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Factors Influencing Self-Assessment of Cognition and Functioning in Bipolar Disorder: A Preliminary Study

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Abstract

Introduction—Self-assessment deficits are common in schizophrenia and span multiple aspects of functioning, including awareness of symptoms, and the ability to assess objective levels of cognitive deficits and everyday functioning. While impaired awareness of illness in bipolar disorder during symptomatic periods is well understood, awareness of disability and cognitive deficits has been less well studied.

Methods—In this pilot study, 30 patients with a lifetime history of bipolar 1 disorder and current bipolar depression completed performance-based tests of cognition and functional capacity and self reported their opinions of their cognitive abilities, everyday functioning, and symptoms. High contact clinicians also provided impressions of the patients' cognitive performance and everyday functioning.

Results—Clinician impressions of cognition and everyday functioning were correlated with the results of the performance-based assessments, whereas the patient self-reports of cognition and functioning were uncorrelated both with their own performance and with the clinician impressions. However, severity of depressive symptoms was correlated with self-reports of functioning in cognitive and functional domains, but not with either performance-based data or clinician impressions of cognition or functioning.

Conclusions—Depression appears to be a factor affecting self-assessment in bipolar disorder and reports of cognition and functioning were minimally related to objective information and clinician impressions. Symptoms of mania were minimal and not correlated with performance-based assessments or clinician impressions.

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Introduction

Severe mental illnesses such as schizophrenia and bipolar disorder are associated with significant impairments in cognitive, social, and everyday functioning (Bowie et al., 2010; Huxley & Baldessarini, 2007; Wingo et al., 2009). Poor insight into illness is a well-documented feature of schizophrenia and includes reduced awareness of having a mental disorder, unawareness of the need for treatment, and limited understanding the consequences of the illness (Amador et al., 1993; Medalia & Thyssen, 2010). Impaired awareness appears to apply to awareness of functional deficits as well. Self-assessments of functioning on the part of people with schizophrenia have consistently been found to be inaccurate compared to the observations of high contact clinicians, trained interviewers, and achievement of objective milestones such as sustaining full time employment (Bowie et al., 2007; Durand et al., 2015; Gould et al., in press; Harvey et al., 2012; Keefe et al., 2015; Sabbag et al., 2011).

Awareness of illness in bipolar patients has not been explored as much as in schizophrenia, particularly regarding disability or cognitive impairments. This paper presents a pilot study on self-assessment of cognitive, social, and everyday functioning of patients with bipolar depression, comparing self-reports of cognition and everyday functioning to both objective performance-based measures of these domains and impressions of high contact clinicians. In one previous study, patients with bipolar illness were found to provide reports of their cognitive abilities that were minimally correlated with concurrently collected objective performance (Burdick et al., 2005). Other studies of bipolar disorder have suggested a mismatch between subjective complaints and objective data (Martinez-Aran et al., 2005; Schouws et al., 2012). Subjective quality of life concerns have been found to be modestly related to objective functional performance (Depp et al., 2009; Pallanti et al., 1999). The accurate self-assessment of both cognition and functioning is likely to have functional implications, in that overestimation of current ability may have the potential to lead to failure experiences and underestimation may reduce motivation to exert effort to attain realistic functional goals.

Our recent studies have shown that the contributions of cognitive and functional skills to impairments in everyday functioning were quite similar in schizophrenia and bipolar disorder (Bowie et al., 2010; Depp et al., 2009b; Mausbach et al., 2010). These findings applied both to achievements of milestones such as residential functioning and to prediction of clinicians' ratings of everyday functional skills. We have recently also shown a pattern of overestimation of functional skills in people with schizophrenia relative both to ratings generated by high contact clinicians (Bowie et al., 2007; Sabbag et al., 2011) and to lifetime achievement of functional milestones (Harvey et al., 2012). Greater self-reported severity of depression in this population was associated with a negative impact on self-assessment in cognitive and functional domains (Sabbag et al., 2012). In our first study of this topic (Bowie et al., 2007), we found that depression had a curvilinear relationship with self-assessment, with low levels of subjective depression leading to overestimation of functioning, high levels leading to underestimation, and mild depression associated with the most accurate self-assessment. In our most recent study on schizophrenia, we also found that the presence of moderate depression was associated with a tendency to rate one's self as less

competent than the impressions of clinicians and that minimal depression was associated with overestimation of functioning compared to clinician impressions (Durand et al., 2015).

