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BRIEF COMMUNICATION

Factor structure of the Positive and Negative Syndrome Scale (PANSS) in Brazil: convergent validation of the Brazilian version

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Objectives: The Positive and Negative Syndrome Scale (PANSS) was developed to assess the symptoms of schizophrenia dimensionally. Although it is widely used in clinical trials in Brazil, it is not fully validated. The aim of this study is to assess the factor structure of the Brazilian PANSS and generate validation data for its current version.
Methods: A total of 292 patients diagnosed with schizophrenia were enrolled.
Results: Principal component analysis suggested a forced five-factor final model that accounted for 58.44% of the total variance, composed of negative, disorganization/cognition, excitement, positive, and depression/anxiety.
Conclusion: The Brazilian PANSS has a similar factor structure and internal consistency compared to versions in several other languages.

Keywords: Schizophrenia; factor analysis; psychometrics

Introduction

Schizophrenia is a heterogeneous disorder with a wide range of symptoms. This extensive clinical variability poses a challenge for establishing accurate diagnosis and assessing treatment response. The Positive and Negative Syndrome Scale (PANSS) is one of the most widely used instruments to evaluate psychotic symptoms. It is composed of 30 items divided into three subscales – Positive Symptoms, Negative Symptoms, and General Psychopathology – developed to assess the severity of symptoms and measure general psychopathology and drug-related changes.[1]

The PANSS has become an important instrument in schizophrenia research. It is one of the instruments most frequently used to assess efficacy of antipsychotic drugs, based on variation of its total score over time.[2] It has been validated in several languages and used in the majority of the studies of new drugs for schizophrenia.

The PANSS Study Group successfully validated a model composed by five dimensions.[3] This five-factor model was the most replicated model across studies in the last decade.[4]

For use in Brazil, PANSS was translated into Brazilian Portuguese by means of a standard cross-cultural adaptation process, and its inter-rater reliability was evaluated.[5,6] Although the PANSS has been widely used in the country, there have been no formal studies validating the scale.

The aim of this study was to investigate whether the factor structure of the Brazilian version of the PANSS converges with the original version and with versions validated for use in other countries/populations, and thus, to generate validity data for the scale in Brazil.

Methods

The sample comprised 292 individuals with a diagnosis of schizophrenia recruited from three different centers: 156 outpatients from the Schizophrenia Program (PROESQ) at Universidade Federal de São Paulo (UNIFESP), Brazil; 93 patients recently discharged from Hospital Luzia de Pinho Melo; and 43 first-episode patients from Santa Casa de Misericórdia de São Paulo, Brazil.

The inclusion criteria were a diagnosis of schizophrenia, as defined by the DSM-IV; age between 12 and 65 years; and absence of severe intellectual disability assessed by family report.

Overall, 191 participants (65.4% of the sample) were men, and the mean ± SD age was 33.64±11.07 years

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(range, 15-63 years). The mean age at illness onset was 23.10±7.43 years (range, 12-54 years) and mean duration of illness was 10.70±9.67 years (range, 0-43 years). All patients were receiving antipsychotics. The mean Global Assessment of Functioning score was 51.82±14.28, and most of the subjects were "moderately ill" (39.7%) according to the Clinical Global Impression Severity scale (3.57±1.12).

Modules A, B, C, D and E of the Structured Clinical Interview for DSM-IV Axis I Disorders were used for diagnosis and the PANSS was administered to assess psychopathology. Eight experienced psychiatrists were trained in both instruments through regular meetings and clinical supervision.

The factor structure of the PANSS was fitted in a six-factor model by principal component analysis (PCA), with eigenvalues higher than one being retained for factor extraction. Equamax rotation was used as in previous studies with PANSS.[7,8] Factor loadings of 0.5 or higher were considered in the interpretation of the factors. The internal consistency of each factor was determined by Cronbach's alpha.

Results

The mean ± SD (range) scores obtained were as follows: total PANSS, 64.30±17.37 (31-124); Positive subscale, 13.59±4.70 (7-33); Negative subscale, 18.49±6.33 (7-43); and General Psychopathology, 32.19±9.37 (16-76).

The PCA suggested six factors by the eigenvalue-one criterion. Five of these explained most of the variance and had acceptable internal consistency (> 0.70). The motor factor presented a Cronbach's alpha of 0.404 and explained a small proportion of the variance, suggesting factor inconsistence. Results of the rotated principal component matrix with five and six factor loadings accounted for 58.44 and 61.99% of the total variance, respectively (Table 1).

Regarding sampling adequacy, the Kaiser-Meyer-Olkin test value of 0.873 and the Bartlett test (chi-square = 4339.882, $p < 0.001$) indicated that the data were highly suitable for factor extraction.

The items "preoccupation" (G15) and "active social avoidance" (G16) were not related to any particular factor in the six-factor model. These items, together with "somatic concerns" (G1) and "lack of judgment and insight" (G12), had insignificant values in the five-factor model.

Discussion

We evaluated the factor structure of the Brazilian version of the PANSS and found a five-factor model similar to those previously described in the literature: positive, negative, disorganization/cognition, excitement and depression/anxiety.

