



Social cognition and functional capacity in bipolar disorder and schizophrenia



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ABSTRACT

Social cognition is a functionally relevant predictor of capacity in schizophrenia (SZ), though research concerning its value for bipolar disorder (BD) is limited. The current investigation examined the relationship between two social cognitive factors and functional capacity in bipolar disorder. This study included 48 individuals with bipolar disorder (24 with psychotic features) and 30 patients with schizophrenia. Multiple regression controlling for estimated IQ scores was used to assess the predictive value of social cognitive factors on the UCSD Performance-Based Functional Skills Assessment (UPSA). Results found that for the bipolar with psychosis and schizophrenia groups, the social/emotion processing factor predicted the UPSA. The theory of mind factor only predicted the UPSA for the schizophrenia group. Findings support the clinical utility of evaluating emotion processing in individuals with a history of psychosis. For BD, theory of mind may be better explained by a generalized cognitive deficit. In contrast, social/emotion processing may be linked to distinct neurobiological processes associated with psychosis.

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1. Introduction

Cognitive assessment is a prominent method of predicting functional capacity and outcome in patients living with bipolar disorder (BD) and schizophrenia (SZ) (Green et al., 2000; Bonnín et al., 2010; Bora et al., 2010; Bearden et al., 2011). Recently, attention has shifted towards social cognition, or that aspect of cognition dedicated to processing social information for adaptive functioning (Ochsner and Lieberman, 2001). Studies on social cognition report deficits in emotion recognition and theory of mind in SZ populations (Bora et al., 2009; Kohler et al., 2010; Green et al., 2012). Of interest, a meta-analysis reported that social cognition may be even more promising than non-social neurocognition in predicting functionality in SZ (Fett et al., 2011). The literature on BD is sparser and less consistent, possibly due to the fluctuating mood states and accompanying changes in cognition exhibited by individuals with this disease. However, studies confirm that individuals exhibit similar though less severe deficits than observed in SZ (Derntl et al., 2012; Caletti et al., 2013; Lee et

al., 2013) and these deficits distinguish patients with high and low psychosocial functioning (Lahera et al., 2012).

Social cognition research comes with the challenges associated with a newly developing field. For example, unlike neurocognitive constructs, there is yet to be a uniformly agreed upon ontology of social cognitive constructs that demonstrate reliable psychometrics, neuroimaging correlates, and downstream functional correlates. However, consensus-building task forces have agreed that theory of mind and emotional processing are among two constructs that warrant further development in SZ research (Green et al., 2008). Factor analytic studies have confirmed that tasks representing these constructs do segregate from neurocognition and converge across similarly constructed tasks (Allen et al., 2007; Goldstein et al., 2008; Allen and Barchard, 2009; Mancuso et al., 2011), and exhibit differential impairments among psychiatric groups (Lee et al., 2013; Ruocco et al., 2014; Thaler et al., 2013a).

Approximately half of patients with BD exhibit psychotic features throughout the course of illness. There is considerable evidence that this subset of individuals exhibits common neurobiological, cognitive, and familial markers with other psychotic disorders that cross diagnostic boundaries (Valles et al., 2000; Bora et al., 2008; Moskvina et al., 2009; Allen et al., 2010; Green et al., 2010). There is some implication that social cognition would follow a similar pattern, given that psychosis alters the processing

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of emotions, social information, and mentalization, and affects interpersonal relationships and community functioning (Van Hooren et al., 2008).

Recent studies have also indicated that patients with BD with a history of psychosis exhibit selective impairments in social/emotion processing. Using the same sample, our group has demonstrated that individuals with psychosis share similar misattributions toward neutral emotional stimuli (Thaler et al., 2013b) and also have broad impairments in an empirically defined social/emotion processing factor that is spared in bipolar disorder without psychosis and controls (Thaler et al., 2013a). The latter study also reported that a theory of mind factor was globally affected in bipolar disorder regardless of psychotic history. Therefore, there is a small but growing evidence base that some but not all social cognitive impairments are coupled to psychosis. However, the extent to which these impairments explain functional capacity remains unknown.

To address this, the current study examined the relationships between social cognition domains and functional capacity moderated by psychosis. Given previous studies reporting associations between social cognition and outcomes in SZ (Fett et al., 2011), we hypothesized that social cognition would predict functional capacity for individuals with BD with psychosis. More specifically and based on the previous finding that emotion processing was affected by a history of psychosis (Thaler et al., 2013a), we hypothesized that this domain would predict capacity in BD with psychosis in a manner similar to SZ. Conversely, theory of mind was globally impaired in BD, and so we hypothesized that the latter domain would predict capacity regardless of psychosis history. The BD without psychosis group served as the baseline group by which the two psychosis groups were compared.