In this preliminary study, we employed performance-based assessments of cognition and functional skills that have previously been widely used to assess community dwelling people with bipolar I disorder who were currently depressed. These research participants also provided self-reports regarding their current mood, and everyday functioning in three different functional domains with a previously validated rating scale (Schneier & Streuening, 1983). They completed a structured self-report assessment of cognitive performance (Ventura et al., 2013) and were examined with a metacognitive variant of the Wisconsin Card Sorting Test (Koren et al., 2004; 2005). High contact clinicians also generated identical functioning and cognitive performance ratings, while unaware of the patients' performance on the assessment measures and their self-reports.

As mood symptoms are clearly and almost continuously salient in many individuals with bipolar disorder (both bipolar 1 and 2; Judd et al., 2002; 2003), we expected that mood might have an impact on both self-reports of functioning and on performance-based assessment measures. We hypothesized that more severe depression would be associated with self-reports of more impairment in cognition and functioning. We further hypothesized that there would be minimal correlations between self-reported cognition and everyday functioning and information obtained from performance-based assessments and clinician impressions.

Methods

Participants

These analyses are part of the larger Validation of Everyday Real World Outcomes (Harvey et al., 2011) study (phase 2), aimed at identifying the determinants of self-assessment of cognition and everyday functioning in severe mental illness. The study participants were patients (n=30) with a lifetime history of DSM-IV Bipolar I disorder (defined as a previous manic episode) who were receiving treatment for bipolar depression at one of two different outpatient service delivery systems, one in Atlanta and one in Little Rock, Arkansas. In addition, high contact clinician informants (case manager or psychologist) provided impressions concerning the functioning of each of the patients. All of these research participants (patients and informants) provided signed, informed consent, and this research study was approved by local IRBs in Miami (Grant home site), Atlanta, and Little Rock. In Atlanta, patients were recruited at a psychiatric rehabilitation program (Skyland Trail); in Little Rock they were recruited from the general outpatient population of the University of Arkansas Medical Center.

All patients were administered a structured diagnostic interview, the Mini International Neuropsychiatric Interview, 6th Edition (MINI; Sheehan et al., 1998) by a trained interviewer. All diagnoses were subjected to a consensus procedure, in which the first author discussed the case with the interviewer and reviewed the structured interview. Patients were excluded for a history of traumatic brain injury with unconsciousness >10 minutes, brain disease such as seizure disorder or neurodegenerative condition, or the presence of another

DSM-IV diagnosis that would exclude the diagnosis of bipolar I disorder. Comorbid substance use disorders were not an exclusion criterion, in order to capture a broad array of patients, but the protocol specified that patients who appeared intoxicated were to be rescheduled. Inpatients were not recruited, but patients could live in a wide array of unsupported, supported, or supervised residential facilities.

Procedure

All patients were examined with an assessment of neuropsychological and functional capacity performance. They also provided self-reports of interpersonal functioning, everyday activities, and vocational skills. Patients also rated their cognitive functioning using a structured procedure. In addition, they performed an additional neuropsychological assessment, the meta-cognitive Wisconsin Card Sorting Test. High contact clinicians generated ratings of cognition and everyday functioning with the clinician versions of the cognition and functional status rating scales. These clinicians were not trained to generate ratings. They were simply asked to provide their impression on questionnaire measures of functioning and cognitive abilities.

Performance-based assessment

Neurocognition—We examined NP performance with a modified version of the MATRICS consensus cognitive battery (Nuechterlein et al., 2008). For this study, we did not include the social cognition measure from the MCCB, the Mayer–Salovey–Caruso Emotional Intelligence Test—Managing Emotions, because there is meta-analytic information that social cognition measures may have a different relationship with everyday outcomes compared to neurocognitive measures (Fett et al., 2011). This minor modification of the MCCB makes the procedures similar to previous work, such as our own, that did not include social cognition measures (Bowie et al., 2008) We calculated a cognitive composite score, with an average of 9 age-corrected T-scores based on the MCCB normative program.