Some previous studies found different number of factors. In the first factor structure study of the PANSS, Kay & Sevy[9] found four factors (negative, positive, excited, and depressive) in an American population. Most recent studies found five to seven factors.[10-12] Our model accounted for 58.44% of the total variance; this is very similar to previous results, which ranged from 53.4 to 59.83%.[7,10] As in other studies, the internal consistency we obtained was good (> 0.8) for the negative and disorganized factors, and acceptable (> 0.7) for the remaining factors.[10,13]

Regarding the composition of individual factors, the negative factor accounted for the greatest individual contribution to variance in the final model (27.97%).[7] The second most robust factor was the "disorganization/cognitive" (11.75%). The item "Mannerisms" appeared previously in the motor dimension of the six-factor model. However, this item fit better when it was moved to the disorganization/cognitive factor in the final five-factor forced model. Fresan et al.[7] highlighted this interface between cognitive and motor components, with the item "Mannerisms" having the highest loading in the Cognitive factor.

The Excitement factor was composed of the same items noted in the study performed by Wallwork et al.[4] of a consensus factor structure of the PANSS. The positive, depression/anxiety, and disorganization/cognition factors were similar to previous studies.[7,8,10,12,13]

Regarding the sixth factor found and not included in the final model, Emsley et al.[10] performed a study of the PANSS factor structure in recent-onset psychosis. They suggested that the five-factor model did not suffice to show the structure of the PANSS, because a seven-factor model emerged in the exploratory phase of their study with a last factor named "motor." We found similar results in our model, and a possible explanation for this might be the presence in our sample of some first-episode patients (14.72%), who can be more susceptible to the effect of antipsychotics.[14] Pappa & Dazzan,[15] in a systematic review, alternatively suggested that, although dyskinesia and Parkinsonism can be induced by antipsychotics, in drug-naïve individuals they could also be the result of neurologic dysfunction related to the pathogenesis underlying the illness. Either way, first-episode patients could be more vulnerable to motor symptoms, which may have biased previous studies.

Some PANSS items were not related to any factor. The item "preoccupation" (G15) has some limitation in clinical use, because it aims to assess autistic, egocentric concerns; however, it can be understood as anxiety- or depression-related concern. "Active social avoidance" (G16) is frequently on the negative factor,[4] but was not related to any factor in our study. The item "somatic concern" (G1) was related to the motor factor in our six-factor model; however, it could not be considered a good discriminant item, as it is normally correlated with the depression factor, in most of the articles found in the literature.[4] These items might require revisiting to remain in the scale, because they may not be useful for clinical practice or even for research purposes. This does not seem to be a problem specific to the Brazilian version, but rather an issue with the PANSS itself.

Finally, these results should be interpreted in light of some limitations. Although several methods could be

Table 1 Five- and six-factor models of the PANSS proposed by principal component analysis with equamax rotation

		Negative		Disorganization/ cognition		Excitement		Positive		Depression/anxiety		Motor
Items		Six-factor	Five-factor	Six-factor	Five-factor	Six-factor	Five-factor	Six-factor	Five-factor	Six-factor	Five-factor	Six-factor
Poor rapport	N3	0.802	0.806									
Lack of spontaneity	N6	0.793	0.794									
Emotional withdrawal	N2	0.781	0.799									
Passive/apathetic social withdrawal	N4	0.739	0.744									
Blunted affect	N1	0.657	0.699									
Motor retardation	G7	0.640	0.628									
Conceptual disorganization	P2			0.696	0.616							
Poor attention	G11			0.649	0.690							
Disorientation	G10			0.638	0.670							
Disturbance of volition	G13			0.613	0.540							
Difficulty in abstract thinking	N5			0.651	0.607							
Stereotyped thinking	N7			0.569	0.661							
Mannerisms/posturing	G5				0.659							0.536
Uncooperativeness	G8					0.713	0.605					
Poor impulse control	G14					0.685	0.658					
Hostility	P7					0.685	0.736					
Lack of judgment and insight	G12					0.542						
Excitement	P4					0.521	0.501					
Delusions	P1							0.834	0.839			
Unusual thought content	G9							0.707	0.779			
Hallucinatory behavior	P3							0.633	0.598			
Suspiciousness/persecution	P6							0.591	0.533			
Grandiosity	P5							0.505	0.579			
Anxiety	G2									0.751	0.749	
Guilt feelings	G3									0.729	0.731	
Depression	G6									0.698	0.704	
Tension	G4									0.654	0.675	
Somatic concerns	G1											0.659
Eigenvalues		8.391		3.526		2.707		1.548		1.360		1.064
Variance (cumulative %)		27.971		39.724		48.747		53.905		58.439		61.987
Cronbach's alpha		0.885	0.885	0.847	0.859	0.738	0.728	0.775	0.775	0.721	0.721	0.404

used, we chose factor analysis (based on PCA method) because it was the most widely used technique for analysis of the factor structure of PANSS in previous studies, allowing us to compare our findings to those obtained in other countries/populations and generate convergent validation. Our sample was composed of individuals recruited from three different centers, from all stages of the disorder, under various antipsychotic treatment regimens, and assessed by different psychiatrists, which resembles the clinical reality of schizophrenic patients and reinforces the strength and validity of the current Brazilian version.

The final five-factor model of the Brazilian version of the PANSS presented a performance very similar to the original English version and to those in several other languages, suggesting convergent validity. PANSS is one of the most important primary outcome measures used to evaluate treatment efficacy in psychiatry, and this study shows, for the first time, that its Brazilian version is valid.

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Disclosure

CN has served as a consultant and has been part of the advisory board for Janssen-Cilag. AG has received speaker's honoraria and has served as a consultant for Janssen-Cilag. RAB has received research grants from Janssen-Cilag, Eli Lilly, Novartis, and Roche; has received lecture fees from Astra Zeneca, Janssen, Novartis, and Lundbeck; and is a shareholder of Radiopharmacus Ltda. and Biomolecular Technology Ltda. The other authors report no conflicts of interest.

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