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Negative symptoms in bipolar disorder and schizophrenia: A psychometric evaluation of the brief negative symptom scale across diagnostic categories

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ABSTRACT

Past studies have demonstrated that the Brief Negative Symptom Scale (BNSS) has excellent psychometric properties in patients with schizophrenia. In the current study, we extended this literature by examining psychometric properties of the BNSS in outpatients diagnosed with bipolar disorder (n = 46), outpatients with schizophrenia (n = 50), and healthy controls (n = 27). Participants completed neuropsychological testing and a clinical interview designed to assess negative, positive, disorganized, mood, and general psychiatric symptoms. Results indicated differences among the 3 groups in the severity of all BNSS items, with SZ and BD scoring higher than CN; however, SZ and BD only differed on blunted affect and alogia items, not anhedonia, avolition, or asociality. BD patients with a history of psychosis did not differ from those without a history of psychosis on negative symptom severity. The BNSS had excellent internal consistency in SZ, BD, and CN groups. Good convergent and discriminant validity was apparent in SZ and BD groups, as indicated by relationships between the BNSS and other clinical rating scales. These findings support the validity of the BNSS in broadly defined serious mental illness populations.

1. Introduction

Negative symptoms have long been considered a core component of the schizophrenia diagnosis (Kraepelin, 1919). Modern studies support this notion, indicating that negative symptoms are distinct from other aspects of schizophrenia psychopathology (e.g., positive symptoms, disorganization) and a significant predictor of important clinical outcomes (e.g., disease liability, subjective well-being, rates of recovery, and social or occupational functioning in the community) (Piskulic et al., 2012; Strauss et al., 2010, 2012a). Although there is some overlap between bipolar disorder and schizophrenia in terms of clinical presentation (Berrettini, 2003a, 2003b), it is currently unclear whether negative symptoms can be reliably detected in bipolar disorder. Among the small number of studies examining negative symptoms in bipolar disorder, there is evidence that bipolar patients in a euthymic state display clinically elevated negative symptoms that are less severe than SZ (Hawkins et al., 1997; Herbener and Harrow, 2001; Lewine, 1990; Mancuso et al., 2015; Thaler et al., 2013). Such findings suggest that negative symptoms may be stable trait like features of illness that persist into periods where BD patients are free from mood episodes. It is unclear whether BD patients with a history of psychosis display more severe negative symptoms than BD patients without a history of psychosis, although such differences might be expected if negative symptoms are tied to liability for psychosis. Given implications for dissecting shared etiology and treatment, it is of critical importance to determine whether negative symptoms can be reliably detected in both BD and SZ.

An important first step in this process is determining whether existing clinical rating instruments have adequate psychometric properties to facilitate reliable and valid assessment of negative symptoms in BD. In 2005, the National Institute of Mental Health (NIMH) held a consensus development conference on negative symptoms of schizophrenia. Among the major conclusions from this meeting were that new negative symptom measures were needed to adequately assess the 5 core negative symptom domains (blunted affect, alogia, avolition, anhedonia, asociality), while excluding content not representative of the negative symptom construct (Kirkpatrick et al., 2006). Two next-generation negative symptom scales were developed in response to this NIMH initiative: The Brief Negative Symptom Scale (BNSS: Kirkpatrick et al., 2011) and the Clinical Assessment Interview for Negative Symptoms (CAINS: Blanchard et al., 2010; Horan et al., 2011; Kring et al., 2013). In prior studies, we reported the psychometric properties of the BNSS in outpatients diagnosed with schizophrenia or

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schizoaffective disorder (Kirkpatrick et al., 2011; Strauss et al., 2012b, 2012c). These studies indicated that the BNSS has strong reliability, as indicated by inter-rater agreement (0.94), internal consistency (0.94), and test-retest scores (0.93) (Kirkpatrick et al., 2011; Strauss et al., 2012b). Good convergent validity was demonstrated by significant relationships with other negative symptom scales, measures of functional outcome, self-reported anhedonia, and neuropsychological test performance (Kirkpatrick et al., 2011; Strauss et al., 2012b). Discriminant validity was established by low or non-significant relationships with psychosis, disorganization, and depression (Strauss et al., 2012b). Multiple factor analytic studies support the existence of a 2-factor structure on the BNSS, with dimensions of Emotional Expressivity (EE: restricted affect, alogia) and Avolition/Apathy (AA: anhedonia, avolition, asociality) (Kirkpatrick et al., 2011; Strauss et al., 2012c). The BNSS has also been translated into several additional languages, and psychometric validation studies in Spanish, Italian, and German have generally yielded similar results to the original English studies (Bischof et al., under review; Chieffi et al., 2015; Garcia-Portilla et al., 2015; Mané et al., 2014; Merlotti et al., 2014; Mucci et al., 2015). Thus, the BNSS demonstrates strong psychometric properties in psychotic disorders assessed across a variety of cultures.

The aims of the current study were twofold: 1) to evaluate group differences in negative symptom severity in outpatients with bipolar disorder (BD), outpatients with schizophrenia (SZ), and healthy controls (CN); 2) to evaluate the psychometric properties of the BNSS in BD compared to SZ. The following hypotheses were made: 1) BD and SZ groups would display greater severity of negative symptoms than CN; 2) SZ would have greater severity of negative symptoms than BD on all BNSS items; 3) BD with a history of psychosis was expected to have greater severity of negative symptoms than BD without a history of psychosis; 4) the BNSS would demonstrate good internal consistency, convergent validity, and discriminant validity in BD and SZ groups.

