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# Determinants of Occupational and Residential Functioning in Bipolar Disorder

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## Abstract

**Background—**Bipolar disorder is associated with reduced rates of employment and residential independence. The influence of cognitive impairment and affective symptoms on these functional attainments has received little previous attention and is the focus of this study.

**Method—**A total of 229 adult outpatients with bipolar disorder without active substance use disorders and with an average of mild severity of affective symptoms were included in the analyses. After adjusting for sociodemographic and illness history covariates, univariate and multivariate analyses were used to evaluate the independent and interactive associations of neurocognitive ability, performance-based functional capacity, and affective symptom severity with residential independence, occupational status and number of hours worked.

**Results—**A total of 30% of the sample was unemployed and 18% were not independently residing. Neurocognitive ability was the strongest predictor of any employment, but depressive symptom severity was the only variable significantly related to hours worked. The strongest predictor of residential independence was performance-based functional capacity. Affective symptoms and neurocognitive ability were independent (non-interactive) predictors of occupational and residential status.

**Limitations—**This is a cross-sectional study and thus causal direction among variables is unknown. The sample was ethnically homogeneous and thus the results may not generalize to ethnically diverse samples.

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**Conclusions—**This study confirmed elevated rates of unemployment and residential non-independence in adults with bipolar disorder. Interventions targeting cognitive deficits and functional capacity may increase the likelihood of any employment or residential independence, respectively. Interventions targeting depressive symptoms may be most influential on work outcomes among those already employed.

### Keywords

Bipolar disorder; severe mental illness; disability; functioning; neuropsychology; employment

## Introduction

Rates of attainment of functional milestones, such as full-time employment and independent living, are far lower in people with bipolar disorder than the general population (Hirschfeld, Lewis et al. 2003; Dean, Gerner et al. 2004). Estimates vary, but approximately 50% of patients are unemployed and employed patients exhibit diminished work performance (reduced hours, absenteeism) compared to non-affected people (Bowden 2005). Indeed, one study found that bipolar disorder is associated with 65.5 annual lost days of work per worker (compared to 27.5 days among people with major depression) (Kessler, Akiskal et al. 2006), and it is estimated that the cost of bipolar disorder per employee is roughly twice that of major depression (Laxman, Lovibond et al. 2008). Supported living arrangements and occupational problems contribute to the estimated 45 billion dollar per year cost of bipolar disorder in the United States (Wyatt and Henter 1995). Greater understanding of the illness-associated factors that predict variation in functional attainments is an important step in tailoring rehabilitation for this group.

In assessing the impact of illness features on occupational functioning, a substantial body of literature has indicated that depressive symptoms are more likely to be associated with sustained work problems and lost days of work than are manic or hypomanic symptoms (Kessler, Akiskal et al. 2006). Indeed other potential predictors of poor work functioning, such as the presence of psychotic features, substance abuse, poor social support, and lower premorbid functioning appear less robust than depressive symptoms (Bauer, Kirk et al. 2001; Huxley and Baldessarini 2007). However, functional impairments persist among those who experience symptomatic recovery, suggesting that abatement of depression may not equate to functional recovery for many (Tohen, Hennen et al. 2000). More recent studies have found that cognitive impairment accounts for substantial variation in occupational functioning(Dickerson, Boronow et al. 2004; Wingo, Baldessarini et al. 2010). Several studies by our group found that performance-based measures of functional capacity (Mausbach, Harvey et al. 2010; Bowie, Depp et al. 2010) and social capacity (Depp, Mausbach et al. 2010) predicted substantial variation in work functioning as well as residential independence.

While the influences of depressive symptoms, functional capacity, and neurocognitive impairment on occupational functioning have been identified in separate studies, their relative impact and potential for interactive effects on work outcomes have received little attention. It is unclear whether affective symptoms and cognitive abilities represent independent or interactive influences along the continuum of work outcomes. Additional limitations of prior research on the predictors of occupational impairment have included treating employment as a dichotomous variable (i.e., employed or unemployed), or assessing the influences of predictors among exclusively employed samples. Thus, it is unclear whether neurocognitive abilities or symptoms reduce the likelihood of any work, some work, or full time work. Finally, few or no studies to our knowledge have assessed the neurocognitive predictors of residential independence in bipolar disorder.

