (0.80) on the stipulated latent factor and minor (0.10 or 0.20) but non-zero cross-loadings on the other factors.

Table 1 presents congruence coefficients for the Procrustes-rotated factor structure. Results showed higher congruence coefficients between the rotated factor matrix and the TM3, with values that exceed the benchmark of 0.85 in most PBQ scales, with the exception of antisocial and narcissistic scales. Inspection of the structure matrix¹ revealed that most items theoretically corresponding to the narcissistic scale also have salient factor loadings (>0.40) in the antisocial scale and the other way around, suggesting little discrimination between these scales. Additionally, item congruence coefficients were generally acceptable for eight of the nine PBQ scales.

¹ A complete structure matrix is available from the first author upon request.

Table 1. Factor and item congruence coefficients for PBQ following completely specified Procrustes rotation to target matrices

	Congruence coefficient by factor			Mean (range) congruence coefficient by item		
	TM1	TM2	TM3	TM1	TM2	TM3
PBQ Avoidant	0.80	0.72	0.85	0.83 (0.63–0.89)	0.76 (0.45 – 0.88)	0.87 (0.65–0.94)
PBQ Dependent	0.89	0.86	0.92	0.86 (0.67–0.96)	0.81 (0.54–0.96)	0.90 (0.71–0.98)
PBQ Passive–aggressive	0.88	0.85	0.92	0.88 (0.74–0.95)	0.82 (0.61–0.94)	0.91 (0.79–0.97)
PBQ Obsessive–compulsive	0.93	0.92	0.95	0.90 (0.77 – 0.98)	0.87 (0.68–0.98)	0.93 (0.82–0.99)
PBQ Antisocial	0.78	0.68	0.81	0.80 (0.52–0.89)	0.70 (0.28–0.83)	0.84 (0.61–0.95)
PBQ Narcissistic	0.76	0.65	0.79	0.81 (0.62–0.95)	0.71 (0.37–0.94)	0.85 (0.64–0.98)
PBQ Histrionic	0.82	0.74	0.87	0.82 (0.76–0.91)	0.74 (0.64–0.86)	0.86 (0.82–0.92)
PBQ Schizoid	0.86	0.81	0.89	0.87 (0.72–0.93)	0.80 (0.57–0.91)	0.89 (0.74–0.96)
PBQ Paranoid	0.91	0.89	0.94	0.91 (0.83–0.96)	0.89 (0.76–0.95)	0.94 (0.85–0.98)

Note: TM 1: items loadings are fixed to 1 in the expected factor and cross-loadings are fixed to 0; TM 2: items loadings are fixed to .80 in the expected factor and secondary factor loadings are fixed to .10; TM 3: items loadings are fixed to .80 in the expected factor and secondary factor loadings are fixed to .20

Correlations between PBQ scales were all positive and moderate to high in magnitude, ranging from 0.27 for schizoid and avoidant to 0.65 for narcissistic and antisocial scales; median

inter-correlation was 0.46. The only exception was correlation between dependent and schizoid scales, which was not statistically significant (Table 2).

Table 2. Correlations between PBQ scales

	M	SD	1	2	3	4	5	6	7	8	9
1. Avoidant	12.73	7.02	–								
2. Dependent	13.72	8.61	0.54**	–							
3. Passive–aggressive	24.41	9.03	0.46**	0.34**	–						
4. Obsessive–compulsive	22.61	10.11	0.43**	0.41**	0.43**	–					
5. Antisocial	13.37	7.14	0.44**	0.28**	0.48**	0.46**	–				
6. Narcissistic	11.37	7.41	0.42**	0.33**	0.42**	0.47**	0.65**	–			
7. Histrionic	14.51	7.66	0.51**	0.49**	0.50**	0.48**	0.57**	0.64**	–		
8. Schizoid	19.95	8.37	0.27**	0.08	0.43**	0.41**	0.55**	0.51**	0.38**	–	
9. Paranoid	11.72	9.53	0.46**	0.33**	0.39**	0.42**	0.59**	0.59**	0.57**	0.54**	–

**p < 0.01 (two-tailed)

RELIABILITY

Cronbach's alpha was calculated to examine reliability. It showed acceptable to high internal consistency for all PBQ scales: avoidant $\alpha = 0.75$, 95% CI (0.71, 0.79); dependent $\alpha = 0.81$, 95% CI (0.77, 0.84); passive–aggressive $\alpha = 0.79$,

95% CI (0.76, 0.82); narcissistic $\alpha = 0.79$, 95% CI (0.75, 0.83); obsessive–compulsive $\alpha = 0.87$, 95% CI (0.85, 0.89); antisocial $\alpha = 0.75$, 95% CI (0.71, 0.79); histrionic $\alpha = 0.81$, 95% CI (0.77, 0.84); schizoid $\alpha = 0.80$, 95% CI (0.77, 0.83); and paranoid $\alpha = 0.90$, 95% CI (0.88, 0.92).

