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Performance of the Brief Negative Symptom Scale Across Languages and Regions: Current Results from Global Harmonization Efforts

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Background

- Reliability and other psychometric properties of new scales for the assessment of psychiatric signs and symptoms require careful evaluation across languages and cultures to prove their suitability for use in global clinical trials. When clinical trials are conducted internationally, it is imperative to attend to cultural influences on clinical assessment tools to help ensure that data can be properly interpreted across regions and be reasonably pooled for analysis. Cross-cultural literature has consistently shown that the expression of the same phenomena in psychiatry can differ substantially across cultures (Kirmayer, 2001). In schizophrenia specifically, prior studies demonstrate comparisons between populations on the same rating scale can reveal meaningful differences - including perceived importance by both patients and clinicians - on phenomena such as social withdrawal (Aggarwal et al, 2012). However, while expression and perceived clinical importance of symptoms may differ, some studies demonstrate that certain phenomenological structures are highly conserved, such as the relatively robust findings on factor analyses across cultures, particularly with respect to negative symptoms (Elmsley et al, 2001).

- In order to further these goals and to advance the assessment of negative symptoms, an ongoing project has been underway focused on translating and testing the Brief Negative Symptom Scale (BNSS) across languages and cultures. Key characteristics of the BNSS are that it: (i) is brief, consisting of only 13-items that can be rated in a 10-20 minute interview; (ii) has a concise manual with a semi-structured interview guide; (iii) is written clearly and simply; (iv) covers all five of the NIMH Consensus Conference domains; and (v) has good separation of the two dimensions thought to underlie negative symptoms (expressivity and anhedonia/amotivation/asociality). Recent findings also suggest that the BNSS is sensitive to drug effects, with effect sizes comparable to established scales.

- Results from multiple studies using the BNSS in populations in different countries were compared for consistency, psychometric performance, and related features. Qualitative comparisons, including clinician perceptions of the relative ease of use of the BNSS, the relevance of BNSS probes and items, and performance of the BNSS in the field were also queried.

Methods

- A group of international collaborators have translated the BNSS for use in multiple languages. Standard methods for validation were applied for each study, specifically. The BNSS was translated, independently back-translated and compared against the original by the scale authors (BK and GS) and then harmonized. Each translation was appropriately documented and managed to ensure accuracy.
- Data from four groups of investigators, including groups in Spain (Spanish), China (Chinese), Italy (Italian), Turkey (Turkish), and Switzerland (German) were compared. For each group, inter-rater reliability was established through the use of pre-recorded videotapes and/or ratings of face-to-face interviews. A standard set of training materials in English was developed and used as the basis for initial training.
- Investigators for each group were queried regarding qualitative experience of using the BNSS, including the perceptions of clinician-researchers conducting assessments and scoring phenomena and patient reactions to the use of the semi-structured interview.

Results

- The inter-rater reliability of the BNSS has proven to be strong and quite consistent across languages, with statistics ranging from 0.65-0.95 (0.65: Item 4 in Turkish study). Studies conducted on the BNSS to date have also shown that a two-factor structure appears to be reliably replicated across languages and cultures. Qualitative reports from the field further support the idea that the brevity and simplicity of the interview language and structure is perceived as valuable by both clinicians and patients.
- The BNSS produces a crisp 2 factor solution, with items that have high and independent loadings on the dimensions of diminished expressivity (EXP) (alogia, restricted affect) and motivation and pleasure (MAP) (avolition, asociality, anhedonia). The Spanish translation found evidence for a 3-factor solution, which had a unique dimension for asociality; however, the 2 factor structure is otherwise consistently replicated.

Table1. Demographics/Internal consistency/Reliability

First author, year	Language	n	Population	%M	Mean age (SD)	Mean score (SD)	Alpha	Inter-rater Reliability	Test-retest Reliability
Kirkpatrick, 2011[1]	English	20	Schizophrenia	80	48.1(6.6)	26.8(16.8)	0.93	Total score: ICC=0.96	Total score, 1 week apart: r=0.81
Strauss, 2012[2]	English	100	Schizophrenia (n=88) and Schizoaffective disorder (n=12)	74	42.2(11.1)	24.1(17.0)	0.94	NR	Total score, 214 (88) days on average apart: r=0.93
Strauss, 2012[3]	English	146	Schizophrenia and Schizoaffective disorder	74.7	42.1(11.8)	NR	NR	NR	NR
Strauss, 2015[4]	English	50	Schizophrenia	54	40.8(12.5)	15.4(14.1)	0.91	NR	NR
Strauss, 2016[5]	English	65	Schizophrenia and Schizoaffective disorder	73.8	40.1(11.2)	23.93(15.17)	0.94	NR	NR
Mane, 2014[6]	Spanish	20	Schizophrenia	70	37.3(11.7)	19.79 (12.64)	0.98	Total score: ICC=0.97	Total score, 1 week apart: r=0.95
Yao, 2014[7]	Chinese	163	Schizophrenia	54.6	45.0(7.0)	18.25(12.7)	0.93	Total score :ICC=0.93	Total score, 2-week apart: ICC=0.82
Mucci, 2015[8]	Italian	912	Schizophrenia	69.8	40.1(10.7)	35.91(17.55)	NR	Total score: ICC=0.98	NR
Bischof, 2016[9]	German	75	Schizophrenia (n=65) and schizoaffective disorder (n=10)	74.7	31.5(10.9)	26.3(14.7)	0.93	Total score: ICC=0.97	NR
Nazli, 2016[10]	Turkish	75	Schizophrenia	76	34.6(8.3)	29.4(17.6)	0.96	Pearson's correlation between interviewer and observer: r=0.98	NR

ICC=Intraclass Correlation Coefficient; r=Pearson's r; NR=No Report.