Functional Capacity—We administered the brief version of the UCSD Performance-based Skills Assessment (UPSA-B; Mausbach et al., 2007) as our functional capacity measure. The UPSA-B is a measure of functional capacity in which patients are asked to perform everyday tasks related to communication and finances. During the *Communication* subtest, participants role-play exercises using an unplugged telephone (e.g., making an emergency call; dialing a number from memory; calling to reschedule a doctor’s appointment). For the *Finance* subtest, participants count change, read a utility bill and write and record a check for the bill. The UPSA-B requires approximately 10 minutes, and raw scores are converted into a total score ranging from 0-100, with higher scores indicating better functional capacity. This test is highly associated with attainment of functional milestones such as work or residential independence (Mausbach et al., 2010) as well as with clinician ratings of quality of everyday functioning (Bowie et al., 2010) in people with bipolar disorder.

Real-World Functional Outcomes—For real-world functioning, we used the Specific Levels of Functioning (SLOF; Schneider and Streuening, 1983). We collected ratings of patients’ behavior and functioning on the following domains: Interpersonal Relationships

(e.g., initiating, accepting and maintaining social contacts, effectively communicating), Participation in Community and Household Activities (shopping, using the telephone, paying bills, use of leisure time, use of public transportation), and Work Skills (e.g., employable skills, level of supervision required to complete tasks, ability to stay on task, completes tasks, punctuality). Note that the Work Skills domain comprises behaviors important for vocational performance, but is not necessarily a rating of behavior during employment. The SLOF has been previously employed in patients with bipolar disorder (e.g., Bowie et al., 2010).

Self-reported and Interviewer Rated Cognitive Functioning—We had patients and the high contact clinicians complete the Cognitive Assessment Inventory (CAI; Ventura et al., 2013). This is a 10-item instrument that asks the person making the judgments about cognition to rate severity of impairments in a variety of cognitive domains. These domains are aimed at the dimensions of cognitive impairment typically studied in schizophrenia. Ratings are generated with on a 6-point (1-6) scale, with scores of 1 reflecting the least impairment. For the purposes of these analyses, we calculated a total score for the clinician and self-reported scores on the CAI. The patient was asked the questions in a standard interview format by a research coordinator. Clinicians were asked to complete the form using the same instructions that the interviewer provided to the patients.

Metacognitive Wisconsin Card Sorting Test—Using a metacognitive adaptation of the Wisconsin Card Sorting task developed by Koren et al. (2004; 2005), we examined subjects' abilities to perform the test and to evaluate the quality of their neuropsychological performance. We administered the Wisconsin Card-Sorting Test (64-card version) and asked patients to decide whether they wanted the response to count toward their total score prior to receiving accuracy feedback. Thus, performance can be split into dependent variables of accuracy (correct sorts), and judgment (proportion of responses "offered" as correct as a function of perceived accuracy).

Psychopathology Measures—Assessment of self-reported depressive symptoms employed the Beck Depression Inventory-II (BDI-II; Beck et al.1996), a 21-item questionnaire. Participants rated each of the 21 items on a scale from 0-3. A total depression score was created by summing the 21 items (range 0 to 63).

Severity of manic symptoms was assessed using the Positive and Negative Syndrome Scale (PANSS; Kay, 1991). This 30-item scale contains items measuring positive symptoms, negative symptoms, and general aspects of psychopathology and was completed after a structured interview by a trained interviewer. The PANSS "excitement" subscale (uncooperativeness, poor impulse control, excitement, and hostility; Lindenmayer et al., 2004) was used to quantify the severity of symptoms of mania.

Data Analyses—The analyses were aimed at identifying any discrepancies between self-reports and clinician impressions and at the correlations between self reported functioning and objective data. Comparisons between self-reports and clinician impressions were performed with paired t-tests and the other analyses used Pearson correlations.

Results

Table 1 presents demographic information on the patient participants and Table 2 presents the scores on the SLOF and CAI, for both self-reports and clinician impressions and for all of the predictor variables, including the UPSA-B, modified MCCB, metacognitive WCST, and the BDI-II. As can be seen in Table 1, the majority of patients were male and approximately half were Caucasian. One third were African American and one fifth had a Hispanic ethnic background. The average age was mid 40's and the average years of education was slightly over high school. All patients were receiving treatment with mood stabilizers and some of the patients were also treated with atypical antipsychotic medications and/or antidepressants. The high contact clinicians were all case managers for the 12 patients recruited in Atlanta and there were 9 patients rated by psychologist raters and 9 by case managers in Little Rock. On average, patients were approximately one standard deviation below the performance of healthy individuals on the UPSA and they were experiencing depressive symptoms of moderate severity with quite mild levels of severity of manic symptoms. The patients performed consistently with the results of previous larger samples of patients with bipolar disorder on the MCCB and the UPSA-B (Harvey et al., 2014). WCST performance was less than 50% correct across the 64 trials and the patients' judgments about whether their responses were correct or incorrect were somewhat less accurate than that. Examinations of the distributions of the scores indicated that there were no significant departures from normal distributions.

