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Social competence and observer-rated social functioning in bipolar disorder

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Abstract

Objective—Impairment in social functioning appears to be common in bipolar disorder, although estimates have been derived largely from self-report measures. We examined performance-based and observer-based ratings of social competence and functioning and assessed the contribution of symptoms and neurocognitive ability to social functioning in bipolar disorder.

Methods—In this cross-sectional study, 164 subjects with bipolar disorder were administered the performance-based Social Skills Performance Assessment (SSPA), rated by an informant on the Specific Level of Functioning (SLOF)—Interpersonal subscale, received clinical ratings of depression and manic symptoms, and performed neurocognitive tests. We assessed the proportion of patients exhibiting social deficits and examined the associations between composite measures of neurocognitive ability, depression and manic symptoms, and SSPA scores with informant-rated, real-world social functioning.

Results—Mean age of the sample was 47.6 years (SD = 14.1). Subjects were experiencing, on average, mild levels of depression and minimal manic symptoms. A total of 29% exhibited norm-referenced impairment on the SSPA, and 64% registered at least one impairment on SLOF items; unemployed subjects had lower SSPA and SLOF ratings. Neurocognitive performance correlated with both performance-based and observer-rated social functioning, whereas depressive and manic symptoms correlated only with observer-rated social impairments. In multivariate models, depression was the most potent association with social functioning, and impairment in social competence (i.e., capacity) increased the strength of the relationships between depression and neurocognitive impairment and social functioning (i.e., real-world functioning).

Conclusions—Our study confirmed the negative relationship of bipolar depression with social functioning. A subgroup of outpatients with bipolar disorder has impaired social competence, which, when present, worsened the impact of depression and cognitive impairment on social functioning.

Keywords

bipolar disorder; depression; disability; mania; neuropsychology; social functioning

Bipolar disorder is among the most disabling illnesses in the world (1). In addition to lower rates of employment and lost wages relative to healthy adults, the impact of bipolar disorder on social functioning is substantial (2-4). People with bipolar disorder have fewer social interactions and smaller social networks than healthy comparison subjects (5, 6) and are less likely to achieve social milestones such as marriage or equivalent relationships than the population as a whole (7). It is apparent that these social impairments persist beyond the resolution of episodes (8), and social dysfunction predicts shorter time to relapse (5) as well as risk for developing depressive symptoms (9). The predictors of social disability in bipolar disorder are unclear, although there is mounting evidence that bipolar depression, even at subsyndromal levels, predicts global disability in bipolar disorder (8, 10). Additional predictors of global disability, including social dysfunction, in bipolar disorder include the presence of psychotic features, comorbid substance abuse, and neurocognitive impairment (11-13).

Nevertheless, progress in specifying the direct and interactive contributors to social disability in bipolar disorder has been hindered by the limitations in the measurement of social functioning, in addition to small sample sizes that have precluded the use of multivariate approaches (14). For one, milestone-based indicators of social functioning, such as marital status or social network size are influenced by contextual factors such as stigma or environmental opportunities that are difficult to separate from illness effects. Second, subjective measures of social functioning, such as social support, are likely to be influenced by mood state at the time of assessment and thus, while important, may produce biased estimates of the impact of bipolar disorder on social functioning. Third, previous research in bipolar disorder has rarely separated social competence, or the cognitive and emotional skills necessary for social interactions, from ratings, self-reports, or milestone-based indicators of social impairment; thus, it is unclear to what extent impairments in social competence are present and contribute to social disability. Social competence is typically measured with performance-based role-play assessments such as the Social Skills Performance Assessment (SSPA) (15) or the Maryland Assessment of Social Competence (16). The inter-relationships between social competence, social functioning, and psychopathologic and neurocognitive illness features have been well described in schizophrenia (17-19) and have led to advances in the quantification of the influences of abilities, clinical symptoms, and environmental factors in terms of their impact on real-world functioning in that illness. In particular, social competence appears to be an intervening variable between symptoms and neurocognitive ability and social functioning (17). Whereas social competence deficits have been investigated in children and adolescents with bipolar disorder (20), only two previous studies, to our knowledge, utilized performance-based and clinician-rated measures of functioning in adults or older adults with bipolar disorder (21, 22). These studies indicate that performance deficits associated with social competence are less severe than in schizophrenia, and suggest that neurocognitive impairment may predict deficits in social competence, yet sample sizes were not sufficiently large to assess the relative strength of associations with social dysfunction beyond bivariate associations.