2. Methods

2.1. Participants

This study included 78 participants between the ages of 18 and 65 years with BD ($n=48$) or SZ ($n=30$). Diagnoses were established by their treating psychiatrist and verified with the Structured Clinical Interview for the DSM-IV (SCID-IV). A subset of the BD group had experienced delusions and/or hallucinations during at least one mood episode and were classified as BD with psychotic features (BD+; $n=24$). All participants were clinically stable during evaluation, had not met diagnostic criteria for a mood episode in the past month, and were able to come to the assessment center and provide informed consent. Exclusion criteria included significant vision or hearing impairment, an intellectual disability, a history of a neurological disorder, substance use within the last 30 days or substance abuse or dependence diagnosis within the last 6 months, or use of medication with known effects on cognition, other than those that were routinely prescribed for the treatment of BD and SZ. This sample was used in previous investigations that examined group differences on emotion recognition variables and social cognition factors (Thaler et al., 2013a, 2013b).

2.2. Measures

Estimated IQ was obtained from the dyadic short form of the Wechsler Adult Intelligence Scale-Third Edition (WAIS-III) to estimate FSIQ based on the WAIS-III Vocabulary and Block Design subtests (WAIS-III; Wechsler, 1997; Ringe et al., 2002). Symptom ratings were assessed with the Hamilton Depression Rating Scale (HAM-D; Hamilton, 1990), the Young Mania Rating Scale (YMRS; Young et al., 1978) the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1983a), and the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1983b). Five measures formed two social cognition factors that were identified by Thaler et al. (2013a). Briefly, the Bell-Lysaker Emotion Recognition Test (BLERT; Bell et al., 1997), the WAIS-III Picture Arrangement subtest (WAIS-III PA), the Reading the Mind in the Eyes Test (Eyes; Baron-Cohen et al., 2001) formed a social/emotion processing factor. The Hinting Task (Corcoran et al., 1995) and the Assessment of Interpersonal Problem-Solving Skills Description score (AIPSS DE; Donahoe et al., 1990) formed a theory of mind factor. Factor scores were calculated by obtaining raw z -scores of relative performance within the sample and averaging them into composite scores based on the obtained factor structure.

Functional capacity was measured by the UCSD Performance-Based Skills Assessment (UPSA; Patterson et al., 2001). This measure estimates everyday functioning by directing participants to complete tasks demonstrating competency in five areas including planning recreational activities, managing finances, communicating with others, navigating maps, and planning a shopping list. Raw scores of each subscale were converted to percentiles and a total score out of 100 points was retained for the analysis.

2.3. Procedure

All participants were recruited from the community, local mental health centers, college campuses, and hospitals. Following a phone screening, participants were invited to participate in testing. Participants provided informed consent and then were administered the SCID-IV and a demographic questionnaire. Those who met criteria for the study were then administered the test battery in a fixed order. Assessors were doctoral level graduate students trained to administer all measures. This study was approved by the local Institutional Review Board (IRB) for human subjects.

2.4. Data analysis

This study employed hierarchical moderated multiple regression. As accomplished by others (Mancuso et al., 2011), two separate analyses were run for the social/emotion processing and theory of mind factor scores to test for unique variance they may have on criterion variables above and beyond general intellectual functioning. Following convention, diagnostic group was dummy coded into two variables representing the three levels of the IV (BD–, BD+, and SZ). The BD– group was held as the baseline diagnostic level that was compared against the BD+ and SZ levels. The social/emotion and theory of mind factor scores were centered around their means to control for multicollinearity. Interaction values were calculated by multiplying diagnostic level by the social cognition factor of interest (i.e. social/emotion factor and theory of mind factor). Block 1 contained the estimated FSIQ score, block 2 contained the social cognitive factor and diagnostic level, and block 3 had the interactions between diagnostic level and factor. Following the main analysis, secondary analyses were run with the SANS, SAPS, HAM-D, and YMRS scores entered as additional covariates to determine if these substantially altered results.

3. Results

3.1. Descriptive statistics

Demographic and clinical information is presented in Table 1. As seen in the table, the SZ group was overall older, included more men, had fewer years of education, lower SES and estimated FSIQ, and more negative symptoms. No differences emerged between the two BD groups.

3.2. Social cognition and functional capacity

The multiple regression analyses were conducted next. Results are shown in Table 2.

For the social/emotion processing factor, there was a significant effect for estimated FSIQ in the first block, $\beta=0.55$, $p < 0.001$. In the second block, only the social/emotion processing factor predicted the UPSA score, $\beta=0.40$, $p=0.023$. In the third block, both estimated FSIQ, $\beta=0.29$, $p=0.033$, and the social/emotion processing factor predicted the UPSA score, $\beta=0.53$, $p=0.036$. In addition, significant interactions were observed for both the BD+ group, $\beta=0.24$, $p=0.048$ and the SZ group, $\beta=0.93$, $p < 0.001$ such that the relationship between the social/emotion processing factor and the UPSA total score was different for these two groups compared to the BD– group. See Fig. 1 for a scatterplot of the linear trends among the three groups.

As seen in the figure, both the SZ group and the BD+ group had positive linear relationships between their social/emotion processing factor score and the UPSA total score. In contrast, the BD– group had a minimal relationship with these two variables.

To test the effects of current symptoms, we reran the analyses while including the HAM-D, YMRS, SANS, and SAPS scores as

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