For the first analysis, paired t-tests compared the self-reported and clinician-rated scores on real-world functioning and cognition. For everyday activities on the SLOF and cognitive functioning measured with the CAI, the patient self-reports reflected significantly **more** severe impairment than the level reported by the clinicians. SLOF Interpersonal and Vocational functioning were essentially identical in terms of clinician ratings and self-reports. Results of these t-tests are presented in Table 2.

Next, Pearson correlations were computed between patient-reported and clinician rated everyday functioning (SLOF) scores and cognitive abilities (CAI). These correlations are presented in Table 3. All four of these correlations were non-significant and the largest of these correlations accounted for approximately 10% of the variance. Vocational functioning was more highly inter-correlated across patient and clinician sources than the other variables.

The next set of correlations was between the performance-based variables (Modified MCCB, UPSA-B, and meta-cognitive WCST), and depression reported by the patients, as well as the clinician and patient reported scores on the SLOF and the CAI. Clinician rated scores on the SLOF work and activities subscales were significantly correlated with both MCCB scores and with performance on the UPSA-B. Further, clinician ratings on the CAI were also correlated with UPSA-B scores, MCCB scores, and performance on the metacognitive WCST. Finally, clinician ratings on the interpersonal functioning subscale on the SLOF were not correlated with the performance-based measures or clinician ratings of cognition generated with the CAI. However, patient reported depression indexed by BDI

scores were not correlated with any of the clinician rated SLOF subscales or clinician ratings on the CAI.

Patient reported functioning manifested a very different pattern of correlations with the predictor variables. There were no statistically significant correlations between patient performance on the MCCB, the UPSA-B, and the meta-cognitive WCST and any of their self-reports of everyday functioning or cognition on the CAI. In contrast, all four aspects of patients' self-reported functioning were significantly correlated with patient-reported BDI scores, with higher depression scores predicting lower self-reported functioning. Excitement scores were all nonsignificantly related to other aspects of self-report. Thus, patients' ratings of their functioning were consistently correlated with their self-reported depression symptoms but were not correlated with their objective ability scores or with clinical ratings of mania-related symptoms.

In a final exploratory analysis, we used partial correlation analysis to adjust for the influences of depression on the convergence of self- assessment and clinician reports. We recomputed the correlations between the 3 domains of everyday functioning on the SLOF and cognition as assessed by the CAI with partial correlations controlling for BDI scores. The correlations increased to $r=-.28$ for interpersonal functioning (.07), were unchanged for activities ($r=.04$) and increased to $r=.34$ ($p<.05$) for vocational outcomes. Most interestingly, however, was the finding that the correlation between self-reported and interviewer rated CAI scores increased from $r=.07$ to $r=.43$ ($p<.05$). This suggests that when the influence of current depression is adjusted, patients' self- reports increase in their correspondence to the impressions coming from clinician raters.

Discussion

In our small pilot study we found that people with bipolar depression, on average, underestimate their cognitive and independent living skills, when clinician ratings of their functioning are used as a reference point. There were no variables on which self-reported cognition or functioning was significantly correlated with either clinician ratings of those same variables or with objective measures of ability; these correlations were so small that most would have been nonsignificant if the sample size had been 100 cases. These findings parallel and extend to that found in Burdick et al. (2005) who also identified minimal association between self-assessed and objective measures of cognitive performance in bipolar disorder. Self-reported depression was consistently correlated with all aspects of self-reported real-world and cognitive functioning, with more severe depression correlating with reports of more impaired functioning. Yet, patient reported depression was also not associated with their objective performance on either NP tests or functional capacity measures. In contrast, clinician impressions of everyday functioning were correlated with patients' performance on cognitive tests and the UPSA-B, and these clinician ratings of functioning were not significantly correlated with patient reported depression. The correlations between the performance-based assessments and clinician ratings of everyday functioning provide evidence of convergence between unique sources of information, because the clinicians were not aware of these scores when they made their ratings. These

findings suggest that patients may have either have limited awareness of objective deficits or that they are indexing their functioning by their level of distress.