To address these gaps in the literature, we investigated a large group of outpatients with bipolar disorder ($n = 164$) who were assessed with a performance-based measure of social competence, observer ratings of social functioning, neurocognitive tests, and psychopathologic symptoms. The goals of the study were (i) to quantify the proportion of subjects with impaired social competence and real-world impairments in social functioning, and (ii) to examine the bivariate and multivariate relationships between demographic, symptom, and neurocognitive variables and social functioning. We hypothesized that neurocognitive ability and depressive and manic symptoms would be associated with

performance-based and observer-rated social functioning, and we explored the direct and moderating effects of social competence impairment in conjunction with neurocognitive ability and psychopathologic symptoms on observer-rated social functioning.

Subjects and methods

Sample

Participants included 164 individuals diagnosed with DSM-IV bipolar I disorder. Participants were drawn from a large sample of individuals previously enrolled in a parent study focusing on the genetics of schizophrenia and bipolar disorder. Participants in the parent study who had consented to follow-up for additional studies were recontacted for enrollment in the current study focusing on predictors of functioning in severe mental illnesses. Previous reports have described the purpose and methods of the parent study in detail (23, 24) as well as the current study of clinical and neuropsychological predictors of functioning (25, 26). Briefly, the parent study required that all participants were of full or mixed Ashkenazi Jewish descent, determined on the basis of ancestry of four grandparents; this sampling restriction was intended to increase genetic homogeneity. Participants were recruited for the parent study via advertisements, Web sites, and publications marketed toward Jewish people. Inclusion criteria were such that all participants needed to be able and willing to provide written informed consent and had to be clinically stable enough to participate in an in-depth clinical evaluation.

The participants in the current study included parent study subjects who met diagnostic inclusion criteria (DSM-IV diagnosis of schizophrenia, schizoaffective disorder, or bipolar I disorder). Participants were recontacted first by letter and then by telephone for enrollment. All participants signed informed consent to participate in the current study.

Instruments

Diagnosis (Parent study)—Diagnostic information was collected with the Diagnostic Interview for Genetics Studies (DIGS) (27), as well as from medical records and informant reports, and all diagnoses plus key criteria ratings were generated in consensus meetings of at least two clinicians (doctoral-level psychologists or psychiatrists). The DIGS is a structured psychiatric interview designed by the National Institute of Mental Health Genetics Initiative for genetic studies of schizophrenia and bipolar disorder. In comparison to the Structured Clinical Interview for DSM-IV, the DIGS is primarily aimed at assessing current and lifetime DSM-IV bipolar disorder and schizophrenia, and the DIGS includes finer detail about the temporal course of these illnesses. The DIGS is widely used in genetic psychiatric epidemiology, and for bipolar disorder it is the most comprehensive assessment in current use. Participants were assessed for the most part in their homes by doctoral-level psychologists.

The remaining instruments described below were administered during the current study assessment, by members of the original team of clinical examiners and most often in the home of the participant.

Psychopathological symptoms—Depressive and manic symptoms were assessed with the self-report Beck Depression Inventory–II (BDI) (28) and the clinician-rated Positive and Negative Syndrome Scale [(PANSS) (29)]–Excitement subscale. The BDI is a widely used 21-item self-report measure of depressive symptoms, with good internal consistency (Cronbach's $\alpha = 0.935$). In the present sample the correlation between the PANSS depression item, rated by the examiner, and the subjects' reports on the BDI was $r = 0.624$, $p < 0.001$. The PANSS–Excitement subscale consists of four items extracted from the PANSS

(uncooperativeness, excitement, impulsivity, and hostility) that have been found to be highly correlated with clinician-rated scales to assess manic symptoms [e.g., the Young Mania Rating Scale (YMRS) (30)] in samples of patients with bipolar disorder (31). Cronbach's alpha for the PANSS–Excitement subscale was 0.765.