We assessed the predictors of employment (as determined by employment status and hours per week worked among those employed) and residential independence in a sample of 239 patients with bipolar I disorder. We focused on three sets of predictors: a) cognitive ability (as measured by composite of neuropsychological tests), b) depressive and manic symptoms (as measured by clinician-rated depressive and manic symptom severity), and c) functional capacity (as measured by the brief version of the UCSD Performance Based Skills Assessment [UPSA-B]). Based on prior research, we hypothesized that cognitive ability, depressive and manic symptoms, and functional capacity (UPSA-B Scores) would all contribute to the prediction of both occupational and residential status. In multivariate models, we explored which of these variables accounted for the greatest proportion of variation in occupational functioning and residential independence. We also explored whether cognitive and symptom variables were best characterized as independent from each other (i.e., additive) or whether these variables were associated with interactive effects, in predicting both employment as a dichotomized variable and with respect to hours per week worked as well as residential status. Finally, we examined the strength of association of individual neuropsychological abilities with residential and occupational status.

## Methods

### Sample

All participants were originally enrolled in an ongoing and longstanding parent study focusing on the genetics of schizophrenia and bipolar disorder. Since 2007, subjects in the parent study who received a bipolar I or schizophrenia have been re-contacted to participate in a follow-on study that involved administration of a battery of neurocognitive and functional capacity measures. These measures are the independent and dependent variables in the present analyses. Previous reports have described the purpose and methodology of the parent study in detail(Fallin, Lasseter et al. 2004; Fallin, Lasseter et al. 2005) Briefly, all participants were full or mixed Ashkenazi Jewish in background, determined on the basis of ancestry of four grandparents; the restriction to AJ ancestry was made to take potential advantage of founder effects in this population (Bray, Mulle et al. 2010). Participants were recruited via advertisements, websites, and publications marketed toward Jewish people. Enrollment in the parent study included the completion of an in-person clinical interview (the Diagnostic Interview for Genetics Studies(Nurnberger, Blehar et al. 1994), blood drawing and family history interview. All participants sign written informed consent to participate in the study, which was approved by the Johns Hopkins Committee for Clinical Investigations.

The follow-on study has enrolled a total of 309 participants had diagnoses of Bipolar 1 disorder who completed the neurocognitive and functional capacity battery. For the present study, analyses were restricted to the age range from 21 to 64 to reduce the impact of developmental confounds (e.g., continuing to reside with parents, reaching retirement age) on estimation of the effect of illness variables on employment and residential status (this excluded 38 participants); an additional 42 subjects were excluded from analyses (due to missing or limited relevance of occupational data, see below) to bring the final N to 229.

### Diagnoses

All participants were outpatients diagnosed at the time of their enrollment in the parent study with bipolar I disorder according the DSM-IV; diagnoses were made in consensus meetings of at least two clinicians (psychiatrists or PhD-level psychologists). We assessed for alcohol use with the 12-item Khavari Alcohol Test. The KAT is a self-report assessment that estimates the number and volume of alcoholic drinks the patient consumed during the past month (Khavari and Farber 1978). The Annual Absolute Alcohol Index (AAAI was

calculated based on the scores to provide a consumption variable. Because the resulting AAAI was highly skewed due to high prevalence of non-alcohol users, we dichotomized this variable into those with scores of 0 (signifying no drinks in past month) and greater than 0 (signifying any alcohol consumption in the past month). Self-report of information on alcohol abuse with adequate reliability and validity has been identified in patients with bipolar disorder (Sonne, Brady et al. 1994; Weiss, Najavits et al. 1998). In addition to alcohol use, we also assessed for the use of illicit substances in the past month (i.e, cocaine, marijuana, opiates or sedatives not prescribed) by self report, coded dichotomously as no use or any use.

### Occupational Status

Occupational status was derived from interviewer-rated questions from the Comprehensive Assessment of History and Symptoms instrument. Participants were asked if they were currently employed, and if yes, how many hours per week they worked on average. Participants' type of employment was classified according to categorizations included in the DIGS. Participants were divided into two groups: a) unemployed or disabled or b) at least part-time worker (1 or more hours worked per week). We excluded participants from the analyses who had missing data on occupational status (n=15), reported they were retired (n=11), full-time homemakers (n=3), or were full-time students (n=15). We did, however, require evidence of a history of work in order to be considered retired.