Some limitations of this study need to be addressed. The first limitation was the sample size of thirty participants. Another restriction of this study was that each patient had to be assessed by a third party (high contact clinician). Our current sample was too small for any sub division of patients into groups and we could not examine the correlations between functioning and self- assessment in the more vs. less depressed subsamples. Medication analyses were impossible given the diversity of treatments offered and the small sample size. Moreover, the study was cross-sectional and so the association of fluctuation in mood with within the same participation and subsequent judgments of cognition and functional status is unknown. Partial correlation analysis adjusting for depression is not a real substitute for longitudinal research on the correlations between functioning, self-assessment, and mood state. Following patients from the depressed to hypomanic or manic states will provide more insight into the impact that mood has on a bipolar patients' level of self-awareness. Moreover, it would be important to gauge whether manic symptoms have similar or opposing effects of depression, perhaps associated with overestimation of cognitive and functional ability; this would require a sample with considerably higher mania ratings than the current sample.

These data raise questions about the reports of patients with bipolar depression regarding their cognitive and functional abilities given the limited concordance to performance-based assessments. These findings are consistent with treatment studies of patients with unipolar major depression, wherein self-reported cognitive deficits track the severity of depressed symptoms and were found to be uncorrelated with both baseline cognitive performance measured with objective tests and changes in cognitive performance during treatment (Mahableshwarkar et al., in press; McIntyre et al., 2014).

These results have implications for future research on clinical interventions in bipolar illness. Similar to currently accepted guidance in schizophrenia, performance-based measures of cognitive functioning and functional capacity should be considered for the assessment of abilities in treatment studies. Clinician ratings seem to have higher levels of convergence with performance-based measures of ability, but any study using these outcomes measures would need to require that all patients have such an informant and that this informant have substantial levels of familiarity with the patients.

Depression had a unique relationship with self-reported functioning in this study. Clinicians did not rate more depressed patients as more cognitively or functionally impaired; this tendency was validated by the results of the performance-based assessments, which were found to be correlated with clinician ratings and not with BDI-II scores. These findings are consistent with a recent study our ours in women with PTSD, where their reports of their everyday functioning were highly correlated with self reported depression and PTSD and uncorrelated with cognitive and functional capacity performance (Kaye et al., 2014). The direction and mechanisms of the influence of depression on self-assessment should be investigated in future research. Objective measures of metacognition, such as the adapted WCST used in this study, might be particularly useful in understanding the influence of

mood state on disruptions in accuracy in online performance judgments on testing, and their functional implications. In addition, attempts to sample patients with a range of severity of depression would allow for testing the idea that the previously observed curvilinear relationship between depression and self-assessment accuracy applies in bipolar disorder as well.