Substance use—In regard to substance use, participants were asked about frequency of past-month use of alcohol and other substances (i.e., cocaine, amphetamine, marijuana, hallucinogens, and nonprescribed opiates or sedatives). We examined the frequency of drinking alcohol on three or more days per week as well as any past-month use of the substances listed above.

Neurocognitive ability—We used a composite score to assess global cognitive ability derived from a set of commonly used neuropsychological tests (Rey Auditory Verbal Learning Test, Trailmaking Test Parts A and B, Wechsler Adult Intelligence Scale III, Letter Number Sequencing, Digit Symbol, Animal Fluency, Wisconsin Card Sorting Test errors, and Continuous Performance Test Identical Pairs version, d-Prime). Scores on these eight measures were derived from raw scores on the basis of published normative data. To obtain the Neurocognitive Composite score we transformed variables to *z*-scores and then obtained an average *z*-score across all tests (which was converted to a *t*-score for ease of interpretation). The internal consistency of the neuropsychological variables used to create the Neurocognitive Composite score was good (Cronbach's alpha = 0.832).

Social competence—The SSPA is a performance-based assessment of social competence. The development and psychometric properties of this instrument are described in detail elsewhere (15). Briefly, participants are asked to engage in two simulated social situations, one of which is socially and emotionally neutral and the other of which is instrumental and of somewhat greater emotional valence: (i) greeting a new neighbor and (ii) calling a landlord to request a repair for which attention was previously requested and not received. These interactions are audiotaped and ratings obtained from these two interactions include affect and grooming (which are rated by the examiner) and seven additional ratings of interest, fluency, clarity, focus, negotiation ability, submissiveness/persistence, and social appropriateness (rated by review of the audiotape by a trained rater who did not participate in the interview process). The resulting items are averaged to a total score ranging from 1-5, with higher scores representing better social competence.

Social functioning—The Interpersonal subscale of the Specific Level of Functioning (SLOF) scale (32) was used to rate severity of social dysfunction. The SLOF is an informant-rated scale, with informants selected based on their familiarity with the participant (e.g., case managers, family members). Items are rated on a 5-point Likert scale ranging from severe impairment to no impairment. The Interpersonal subscale consists of seven items from the 43-item scale that measure the degree to which the participant is impaired in (i) accepting contact with others, (ii) initiating contact with others, (iii) communicating effectively, (iv) engaging in activities without prompting, (v) participating in groups, (vi) forming and maintaining friendships, and (vii) asking for help when needed. The internal consistency of the SLOF–Interpersonal subscale was alpha = 0.837.

In all cases, examiner ratings were based on informant report when informants were available, augmented by their impression of the patient. In the case where informants were unavailable, the examiner generated real-world social functioning ratings from their observations of and interactions with the subject and all available additional information (examiners have experience with the subjects from earlier interactions in the parent study and have access to previously gathered clinical and life history information). A total of 15%

of the bipolar disorder group lacked the informant and were rated by the examiner alone on the SLOF. We examined whether there were differences on the SLOF variables for those who were rated by an examiner, and there were no statistically significant differences on the SLOF items or demographic variables (all p -values > 0.05).

Statistical analyses

We first calculated the descriptive statistics for the sample in regard to the mean values and item-level performance on the SLOF and the SSPA. We then generated normative performance scores, which were calculated from the proportion of participants whose mean values were < 1 SD or below the mean SSPA performance of normal comparison subjects reported in Patterson et al. (15). To assess the associations with SLOF and SSPA scores in the bipolar disorder sample, bivariate Pearson correlations were calculated. Multivariate analyses were conducted using hierarchical entry regressions to determine the relative strength of association with SLOF scores, and the general linear model was employed to assess the main effects and two-way interactions between SSPA performance, psychopathologic symptoms, and neurocognitive ability on SLOF scores. There was no evidence of multicollinearity (variance inflation factor > 5 ; none of the variables needed to be excluded). To mitigate against the risk of Type 1 errors, we adjusted the alpha level by dividing 0.05 by number of bivariate correlations (5 tests or 0.01), overall r^2 values in multiple regression (1 test or 0.05), and omnibus ANOVAs (3 tests or 0.167).