### Residential Status

Participants were interviewed by research staff regarding their current living arrangement and were divided into one of four residential status groups: a) head of household, independent (i.e., lives alone or with others and has primary or co-equal financial and/or logistical responsibility for the household), b) head of household, semi-independent (bears only partial and not co-equal financial and/or logistical responsibility for the household, c) not head of household, but in community (i.e., living in a group home, or as a dependent in the home of their parents or children, etc.), and d) residential treatment facility (i.e., have a degree of community exposure but require residence in a treatment environment). For the purposes of our analyses, participants who were heads of household and either independent or semi-independent were classified as “independent”, and those who were not heads of household were classified as “not independent.”

### Neurocognitive Ability

We used a Neurocognitive Composite Score to assess global cognitive ability derived from a set of commonly used neuropsychological tests (RAVLT learning, Trail Making Test Parts A and B, WAIS-III Letter Number Sequencing and Digit Symbol, Animal Fluency, Wisconsin Card Sorting Test Errors, and Continuous Performance Test Identical Pairs version, d-Prime). Scores on these 8 measures were derived from raw scores on the basis of published normative data. To obtain the Composite Neurocognitive Score we transformed variables to Z-scores and then obtained an average Z-score across all tests. The internal consistency of the neuropsychological variables used to create the composite score was Cronbach's alpha = 0.852.

### Functional Capacity

Participants were administered the brief version of the UCSD Performance-based Skills Assessment (UPSA-B)(Mausbach, Harvey et al. 2007). The UPSA-B assesses the participant's capacity to perform tasks similar to those encountered in daily life. Two domains are assessed on the UPSA-B: 1) *Financial skills*, in which participants are required to count change, make change from an item purchased at a store, and write a check for a

utility bill, and 2) *Communication skills*, in which participants are asked to demonstrate how to use a telephone to dial emergency services, call information to ask for a telephone number, and call a physician to reschedule a medical appointment. For each domain, the total percent correct is calculated and converted to a standardized score ranging from 0-50. A summary score is then calculated by summing the two domain scores (range = 0-100), with higher scores indicating better functional capacity. The UPSA-B has been shown to have very suitable psychometric properties (Leifker, Patterson et al.) and to be the best short-form predictor of neurocognitive performance in a large-scale study of people with schizophrenia(Green, Schooler et al. 2011).

## Affective Symptoms

Depressive and manic symptoms were assessed with the self-report Beck Depression Inventory – II (BDI)(Dozois, Dobson et al. 1998) and the clinician-rated Positive and Negative Syndrome Scale (PANSS)(Kay, Opler et al. 1988)-Excitement subscale. The BDI is a widely used 21-item self-report measure of depressive symptoms, with good internal consistency (Cronbach alpha = 0.936). In the present sample the correlation between the PANSS depression item, rated by the examiner, and the patients' reports on the BDI was $r=0.657$, $p<0.001$. 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(Young, Biggs et al. 1978)) in samples of patients with bipolar disorder(Lindenmayer, Brown et al. 2004). The Cronbach's Alpha for the PANSS-Excitement Scale was 0.750.