Table 2. Summary of Factor Analyses

Language	English[1]		English[3]		Spanish			Italian		Chinese		German		Turkish	
Methods	PCA		PAF		PCA			PAF		Not specified		PAF		PCA	
Factor Loading	1	2	1	2	1	2	3	1	2	1	2	1	2	1	2
Item \ Factor Name	Emotional expressivity	Anhedonia /avolition/ asociality	Emotional expressivity	Motivation & pleasure	External world	Inner world	Alogia	Poor emotional expression	Avolition	Impairment of observable behavior	Impairment of subjective experience	Diminished expression	Motivation /Pleasure	Poor emotional expression	Avolition
1: Intensity of pleasure	0.27	**0.91**	-0.05	**0.79**	**0.92**	0.46		0.65	**0.89**		**0.84**		**0.91**	-0.08	**0.85**
2: Frequency of pleasure	0.19	**0.93**	-0.03	**0.88**	**0.87**	0.39		0.62	**0.89**		**0.85**		**0.86**	0.02	**0.93**
3: Intensity of future pleasure	0.13	**0.83**	-0.15	**0.60**	**0.80**	0.35		0.62	**0.86**		**0.87**		**0.86**	-0.23	**0.75**
4: Lack of Normal Distress	0.49	0.13	**0.51**	0.05	Not included			0.48	0.61		**0.48**	-0.09	0.58	**-0.52**	0.23
5: Asociality Behavior	0.56	**0.77**	0.24	**0.62**	**0.78**	0.43		0.61	**0.79**		**0.79**		**0.62**	0.56	**0.87**
6: Asociality Inner-experience	0.54	**0.71**	0.22	**0.67**	**0.73**	0.36		0.59	**0.78**		**0.74**		**0.65**	0.14	**0.97**
7: Avolition Behavior	0.48	**0.79**	0.08	**0.79**	0.66	**0.75**		0.71	**0.83**		**0.80**		**0.72**	-0.20	**0.72**
8: Avolition inner-experience	0.47	**0.77**	0.07	**0.81**	0.63	**0.77**		0.66	**0.82**		**0.78**		**0.79**	-0.26	**0.71**
9: Facial expression	**0.71**	0.31	**0.62**	0.23	0.39	**0.91**		**0.90**	0.71	**0.78**		**0.86**		**-0.89**	0.01
10: Vocal expression	**0.77**	0.17	**0.81**	0.04	0.34	**0.89**		**0.92**	0.71	**0.81**		**0.86**		**-0.98**	-0.05
11: Expressive gestures	**0.78**	0.09	**0.75**	0.09	0.49	**0.88**	0.36	**0.91**	0.70	**0.81**		**0.93**		**-0.94**	-0.03
12: Quantity of speech	**0.87**	0.30	**0.98**	-0.11	0.55	0.62	**0.77**	**0.85**	0.60	**0.92**		**0.90**		**-0.86**	0.03
13: Spontaneous elaboration	**0.81**	0.39	**0.95**	-0.13	0.58	0.66	**0.74**	**0.85**	0.62	**0.83**		**0.96**		**-0.89**	0.05

Items loading on the factor are in bold. PCA=Principal Components Analysis; PAF=Principal Axis Factor Analysis.

Table 3. Convergent Validity

Construct/Concurrent assessment	r	Study
PANSS Total (Positive and Negative Syndrome Scale)	0.24 – 0.64	1,7,8,9
PANSS Negative Subscale	0.42 – 0.89	1,6,7,8,9,10
SANS (Scale for the Assessment of Negative Symptoms)	0.68 – 0.89	1,2,5,6,7,9
BPRS (Brief Psychiatric Rating Scale)	0.68 – 0.82	2,4,5
LOF (Level of Function Scale)	-0.68 – -0.71	2,5
GAF (Global Assessment of Functioning Scale)	-0.69	9
PSP Total (Social Performance Scale)	-0.73	9
CDSS (Calgary Depression Scale for Schizophrenia)	-0.13 – 0.28	8, 10
ESRS (Extrapyramidal Symptom Rating Scale)	0.21	10
DPB (Defeatist Performance Beliefs Scale)	0.38	5

Conclusions

- To date, the results demonstrate that the BNSS has strong performance as a tool that is sensitive across languages and cultures.
- Reported ICCs for the BNSS total score ranged from 0.93-0.98.
- Qualitative reports do reveal subtle differences in ratings across languages/cultures, specifically when evaluating gold-standard scores for training materials utilized in the network. These observations are consistent with findings from other studies of negative symptoms across cultures.
- *Examples:* Italian BNSS raters reported "cultural differences (for) ratings attributed to US patients on the anhedonia subscale and on items 10 and 11 (vocal expression and expressive gestures)" with average differences of approximately 1 point from gold-standard.
- The BNSS is well positioned to capture change in negative symptoms for both psychosocial and pharmacologic intervention trials.
- New efforts are underway with translation and harmonization in multiple additions languages (e.g. Japanese, Russian, Polish, Danish, French, and Portuguese) to further evaluate the performance of the BNSS globally.

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