Results

Sample characteristics

Table 1 presents the sample characteristics and clinical ratings for the groups. The mean age of the 164 subjects was 47.4 (SD = 14.2). On average, the sample experienced a mild level of severity of depressive symptoms, and minimal severity of manic symptoms as indicated by the PANSS–Excitement score. The overall cognitive ability (t -score = 45) indicated that the sample was experiencing, on average, minimal impairment in global cognitive function, but these scores do not consider premorbid levels of cognitive performance or intraindividual variability across measures. The great majority were prescribed psychotropic medications, as 95% were taking an atypical antipsychotic, mood stabilizer, or antidepressant. Among individual medication classes, 81% were taking a mood stabilizer, 47% an atypical antipsychotic, and 42% an antidepressant (the total exceeds 100% as some participants were taking multiple classes of medications).

Social competence and SLOF social functioning ratings

Based on a previous study that administered the SSPA to healthy comparison (HC) subjects (15), the proportion of participants with their performance 1 SD below the mean of the HCs was 30% (which is significantly higher than expected from a normal distribution with a 95% confidence interval $\pm 7\%$). A total of 64% of the sample had at least one item with minimal or greater impairment on the SLOF, with a mean of 2.2 items in this impaired range (SD = 2.2). On the individual SLOF–Interpersonal items, at least minimal impairment (scores < 5) was present as follows (in descending order): *Seeks and maintains friendships* (38%), *Initiates contact with others* (36%), *Participates in groups* (35%), *Asks for help* (31%), *Engages in activities without prompting* (29%), *Accepts contact with others* (27%), and *Communicates effectively* (24%). SSPA scores were significantly correlated with ratings of SLOF–Interpersonal functioning impairments in the bipolar disorder sample ($r = 0.244$, $p = 0.002$).

Bivariate associations of SSPA performance and SLOF social functioning ratings

There were no significant relationships between age and marital status, or age at onset of bipolar disorder, with either social competence (SSPA) or real-world social functioning (SLOF). The only demographic variables to approach significance at the 0.01 level were gender and education, with women exhibiting less impaired SLOF ratings than men [$F(1,163) = 5.4$, $p = 0.021$] and a positive correlation between educational attainment and the SSPA (see Table 2). Employed subjects had higher SSPA scores [$F(1,163) = 7.4$, $p = 0.007$] and SLOF–Interpersonal ratings [$F(1,161) = 8.1$, $p = 0.005$] than unemployed subjects. Participants who endorsed using other substances [marijuana ($n = 11$) or cocaine ($n = 3$)] registered lower SSPA scores [$F(1,162) = 6.0$, $p = 0.015$], but there was no effect for SLOF scores or associations between using alcohol three or more days per week ($n = 8$) and SSPA or SLOF ratings. The Neurocognitive Composite score was significantly but modestly associated with both SSPA scores and SLOF ratings. BDI scores and PANSS–Excitement scores were both negatively correlated with SLOF ratings. However, neither BDI nor PANSS–Excitement scores were related to the performance-based SSPA social functioning scores.

Multivariate analyses of the associations with SLOF social functioning

In a hierarchical entry regression, adjusting for gender and education in the first step, entering BDI score, PANSS–Excitement score, SSPA score, and Neurocognitive Composite score in the second step resulted in an r^2 of 0.218 ($SE = 0.56$, $p < 0.001$). Individual coefficients (in descending order of variance accounted for) were BDI score ($B = -0.020$, $SE = 0.004$, $t = 4.5$, $p < 0.001$), PANSS–Excitement ($B = -0.039$, $SE = 0.016$, $t = 2.4$, $p = 0.018$), and SSPA scores ($B = 0.221$, $SE = 0.111$, $t = 2.0$, $p = 0.048$). The coefficient for the Neurocognitive Composite score was not significant ($B = 0.004$, $SE = 0.006$, $t = 0.73$, $p = 0.469$).