## Statistical Analyses

We first examined variables for normality and performed transformations when necessary. Preliminary bivariate analyses examined the discrete outcome measures (employment status and residential status) versus demographic variables, age at onset, and alcohol use, to identify potential covariates of importance for the main multivariate analyses. For descriptive purposes, bivariate analyses were also used to examine the discrete outcome measures (employment status and residential status) against each of the study variables (cognitive composite score, UPSA-B score, BDI score, and PANSS-Excitement score), as well as against the 8 neurocognitive tests contributing to the cognitive composite score. We then conducted three main sets of analyses, separately predicting each outcome measure (employment status, residential status, and hours worked) from 4 study variables (cognitive composite score, UPSA-B score, BDI score, and PANSS-Excitement score), with inclusion of appropriate covariates. SPSS logistic regression models were used for prediction of employment status and residential status; covariates (e.g., demographic variables, age of onset, and alcohol use) that differed significantly between outcome groups (e.g. employed versus unemployed, independent versus dependent residence) were included in the logistic models. Covariates were entered in the first step of the logistic modeling, and in the second step, a forward entry procedure was used to determine the relative effects of study variables. For the third main analysis, we used hierarchical regression in the same manner with hours worked as the dependent variable, producing partial correlations for the “hours worked” outcome versus the 4 study variables; as with the logistic models, appropriate covariates (associated with hours worked) were included. We elected not to include medication usage as a covariate since these are confounded with symptom severity measures (i.e., people with more severe depression more likely to be taking anti-depressant medications). In each of these regressions, we also tested interaction terms between cognitive ability and 1) BDI score, 2) PANSS-Excitement score, and 3) UPSA-B score. To control for test-wise error, we employed Bonferroni corrections and subsequently set the p-value for omnibus comparisons at 0.0125, given that four tests were conducted for each of the outcomes (occupational

status, residential status, and hours worked), and we set the p-value at 0.006 for individual neurocognitive abilities, given that 8 tests were employed. Missing data were minimal and were handled in analyses with listwise deletion.

## Results

### Sample Characteristics

A total of 229 participants were included in the analyses. In regard to the distribution of employment status, 30.0% of the sample was unemployed, and, among those employed, the mean number of hours per week worked was 32.9 (sd=13.7, range 1 to 80). In terms of residential status, 19.3% were non-independent and 80.7% were independently residing. Occupational and residential statuses were strongly related, such that 58% of patients who were non-independent were unemployed, whereas only 25% of independently residing patients were unemployed. In addition, the mean hours worked among non-independent patients (23.3; sd=12.9) was significantly lower than among independent patients (33.6; sd=12.9; F (1,158)=8.8, p=0.003).

Comparing demographic and clinical factors across employment groups (Table 1), unemployed patients were more likely to be older and not currently using alcohol. Unemployed patients were more likely to be prescribed anti-depressants and anti-psychotics. Groups did not differ on gender, educational attainment, marital status, mood stabilizer use, age of onset of bipolar disorder, or use of illicit substances in the past month. In contrast, groups based on residential independence differed along more socio-demographic variables, with non-independent patients more likely to be younger, less educated, never married, and less likely to currently use alcohol. Non-independent individuals also had a younger mean age at onset, and were more likely to be taking anti-psychotic medication. Only alcohol use was significantly associated with number of hours worked. Therefore, in the next set of analyses, we entered the following covariates: 1) for employment: age, alcohol use; 2) for number of hours worked: alcohol use; 3) for residential status: age, age of onset, education, marital status, and alcohol use. Note that we did not include medication usage as a covariate due to confounding with symptom severity measures.

### Occupational Status

As seen in Table 2, multivariate analyses, adjusting for covariates, revealed that unemployed patients had lower cognitive composite scores, more severe manic symptoms (PANSS-Excitement), and lower UPSA scores. Depressive symptoms (BDI scores) were more severe among unemployed people at the $p<0.05$ level, but after correcting for multiple comparisons this difference was no longer significant. Bivariate analyses showed that 5 of the 8 individual cognitive tests (Learning, Trail Making Tests Parts A and B, Digit Symbol, and CPT D-Prime) were significantly related to occupational status after adjusting for multiple comparisons (i.e., at the 0.006 level).

Multivariate logistic regression analyses with all four predictors entered into a model revealed that the strongest and only significant predictor of employment status was Cognitive Composite (OR: 1.71 95% CI: 1.1-2.5, p=0.006). Neither of the interaction terms between Cognitive Composite and BDI Scores (b=-0.004, S.E.=0.013, p=0.763) as well as Cognitive Composite and PANSS Excitement (b=0.004, S.E.=0.004, p=0.286) were significant indicating independent effects.

In contrast to dichotomized employment status, partial correlations indicated that only depressive symptom severity was a significant predictor of the number of hours worked (r=-0.326, $p<0.001$), with non-significant associations with Cognitive Composite (r=0.127, p=0.113), UPSA-B Score (r=0.108, p=0.178), and PANSS-Excitement (r=-0.092, p=0.254).