2. Method

2.1. Participants

Participants included 50 outpatients meeting DSM-IV-TR criteria for schizophrenia (SZ), 46 outpatients meeting criteria for bipolar I disorder (BD), and 27 healthy controls (CN). BD and SZ patients were recruited from advertisements at local outpatient community mental health centers, and were clinically stable at the time of evaluation as indicated by no change in medication regimen over the past 4 weeks. Diagnoses were determined via a best-estimate approach, including medical history, family informants, and the Structured Clinical Interview for DSM-IV (SCID: First et al., 2002). BD patients were euthymic at the time of testing and not in a mood episode as determined by the SCID. Of the BD patients, 22 met criteria for lifetime history of psychosis, as indicated by the presence of delusions or hallucinations during a mood episode as defined by the SCID-IV. CN were recruited via advertisements posted throughout the community, internet, and college campuses. The SCID-IV was administered to CN to rule out lifetime history of Axis I psychotic disorders, mood disorders, and post-traumatic stress disorder. CN also had no family history of BD or SZ. All participants denied current substance abuse or dependence in the past month, history of head injury, or neurological disorders.

Demographic and clinical characteristics of the SZ, BD, and CN groups are presented in Table 1. The 3 groups did not significantly differ in age or sex; however, the 3 groups differed in ethnicity and personal education, such that SZ had lower education than BD and CN. A greater proportion of the SZ patients were taking first and second generation antipsychotics than BD patients, and more BD patients were taking antidepressants and mood stabilizers than SZ patients. SZ had significantly higher chlorpromazine equivalent dosage (Woods, 2003) scores than BD, $F(1, 95) = 31.0$, $p < 0.001$. (See Table 2.)

2.2. Procedures

A battery of psychiatric rating instruments was completed for all participants, including: 1) BNSS (Kirkpatrick et al., 2011); 2) Brief Psychiatric Rating Scale (BPRS: Overall and Gorham, 1962); 3) Young Mania Scale (YMS: Young et al., 1978); 4) Hamilton Depression Rating Scale (HDRS: Hamilton, 1960). Raters had a master's degree or higher and at least 1 year of clinical experience. All raters were trained to reliability standards prior to conducting assessments (inter-rater agreement >0.80 with gold standard ratings). Neuropsychological assessments included the Vocabulary, Digit Symbol Coding, Block Design, Matrix Reasoning, and Digit Span subtests of the Wechsler Adult Intelligence Scale, Third Edition (WAIS-III: Wechsler, 1997).

The BNSS is a 13 item clinical rating scale, which is organized into 6 subscales that load onto two distinct factors. One factor reflects diminished Emotional Expressivity (EE) (blunted affect, alogia) and the other Avolition-Apathy (AA: anhedonia, avolition, asociality). All items are rated on a 7-point (0–6) scale, with anchor points ranging from absent (0) to severe (6). A total score is calculated by summing all items and factor scores are calculated for EE and AA by averaging the relevant items. Administration time is approximately 12 min, and the BNSS includes a comprehensive but brief manual, workbook, and score sheet.

2.3. Data analysis

Group differences in BNSS severity were evaluated using one-way ANOVA and significant effects followed up using post hoc LSD contrasts. Internal consistency of BNSS items was examined separately for each diagnostic group using Cronbach's Alpha. Alpha-if-item deleted analyses were conducted within each group to determine the benefit of excluding any individual BNSS items. Convergent validity was determined via correlations between the BNSS and the BPRS negative factor and cognitive test scores on the WAIS-III. Discriminant validity was examined via correlations between the BNSS and measures which should have null or low to moderate correlations with negative symptoms, including the YMS, HDRS, and BPRS Positive, Disorganized, and Total scores.

3. Results

3.1. Group differences in BNSS severity

Severity scores for BNSS items, factor scores, and total are presented in Table 1. The 3 groups differed in severity of all BNSS items, the 2 factor scores, and total score. BD and SZ did not differ in severity of anhedonia, asociality, or avolition items or the AA dimension score; both patient groups had greater severity for these items and dimension scores than CN. SZ had greater severity of restricted affect, alogia, and the EE factor score than CN; however, SZ and BD did not differ on these variables.

SZ also had greater severity of BPRS positive, negative, disorganized, and total scores than BD. BD had significantly higher YMS scores than SZ, but SZ and BD did not differ on HDRS total scores.

BD patients with a history of psychosis did not significantly differ from those without a history of psychosis on any of the 13 BNSS items, the EE or AA dimension scores, or total score.

3.2. Internal consistency

Cronbach's Alpha was high for all 3 groups, indicating that the BNSS items measure a single latent construct in all 3 groups (SZ = 0.91; BD = 0.92; CN = 0.85). Item-total correlations indicated that all BNSS items were significantly correlated with the total score in SZ and BD groups. In CN, all items except lack of normal distress were significantly correlated with the total score; there was no variability in CN scores on the lack of normal distress item, i.e., all had a score of 0.