Finally, we examined whether social competence (SSPA scores used to define impaired versus unimpaired cases) moderated the relationship between SLOF–Interpersonal score and (i) BDI score, (ii) Neurocognitive Composite score, and (iii) PANSS–Excitement score. We included gender and education as covariates in these analyses. In each of these three analyses, the overall model was significant below the $p < 0.0167$ level. With respect to depression (BDI score), there was a significant main effect for depressive symptoms on SLOF–Interpersonal ($B = -0.013$, $SE = 0.006$, $t = 2.2$, $p = 0.026$), no main effect for SSPA, and a significant interaction between SSPA and BDI score ($B = -0.020$, $SE = 0.009$, $t = 2.2$, $p = 0.027$). Thus, having an impaired SSPA score (i.e., < 1 SD below normative mean of 4.1) was related to a greater impact of depressive symptoms on SLOF–Interpersonal scores. With neurocognitive ability (Neurocognitive Composite score), there was a main effect for SSPA score ($B = -1.6$, $SE = 0.572$, $t = 2.8$, $p = 0.005$), no main effect for Neurocognitive Composite, and a significant interaction between Neurocognitive Composite and SSPA score ($B = 0.32$, $SE = 0.013$, $t = 2.44$, $p = 0.016$). Finally, there was a main effect for PANSS–Excitement scores on SLOF–Interpersonal ($B = -0.043$, $SE = 0.020$, $t = 2.1$, $p = 0.035$), yet no main effect for SSPA or significant interaction term.

Discussion

Consistent with prior reports, we found that the majority of a large sample of outpatients with bipolar disorder exhibited at least some social impairments on an observer-rated measure. In addition, nearly one third of subjects exhibited impairment in social competence based on a performance-based measure of functioning. There were few demographic associations with observer-rated or performance-based indicators, suggesting that social impairments are not restricted to specific demographic subgroups of patients with bipolar

disorder. However, both social capacity and social functioning scores were diminished among unemployed subjects. Bivariate analyses revealed that, similar to previous work in schizophrenia, neurocognitive ability was a shared correlate of social competence and observer-rated social functioning, whereas psychopathologic symptoms (depressive and manic symptoms) were associated only with observer-rated social function. In multivariate analyses, the severity of depressive symptoms was the strongest overall correlate of observer-rated social functioning, underscoring the need for effective treatments that reduce bipolar depression. Overall, even among outpatients experiencing low severity of symptoms, social disability is common in bipolar disorder, and social disability presents a target for intervention. In addition, a subset of patients is also impaired in social competence, and when present, the impact of depression and cognitive impairment on social functioning may be increased; therefore, a subset of people with bipolar disorder may benefit from interventions to enhance social skills. However, since the minority of subjects was impaired, social skills interventions do not appear to be generically indicated.

These findings must be interpreted in light of several limitations. The sample consisted largely of community-dwelling participants who were experiencing, on average, a low level of severity of symptoms, and who were racially and ethnically homogenous (all were of Ashkenazi Jewish descent) and who had a high level of education on average. Therefore, generalization of these findings to more severely ill samples (e.g., inpatients) and to ethnically diverse samples may be limited. In particular, it may be that more severely symptomatic patients experience a higher rate of impairment in social competence. The study was cross-sectional, and therefore it is difficult to determine the direction of the impact of the variables studied; prior longitudinal research (2) suggests bidirectional relationships such that symptoms predict later social impairment and vice versa. It may be that symptoms produce deficits in social competence, such as by reducing opportunities to acquire and practice social skills. Finally, we lacked a standardized measure of manic symptoms, such as the YMRS, although the PANSS– Excitement scale used in this study has been shown to correspond well with the YMRS (31).