In multivariate analyses, BDI score was the only significant predictor ($R^2$=0.112, B=-0.448, S.E.=0.101, t=4.4, p<0.001), such that every additional BDI point equated to a loss of ½ hour of work per week. None of the individual cognitive tests correlated significantly with hours worked.

### Residential Independence

Non-independent patients had lower scores on the Cognitive Composite and UPSA-B Scores, and higher severity on the PANSS Excitement Scale, after adjusting for covariates. Depression did not differ between independent and non-independent groups. Among individual cognitive tests, RAVLT Learning, Trail Making Test(Part A), Digit Symbol, Animal Fluency, and CPT D-Prime were significantly worse in the non-independent group after adjusting the alpha level for multiple comparisons. Multivariate logistic regression revealed that the UPSA-B Score was the only significant predictor (OR: 1.06, 95% CI: 1.03-1.11, p=0.002) of residential status when all four variables were entered into the model. As with employment status, there were no significant interactions between Cognitive Composite and depressive (b=-0.001, S.E.=0.017, p=0.993) or manic symptoms (b=0.005, S.E.=0.003, p=0.154).

## Discussion

In a large sample of outpatients with bipolar disorder, we assessed the additive and interactive association of neurocognitive ability, functional capacity, and affective symptoms on occupational and residential attainments. Overall, our study replicates prior findings regarding the substantial negative impact of bipolar disorder on occupational functioning and residential independence. The rates of unemployment (30%) and non-independent living (18%) in our sample are lower than some previous reports (Bowden 2005; Huxley and Baldessarini 2007), which is likely due to characteristics of the sample (e.g., average of a college level of education, mild severity of affective symptoms, substance use disorders excluded). Nevertheless, even among a sample of relatively high-functioning patients with bipolar disorder, the rate of unemployment was roughly three times higher than the general population.

There were several findings about the relative strength of association of cognitive abilities, functional capacity, and depressive and manic symptoms. In regard to occupational functioning, our analyses indicated that the contribution of cognitive abilities and symptoms were independent from one another, supporting an additive effect of these variables rather than an interactive one, in prediction of both residential and occupational status. Yet, the effect of these variables differed across the range of employment outcomes. Cognitive impairment was the strongest predictor of being unemployed (vs. employed), and depressive symptoms severity did not differ between unemployed and employed patients. However, depressive symptom severity was the strongest and only statistically significant predictor of hours worked, among those who were employed. One interpretation of this discrepancy is that cognitive deficits may limit capacity of individuals to be employed in any capacity, yet among employed patients variation in cognitive abilities is minimal. The impact of depression may be more in limiting day-to-day work performance (e.g., absenteeism). Taken together, relative freedom from both depressive symptoms and cognitive deficits may be required to participate in full-time work. Although these findings would need to be replicated in samples with different levels of symptom severity and/or cognitive impairment, it may be that vocational rehabilitation aimed at bipolar disorder should target cognitive impairments among patients who are not working (McGurk, Mueser et al. 2007), whereas employed patients may benefit from workplace interventions and policies that address depression to maximize their occupational productivity (World Health Organization, 2005).

Residential independence was associated with more demographic variation than was employment. However, as with occupational functioning, independent patients had better cognitive performance, higher UPSA-B scores, and less severe manic symptoms. We lacked a measure of performance within independent patients (parallel to work hours), and so it is unclear if depression might predict variation among independent patients. We found that the UPSA-B was the strongest predictor of residential independence. The UPSA-B is a measure of capacity to perform activities of daily living (i.e., communication skills, financial management), and it is likely that impairment in these skills presents barriers to residential independence. One possibility is that impairment in these skills is due to loss of formerly intact abilities, such as through the development of cognitive impairments. Functional capacity appears to mediate the relationship between cognitive ability and a variety of functional abilities in bipolar disorder, including activities of daily living (Bowie, Depp et al. 2010). Another possibility is that the onset of bipolar disorder interferes with the development of these independent living skills; to this end, it was notable that non-independent patients had significantly earlier ages of onset. Future longitudinal research would be needed to determine the causal influences of illness variables on problems in developing functional skills. It is also possible that interventions directly targeting functional capacity in schizophrenia (Patterson, Mausbach et al. 2006) may be adapted for the subset of patients with bipolar disorder who are seeking to transition to residential independence.