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References

- Amador XF, Strauss DH, Yale SA, Flaum MM, Endicott J, Gorman JM. Assessment of insight in psychosis. *American Journal of Psychiatry*. 1993; 150:873–879. [PubMed: 8494061]
- Beck, A.; Steer, R.; Brown, G. BDI-II. The Beck Depression Inventory. The Psychological Corporation; San Antonio, TX: 1996.
- Bowie CR, Depp C, McGrath JA, Wolyniec P, Mausbach BT, Thornquist MH, Pulver AE. Prediction of real-world functional disability in chronic mental disorders: a comparison of schizophrenia bipolar disorder. *American Journal of Psychiatry*. 2010; 167:1116–1124. doi: 10.1176/appi.ajp.2010.09101406. [PubMed: 20478878]
- Bowie CR, Leung WW, Reichenberg A, McClure MM, Patterson TL, Heaton RK, Harvey PD. Predicting schizophrenia patients' real-world behavior with specific neuropsychological and functional capacity measures. *Biological Psychiatry*. 2008; 63:505–511. [PubMed: 17662256]
- Bowie CR, Twamley EW, Anderson H, Halpern B, Patterson TL, Harvey PD. Self-assessment of functional status in schizophrenia. *Journal of Psychiatric Research*. 2007; 41(12):1012–1018. [PubMed: 17014866]
- Burdick KE, Endick CJ, Goldberg JF. Assessing cognitive deficits in bipolar disorder: are self-reports valid? *Psychiatry Research*. 2005; 136:43–50. [PubMed: 16024090]
- Depp CA, Mausbach BT, Eyler LT, Palmer BW, Cain AE, Lebowitz BD, Patterson TL, Jeste DV. Performance-based and subjective measures of functioning in middle-aged and older adults with bipolar disorder. *Journal of Nervous and Mental Disease*. 2009; 197:471–475. doi: 10.1097/NMD.0b013e3181ab5c9b. [PubMed: 19597353]
- Depp CA, Mausbach BT, Harvey PD, Bowie CR, Wolyniec PS, Thornquist M, Patterson TL. Social competence and observer-rated social functioning in bipolar disorder. *Bipolar Disorders*. 2009b; 12:843–50. doi: 10.1111/j.1399-5618.2010.00880.x. [PubMed: 21176031]
- Durand D, Strassnig M, Sabbag S, Gould F, Twamley EW, Patterson PT, Harvey PD. Factors Influencing Self-Assessment of Cognition and Functioning in Schizophrenia: Implications for Treatment Studies. *European Neuropsychopharmacology*. 2015; 25:185–191. doi: 10.1016/j.euroneuro.2014.07.008. [PubMed: 25104226]
- Fett AK, Viechtbauer W, Dominguez MD, Penn DL, van Os J, Krabbendam L. The relationship between neurocognition and social cognition with functional outcomes in schizophrenia: a meta-analysis. *Neuroscience and Biobehavioral Reviews*. 2011; 35:573–588. doi: 10.1016/j.neubiorev.2010.07.001. [PubMed: 20620163]
- Gazalle FK, Frey BN, Hallal PC, Andreatza AC, Cunha AB, Santin A, Kapczinski F. Mismatch between self-reported quality of life and functional assessment in acute mania: a matter of unawareness of illness? *Journal of Affective Disorders*. 2007; 103:247–252. [PubMed: 17289153]
- Gould, F.; McGuire, LS.; Durand, D.; Lurrari, C.; Sabbag, S.; Patterson, TL.; Harvey, PD. Self-assessment in schizophrenia: Accuracy of assessment of cognition and everyday functioning. *Neuropsychology*. in press.
- Harvey PD, Siever LJ, Huang GD, Muralidhar S, Zhao H, Miller P, Concato J. The Genetics of Functional Disability in Schizophrenia and Bipolar Illness: Methods and Initial Results for VA Cooperative Study #572. *Neuropsychiatric Genetics*. 2014; 165:381–389. doi: 10.1002/ajmg.b.32242. [PubMed: 24798943]