Despite these limitations, these findings suggest that social disability is the rule rather than the exception in bipolar disorder, even among outpatients with low severity of symptoms. Based on the criterion of any exhibited deficit on the SLOF, 64% of subjects exhibited some social impairment, and these deficits were distributed evenly among demographic strata. This suggests that the proportion of patients with social impairments is similar to the proportion of patients who are actively symptomatic with bipolar disorder [roughly 50% of time spent with depressive symptoms and 10% with manic symptoms (33, 34)], and they likely covary with other aspects of disability, such as lower rates of employment, as we found in our study. Improving social functioning may be best achieved by reducing bipolar depression, yet there are other contributors, particularly neurocognitive ability, that remain largely unaddressed by current pharmacologic and psychosocial interventions (11, 35, 36). These findings echo the conclusions of Miklowitz et al. (37) from the Systematic Treatment Enhancement Program for Bipolar Disorder psychosocial intervention study, who note that while intensive psychosocial interventions targeting depressive relapse prevention are effective in reducing general disability (including social impairments), a significant level of functional disability remains.

Interventions that directly target functional improvements (including vocational rehabilitation) (38, 39), adapted from psychosocial interventions established in schizophrenia, may be one route to enhancing social functioning. In addition to tailoring these interventions for people with bipolar disorder and their relatively higher premorbid levels of functioning as has been previously suggested (37), our findings suggest that psychosocial interventions likely need to be tailored within the heterogeneous population of

bipolar disorder. Performance-based assessment may better identify the subset of participants who evidence impairment in social competence, who represented 30% of our sample. There is little known about how to optimally incorporate social competence training into psychosocial intervention in bipolar disorder. Family-focused treatment which includes communication training is effective in improving psychosocial functioning in bipolar disorder (40). In schizophrenia, the evidence for efficacy of social competence training is generally positive, particularly when linked with programs emphasizing functional recovery, such as vocational training. It may also be that social functioning is indirectly enhanced via cognitive remediation in bipolar disorder, as has been observed in schizophrenia (41). Finally, longitudinal data on the causal relationships between symptoms, neurocognition, and social function may help to elucidate critical periods in which to reduce the probability of social disability in the large and heterogeneous population of people with bipolar disorder.

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Table 1

Sample characteristics (n = 164)

Variable	Mean (SD) or %	Range
Age (years)	47.5 (14.2)	18–80
Gender, Female (%)	49.8	–
Ever married (%)	51.2	–
Education (%)		–
< High school	8.0	
High school	6.8	
Some college (1-3 years)	25.9	
Bachelor's degree (4 years)	34.0	
> Bachelor's degree (> 4 years)	25.8	
Employed (%)	67.8	–
Age at onset of first depressive or manic episode (years)	19.5 (7.4)	5–45
Alcohol use (≥ 3 days/week in past month), %	4.9	–
Other substance use (any past-month use) ^a , %	8.5	–
Neurocognitive Composite (<i>t</i> -score)	45.5 (8.5)	23.0–89.1
Depressive symptoms (BDI score)	9.9 (10.3)	0–48
Manic symptoms (PANSS–Excitement score)	6.5 (3.0)	4–17
SSPA score	4.4 (0.4)	2.9–5.0
SLOF–Interpersonal score	4.5 (0.6)	2.1–5.0

BDI = Beck Depression Inventory; PANSS = Positive and Negative Syndrome Scale; SSPA = Social Skills Performance Assessment; SLOF = Specific Level of Functioning scale.

^aParticipants were asked about use of cocaine, amphetamine, marijuana, hallucinogens, and nonprescribed opiates or sedatives; 3 participants endorsed cocaine use and 11 endorsed marijuana use.

Table 2

Pearson correlations between Social Skills Performance Assessment (SSPA) and Specific Level of Functioning (SLOF)–Interpersonal scale ratings and study variables

	Age	Education ^a	BDI score	PANSS–Excitement subscale	Neurocognitive Composite score
SSPA	$r = 0.055$ $p = 0.483$	$\rho = 0.185$ $p = 0.019$	$r = -0.110$ $p = 0.164$	$r = -0.151$ $p = 0.053$	$r = 0.294$ $p < 0.001$
SLOF	$r = 0.017$ $p = 0.827$	$\rho = 0.105$ $p = 0.189$	$r = -0.362$ $p < 0.001$	$r = -0.237$ $p = 0.002$	$r = 0.204$ $p = 0.009$

BDI = Beck Depression Inventory; PANSS = Positive and Negative Syndrome Scale.

^aSpearman correlation used to calculate coefficients.