Finally, there were notable findings in regard to the influence of global versus specific cognitive impairments on residential and employment status groups. In regard to global neurocognitive ability, employed and residentially independent patients showed, on average, a level of cognitive ability only slightly below the normal range (0.2 standard deviations below average performance). In contrast, exploratory analyses of the individual cognitive tests that comprised the global composite measure revealed that, even among employed and independent patients, the mean performance in tests of sustained attention/discriminability (CPT D-Prime), executive control (WCSD Perseverative Errors) and psychomotor speed (Trail Making Test Part A) were still over 0.5 standard deviations below average. Therefore, even if global cognitive ability is preserved among employed and independent patients, deficits in some cognitive abilities may be present and might interfere in more subtle ways with functional performance. Since these findings derive from single neuropsychological tests, future research would be needed to detect the influences of specific neurocognitive domains on attaining and maintaining functional attainments.

There are several limitations to this study. In terms of generalizability, this is a sample of treated outpatients with bipolar disorder, with a college level of education on average; therefore, this sample is one that likely had relatively greater opportunity for occupational and residential success. In addition, these patients were selected from one ethnic group. Therefore, these results may not apply to socioeconomically or ethnically diverse samples. Additionally, the mean level of severity of depressive and manic symptoms was in the mild range, and the rate of substance use was lower than in prior samples with bipolar disorder, so the relative impact of symptoms (or substance use disorder) on functional attainments may be greater among more symptomatic patients. The study design was cross-sectional, and the so the actual direction of effects is unknown. For instance, it is quite possible that diminished work hours may increase depressive symptoms. Additional measures would have been beneficial. Measures of functional attainments were obtained from structured interview, but were not validated against actual employment records. Moreover, we used number of hours worked as a single proxy for work performance, and future study should employ additional measures of performance (e.g., days of worked missed, level of productivity at work). We lacked a gold standard measure of manic symptoms (e.g., the YMRS (Young, Biggs et al. 1978)), and therefore, the relative association of manic symptoms with functional outcomes should be interpreted with caution. Finally, the lack of

relationships between functional capacity and work hours may be due to ceiling effects identified previously with the UPSA-B in bipolar disorder (Mausbach, Harvey et al. 2010); future development of performance-based tasks that represent a greater variety of work abilities and/or more challenging independent living skills may be particularly beneficial for bipolar disorder.

In conclusion, cognitive ability, functional capacity and affective symptoms all predict variation in occupational and residential status. However, cognitive impairment was the strongest predictor of whether or not a patient engaged in any work, whereas depressive symptoms were most impactful in determining the quantity of work among those already employed. Impairment in functional capacity may be more likely than either cognitive impairments or affective symptoms to impact residential independence. The influence of affective symptoms and cognitive impairment appeared to be independent from one another. These results, taken together, suggest that functional rehabilitation programs designed for bipolar disorder may need to be tailored depending upon the treatment target, with potentially different interventions for unemployed, employed, and non-independent subgroups. Future longitudinal research should examine the temporal and potentially bi-directional influences between illness features such as cognitive impairment and depression and functional attainments.