- Harvey PD, Raykov T, Twamley EW, Vella L, Heaton RK, Patterson TL. Validating the measurement of real-world functional outcomes: phase I results of the VALERO study. *American Journal of Psychiatry*. 2011; 168:1195–1201. doi: 10.1176/appi.ajp.2011.10121723. [PubMed: 21572166]
- Harvey PD, Sabbag S, Prestia D, Durand D, Twamley EW, Patterson TL. Functional Milestones and Clinician Ratings of Everyday Functioning in People with Schizophrenia: Overlap Between Milestones and Specificity of Ratings. *Journal of Psychiatric Research*. 2012; 46:1546–1552. doi: 10.1016/j.jpsychires.2012.08.018. [PubMed: 22979993]
- Huxley N, Baldessarini RJ. Disability and its treatment in bipolar disorder patients. *Bipolar Disorders*. 2007; 9:183–196. [PubMed: 17391360]
- Judd LL, Akiskal HS, Schettler PJ, Endicott J, Maser J, Solomon DA, Keller MB. The long-term natural history of the weekly symptomatic status of bipolar I disorder. *Archives of General Psychiatry*. 2002; 59:530–537. [PubMed: 12044195]
- Judd LL, Akiskal HS, Schettler PJ, Coryell W, Endicott J, Maser JD, Keller MB. A prospective investigation of the natural history of the long-term weekly symptomatic status of bipolar II disorder. *Archives of General Psychiatry*. 2003; 60:261–269. [PubMed: 12622659]
- Kaye JL, Dunlop BW, Iosifescu DV, Mathew SJ, Kelley ME, Harvey PD. Cognition, Functional Capacity, and Disability in Women with Posttraumatic Stress Disorder: Examining the Validity of Self Reports. *Journal of Psychiatric Research*. 2014; 57:51–57. doi: 10.1016/j.jpsychires.2014.06.002. [PubMed: 24974001]
- Keefe RSE, Davis VG, Spagnola NB, Hilt D, Dgetluck N, Ruse S, Harvey PD. Reliability, Validity and Treatment Sensitivity of the Schizophrenia Cognition Rating Scale. *European Neuropsychopharmacology*. 2015; 25:176–184. doi: 10.1016/j.euroneuro.2014.06.009. [PubMed: 25028065]
- Koren D, Poyurovsky M, Seidman LJ. The neuropsychological basis of competence to consent in first-episode schizophrenia: a pilot metacognitive study. *Biological Psychiatry*. 2005; 57:609–16. [PubMed: 15780847]
- Koren D, Seidman LJ, Poyurovsky M. The neuropsychological basis of insight in first-episode schizophrenia: a pilot metacognitive study. *Schizophrenia Research*. 2004; 70:195–202. [PubMed: 15329296]
- Lindenmayer JP, Brown E, Baker RW, Schuh LM, Shao L, Tohen M, Ahmed S, Stauffer VL. An excitement subscale of the positive and negative syndrome scale. *Schizophrenia Research*. 2004; 68:331–337. [PubMed: 15099614]
- Mahableshwarkar, AR.; Zajecka, J.; Jacobson, W.; Chen, Y.; Keefe, RSE. A Randomized, Placebo-Controlled, Active-Reference, Double-Blind, Flexible-Dose Study of the Efficacy of Vortioxetine on Cognitive Function in Major Depressive Disorder. *Neuropsychopharmacology*. in press. doi: 10.1038/npp.2015.52
- Martinez-Aran A, Vieta E, Colom F, Torrent C, Reinares M, Goikolea JM, Sánchez-Moreno J. Do cognitive complaints in euthymic bipolar patients reflect objective cognitive impairment? *Psychotherapy and Psychosomatics*. 2005; 74:295–302.
- Mausbach BT, Harvey PD, Goldman SR, Jeste DV, Patterson TL. Development of a brief scale of everyday functioning in persons with serious mental illness. *Schizophrenia Bulletin*. 2007; 33:1364–1372. [PubMed: 17341468]
- Mausbach BT, Harvey PD, Pulver AE, Depp CA, Wolyniec PS, Thornquist MH, Patterson TL. Relationship of the Brief UCSD Performance based skills assessment (UPSA-B) to multiple indicators of functioning in people with schizophrenia and bipolar disorder. *Bipolar Disorders*. 2010; 12:45–55. doi: 10.1111/j.1399-5618.2009.00787.x. [PubMed: 20148866]
- McIntyre RS, Lophaven S, Olsen CK. A randomized, double-blind placebo-controlled study of vortioxetine on cognitive function in depressed adults. *International Journal of Neuropsychopharmacology*. 2014; 17:1557–1567. 2014. doi: 10.1017/S1461145714000546. [PubMed: 24787143]
- Medalia A, Thysen J. A comparison of insight into clinical symptoms versus insight into neurocognitive symptoms in schizophrenia. *Schizophrenia Research*. 2010; 118:134–139. doi: 10.1016/j.schres.2009.09.02. [PubMed: 19840898]

- Nuechterlein KH, Green MF, Kern RS, Baade LE, Barch DM, Cohen JD, Marder SR. The MATRICS Consensus Cognitive Battery, part 1: test selection, reliability, and validity. *American Journal of Psychiatry*. 2008; 165:203–213. doi: 10.1176/appi.ajp.2007.07010042. [PubMed: 18172019]
- Pallanti S, Quercioli L, Pazzagli A, Rossi A, Dell'Osso L, Pini S, Cassano GB. Awareness of illness and subjective experience of cognitive complaints inpatients with bipolar I and bipolar II disorder. *American Journal of Psychiatry*. 1999; 156:1094–1096. [PubMed: 10401459]
- Sabbag S, Twamley EM, Vella L, Heaton RK, Patterson TL, Harvey PD. Assessing everyday functioning in schizophrenia: not all informants seem equally informative. *Schizophrenia Research*. 2011; 131:250–255. doi: 10.1016/j.schres.2011.05.003. [PubMed: 21620682]
- Sabbag S, Twamley EW, Vella L, Heaton RK, Patterson TL, Harvey PD. Predictors of accuracy of self-assessment of everyday functioning in people with schizophrenia. *Schizophrenia Research*. 2012; 137:190–195. doi: 10.1016/j.schres.2012.02.002. [PubMed: 22386735]
- Schneider LC, Struening EL. SLOF: a behavioral rating scale for assessing the mentally ill. *Social Work Research and Abstracts*. 1983; 19:9–21. [PubMed: 10264257]
- Schouws SN, Comijs HC, Stek ML, Beekman AT. Self-reported cognitive complaints in elderly bipolar patients. *American Journal of Geriatric Psychiatry*. 2012; 20:700–706. doi: 10.1097/JGP.0b013e31822ccd27. [PubMed: 21857220]
- Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, Dunbar GC. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry*, 59 Suppl. 1998; 20:22–33.
- Ventura J, Reise SP, Keefe RS, Hurford IM, Wood RC, Bilder RM. The Cognitive Assessment Interview (CAI): reliability and validity of a brief interview-based measure of cognition. *Schizophrenia Bulletin*. 2013; 39:583–559. doi: 10.1093/schbul/sbs001. [PubMed: 22328641]
- Wingo A, Harvey PD, Baldessarini RJ. Neurocognitive impairment in bipolar disorder patients: functional implications. *Bipolar Disorder*. 2009; 11:113–125. doi: 10.1111/j.1399-5618.2009.00665.x.