DISCUSSION

According to a cognitive view of personality disorder, a key feature of pathological personality functioning are dysfunctional beliefs about the self, others and the world [10]. The PBQ has been developed to capture the cognitive component of personality pathology, and currently is one of the most comprehensive and psychometrically well-established measures [3,29]. The present study added to previous research by examining the psychometric validity of its Argentinian version.

Internal structure analysis largely supported the factor structure of the PBQ. Specifically, factor congruence coefficients showed that seven of the nine PBQ scales were replicable. Antisocial and narcissistic scales were complex and exhibited little discrimination between them. This finding has also been reported previously [10,30], which poses some questions as to the distinctiveness of dysfunctional beliefs in antisocial and narcissistic PDs, as proposed by the cognitive theory. A study conducted by Gunderson and Ronningstam [31] on patients diagnosed with antisocial PD and patients with narcissistic PD revealed significant differences only in feelings of grandiosity (i.e. stronger in narcissistic PD), while there were no differences in interpersonal relations, reactivity, affect and mood states. The fact that there were more similarities than differences led us to question whether these categories should be kept separate. Kernberg [32] has suggested that antisocial PD may represent a subcategory of narcissistic PD. In light of such findings, further research aimed to thoroughly assess the discriminant validity between these constructs seems necessary.

Correlation analysis revealed moderate to strong correlations between almost all PBQ scales. While some researchers [33] pointed out that such intercorrelations between the scales may reflect a weakness in construct validity, others have argued that they may, in fact, reflect overlap in the nosological categories [34]. In this sense, pure PDs are extremely rare [35]. Instead, people often show traits, beliefs and strategies associated with different PDs [14]. Thus, it would seem feasible that such overlap may also be present in the cognitive features of PDs measured by PBQ scales. Nevertheless, ac-

ording to the theory of personality disorders, one would expect certain PDs to be either unrelated (e.g. avoidant and antisocial) or negatively related to each other (e.g. schizoid and dependent), contrary to all the positive correlations that we found in our study. Not surprisingly, a similar pattern of correlations between all PBQ scales was also found in many studies [9,28,36]. A possible reason accounting for the observed intercorrelations between PBQ scales may be the influence of a general distress factor [7].

Finally, indexes of internal consistency were satisfactory for all PBQ scales, ranging from 0.75 (avoidant and antisocial) to 0.90 (paranoid). All in all, the results support the validity and reliability of the PBQ in Argentina, providing a measure that may help to identify patients' beliefs, develop a cognitive conceptualization of their problems, offer more focused interventions and evaluate the effectiveness of such interventions.

The current study has a number of limitations that warrant mentioning. First, the study sample was primarily composed of individuals from the general population. Although PDs are not uncommon in community-based samples [37-38], the generalizability of the findings needs to be tested in larger clinical samples. Second, the way we analyzed PBQ factor structure – by comparing data observed after Procrustes rotation with target matrices and computing congruence coefficients – might be criticized, as such method does not provide statistical indexes to rigorously test model fit compared with CFA techniques. Although at first glance this may not be compelling for applied research, this approach has been repeatedly demonstrated as useful for testing the latent structure of personality-related measures, even though the measure did not fit particularly well in the CFA model [19,21]. Beyond this, it would be valuable for further research to replicate our findings.

Third, examining the internal structure is just one element of construct validity among several others [16]. Thus, future research should provide additional evidence of PBQ validity to a more substantial degree. In particular, it would be worthwhile to examine whether specific sets of dysfunctional beliefs are endorsed by patients with different PDs (for example, whether patients with avoidant PD score significant-

ly higher in the PBQ scale theoretically linked to their specific disorder, and so on). Addressing this issue will not only provide criterion-related validity, but also demonstrate the usefulness of PBQ as an aid measure for differential diagnosis of PDs, providing unique and valuable information, as many of the DSM-IV criteria for PDs are largely defined in behavioral and emotional terms [3].

In conclusion, despite its limitations, the present study provides evidence of validity and reliability of PBQ that supports its use in Argentina, making it a practical tool for the measurement of dysfunctional beliefs related to PDs that can be applied for professional and research purposes.

Acknowledgements

We are grateful to Aaron T. Beck for his substantial contributions to the translation of the PBQ.

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