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**Table 1**

**Sample Characteristics by Employment and Residential Status (n=229)**

| Sample Characteristics | Unemployed (n=69) M(sd) or % | Employed (n=160) M(sd) or % | F/X$^2$(p-value) | Non-Independent (n=41) M (sd) or % | Independent (n=188) M (sd) or % | F/X$^2$ (p-value) |
|---|---|---|---|---|---|---|
| Age | 49.4 (10.0) | 44.3 (10.6) | 11.5(p<0.001) | 40.4 (12.7) | 46.9 (10.1) | 13.5 (p<0.001) |
| Sex (% Female) | 55.9% | 47.8% | 2.2(p=311) | 37.5% | 52.9% | 3.1(p=077) |
| Education | 15.8 (9.6) | 15.2 (2.2) | 3.3(p=0.858) | 13.4 (3.3) | 15.8 (5.8) | 7.5 (p=0.007) |
| Marital Status (% Ever Married) | 50.7% | 48.4% | 0.1(p=0750) | 17.9% | 55.6% | 19.1(p<0.001) |
| Age of Onset of Bipolar Disorder [1] | 17.0 (8.6) | 18.6 (6.5) | 2.2 (p=0.482) | 15.8 (7.0) | 19.2 (6.7) | 6.2 (p=0.012) |
| % Receiving an anti-psychotic (atypical or typical) | 60.3% | 32.7% | 14.9(p<0.001) | 55.0%* | 37.6%* | 4.2 (p=0.041) |
| % Receiving a mood-stabilizer | 70.6% | 68.6% | 0.7(p=0.761) | 62.5% | 70.4% | 0.3 (p=0.350) |
| % Receiving an anti-depressant | 54.3% | 33.3% | 8.4(p=0.003) | 37.5% | 39.7% | 0.8(p=0.797) |
| Absolute Annual Alcohol Index (% > 0 consumption) | 23.5% | 49.1% | 12.7 (p<0.001) | 22.5% | 45.0% | 6.9 (p<0.009) |
| Illicit substance use in past month (% > 0 consumption) | 8.8% | 11.3% | 0.3 (p=0.575) | 5.0% | 11.6% | 1.5 (p=0.213) |

[1] Age at onset was defined as age at first occurrence of major depression, manic, or mixed episode.

**Table 2**

**Comparison on Clinical Variables by Occupational and Residential Status**

| Sample Characteristics | Unemployed (n=69) M(sd) or % | Employed (n=160) M(sd) or % | F/X² (p-value) [1] | Non-Independent (n=41) M (sd) or % | Independent (n=188) M (sd) or % | F/X² (p-value) [2] |
|---|---|---|---|---|---|---|
| Neurocognitive Composite Score | -0.8 (1.0) | -0.2 (0.8) | 13.5(p<0.001) | -1.0 (1.0) | -0.3 (0.8) | 15.5 (p<0.001) |
| RAVLT Learning | -0.9 (1.6) | -0.4 (1.3) | 7.3 (0.008) | -1.4 (1.5) | -0.4 (1.3) | 8.8 (0.003) |
| Trail Making Test, Part A | -1.5 (1.8) | -0.7 (1.3) | 8.9 (0.003) | -1.9 (1.8) | -0.8 (1.4) | 14.0 (p<0.001) |
| Trail Making Test, Part B | -0.8 (1.92) | 0.3 (1.28) | 16.84 (p<0.001) | -0.8 (2.05) | 0.1 (1.4) | 6.4 (0.012) |
| Letter Number Sequencing | -0.1 (1.06) | 0.1 (1.01) | 0.82 (0.367) | -0.4 (0.9) | 0.1 (1.0) | 3.5 (0.063) |
| WAIS Digit Symbol | -0.6 (1.12) | 0.04 (1.1) | 10.0 (0.002) | -0.8 (1.1) | -0.01 (1.1) | 9.5 (0.002) |
| Animal Fluency | -0.1 (1.3) | 0.2 (1.3) | 4.5 (0.040) | -0.4 (1.3) | 0.2 (1.3) | 8.6 (0.004) |
| WCST Perseverative Errors | -1.0 (1.0) | -0.8 (1.0) | 1.0 (0.299) | -1.0 (1.1) | -0.9 (1.0) | 0.9 (0.356) |
| CPT D Prime | -1.0 (1.2) | -0.6 (1.1) | 8.1 (0.003) | -1.3 (1.4) | -0.6 (1.1) | 10.1 (0.002) |
| Beck Depression Inventory Total Score | 12.6 (10.9) | 8.56 (9.8) | 5.6 (0.019) | 10.1 (9.7) | 9.6 (10.4) | 0.2 (0.686) |
| PANSS Excitement Score | 7.2 (3.8) | 6.0 (2.4) | 6.9 (0.009) | 8.0 (4.7) | 6.1 (2.5) | 11.0 (0.001) |
| UPSA Score | 84.9 (14.5) | 89.9 (8.3) | 9.2 (0.003) | 80.4 (18.2) | 90.1 (7.8) | 21.8 (p<0.001) |

[1] Comparisons by employment included the following covariates: age, alcohol use

[2] Comparisons by residential status included the following covariates: age, age of onset, education, marital status, and alcohol use