Table 1

Demographic and Clinical Variables for 30 Patients in the VALERO II Bipolar Pilot Study

Characteristic	n=30	
	n	%
Male	16	53
Race		
Caucasian	16	53
African American	14	47
Hispanic Ethnicity	6	20
Medication Status		
Mood Stabilizer	30	100
Antipsychotic	20	67
Antidepressant	14	47
Lifetime Substance Abuse	15	50
	Mean	SD
Age (Years)	44.3	12.8
Age at First Manic Episode	24.4	10.8
Education (Years)	12.6	2.5

Table 2

Everyday functioning, Cognition, and Mood Symptoms in 30 Patients with Bipolar Depression: Clinician Ratings and Patient Reports
Cognition and Everyday Outcomes as Reported by Patients and Clinicians

Cognition and Everyday Outcomes as Reported by Patients and Clinicians						
Variable	Clinician Ratings		Patient Reports		t	p
	M	SD	M	SD		
SLOF Interpersonal Functioning ^a	4.36	0.75	4.31	0.80	0.62	0.542
SLOF Activities Subscale	4.86	0.83	4.56	0.51	2.67	0.012
SLOF Vocational Subscale	4.06	0.92	4.29	0.83	1.43	0.160
Cognitive Assessment Inventory ^b	14.07	7.40	18.83	5.79	3.96	0.001
Cognition, Functional Capacity, and Symptoms						
	M	SD				
Cognition Composite Score ^c	44.31	8.90				
UPSA-B Score ^d	76.62	9.84				
BDI-II	21.94	14.29				
PANSS Excitement ^e	8.16	7.54				
WCST Performance (% correct)	43.75	37.50				
WCST Assessment (% correct)	36.25	39.40				

^aPresented as average item scores; range= 1 to 5; higher scores reflect better functioning

^bHigher scores reflect more impairment

^cT-score: Mean = 50 and SD=10

^dScores range from 0-100

^eScores range from 4-56, higher scores reflect more impairment

Table 3

Pearson Correlation Analyses Examining Everyday Functioning and Cognition: Clinician Ratings and Patient Reports
Correlations Between Self-reported vs. Clinician Rated Functioning

Correlations Between Self-reported vs. Clinician Rated Functioning					
Clinician Rated	Patient Reported				
SLOF Interpersonal Functions Subscale	.17				
SLOF Activities Subscale	.01				
SLOF Vocational Subscale	.30 ^a				
Cognitive Assessment Inventory	.07				
Correlations Between Self-reported vs. Clinician Rated Functioning, Performance, and Symptom Measures					
Clinician Rated	MCCB Total Score	UPSA-B	WCST Performance	BDI Total	PANSS Excitement
SLOF Interpersonal Functions	.16	.07	.10	-.20	-.14
SLOF Activities Subscale	.31 [*]	.39 [*]	.29 ^a	.21	-.07
SLOF Vocational Subscale	.23	.37 [*]	.28	-.20	-.16
Cognitive Assessment Inventory	.41 [*]	-.30 ^a	.54 [*]	.20	-.10
Self-Reported					
SLOF Interpersonal Functions	.24	-.13	-.06	-.58 [*]	.18
SLOF Activities Subscale	.11	.14	-.06	-.40 [*]	.14
SLOF Vocational Subscale	.08	.00	.22	-.59 [*]	.11
Cognitive Assessment Inventory	.22	-.29	.06	.60 [*]	-.17

* p<.05

^a p<.10