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Correlates of real world executive dysfunction in bipolar I disorder

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ABSTRACT

Background: Bipolar disorder is characterized by impairments in cognitive functioning, both during acute mood episodes and periods of euthymia, which interfere with functioning. Cognitive functioning is typically assessed using laboratory-based tests, which may not capture how cognitive dysfunction is experienced in real-life settings. Little is known about the specific illness characteristics of bipolar disorder that contribute to cognitive dysfunction in everyday life.

Methods: Participants met DSM-IV criteria for bipolar I disorder ($n = 68$) in a depressed or euthymic state. Everyday executive functioning was evaluated using the Behavior Rating Inventory of Executive Functioning (BRIEF) and the Frontal Systems Behavior Rating Scale (FrSBe). Participants completed clinician rated measures of mood state (Hamilton Depression Rating Scale, Young Mania Rating Scale), prior illness course and co-morbidities (Mini International Neuropsychiatric Interview), as well as self-report measures of psychotropic medication use and medical co-morbidity.

Results: Individuals in this study reported significant impairment in every domain of executive functioning. These deficits were associated with a multitude of illness factors, some directly impacted by mood symptoms and others shaped by illness chronicity, psychiatric comorbidity, medical co-morbidity, and medication use.

Discussion: Executive functioning problems observed in everyday functioning in bipolar disorder are not entirely mood-state dependent. Cognitive rehabilitation for executive dysfunction should be considered an important adjunctive treatment for many individuals with bipolar disorder.

1. Introduction

Bipolar I disorder is characterized by episodes of mania and depression that interfere with psychosocial functioning. Rates of attainment of functional milestones are considerably lower in people with bipolar I disorder than the general population (Dean et al., 2004; Hirschfeld et al., 2003). Approximately 50% of patients are unemployed and those who are employed tend to experience diminished work performance (Bowden, 2005). Additionally, many individuals with bipolar disorder do not live independently (Wyatt and Henter, 1995), have unstable relationships (Depp et al., 2010; Kokcu and Kesebir, 2010; Sheets and Miller, 2010), and experience diminished levels of overall life satisfaction (Altamura et al., 2011; Latalova et al., 2011). Thus, understanding features of this illness that cause functional impairment is vital to its treatment as well as improvement in overall level of satisfaction.

Cognitive dysfunction is one illness feature particularly important for understanding impairments in functioning (Dickerson et al., 2004a; Jaeger et al., 2007; Martinez-Aran et al., 2004, 2007; Martino et al., 2009; Martino et al., 2008; Zubieta et al., 2001). Acutely ill patients demonstrate dysfunction in several cognitive domains, including attention, psychomotor speed, visuospatial

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abilities, executive functioning (e.g., planning and organization, cognitive flexibility, reaction inhibition), decision making, memory and learning, and emotion processing (Burdick et al., 2007; Goldberg and Chengappa, 2009; Zarate et al., 2000). Cognitive dysfunctions are present when patients are depressed or manic, but persist during remission to a lesser degree (Malhi et al., 2007; Mann-Wrobel et al., 2011; Rosa et al., 2010; Thompson et al., 2005). The main cognitive domains affected in remitted patients with bipolar disorder are verbal memory, attention, and executive function (Robinson et al., 2006; Torres et al., 2007). Impairment in these neuropsychological domains is associated with impaired global functioning and occupational status (Altshuler et al., 2007, 2008; Dickerson et al., 2004b), whereas preserved executive function leads to better vocational performance (Bearden et al., 2011).

Although previous studies have documented links between impairment in objective measures of neuropsychological performance and functioning, it is less clear how mood symptoms relate to the subjective experience of cognitive dysfunction in daily life. Cognitive functioning is predominantly assessed by means of standardized cognitive tests and there is a lack of studies in bipolar disorder investigating how cognitive impairments translate from laboratory settings into the real world. This is particularly important for the area of executive functioning where laboratory based testing has its limitations. That is, executive functioning (the ability to plan and organize behaviors) can be preserved in structured settings such as during laboratory based testing, but impairments can reveal themselves when individuals are required to organize their own behavior and daily structure. Thus, to better understand the full range of executive dysfunction in bipolar disorder, investigators are increasingly relying on behavioral measures, such as performance-based assessment of functional capacity, third-party ratings of functional behavior, and self-report measures of everyday difficulties, as a compliment to objective, laboratory-based tests of neuropsychological functioning. These methods have been pioneered in schizophrenia where impairments in everyday functioning are common (Sabbag et al., 2011). Daily living deficits in schizophrenia are predicted by a complex combination of illness features including impaired neuropsychological performance, symptoms, and functional capacity (Harvey and Strassnig, 2012). Positive and negative symptoms directly predict certain domains of everyday functioning (Bowie et al., 2006), whereas others are predicted by neurocognition, an effect, which, is largely mediated through functional competence (Bowie et al., 2008, 2006; Koren et al., 2006; Nakagami et al., 2008; Ventura et al., 2009).

In contrast to the comprehensive body of research assessing determinants of everyday the experience of daily executive functioning in schizophrenia, substantially less is known about the illness characteristics that contribute to the experience of impaired everyday executive functioning in bipolar disorder (Green, 2006; Wingo et al., 2009). This study seeks to address this gap in the literature by examining how mood symptoms are related to the real world experience of executive dysfunction in bipolar disorder. We hypothesized that both mania and depression severity would positively predict self-reported daily executive functioning difficulties. Likewise, we expected that additional clinical features of bipolar disorder, such as psychiatric medication regime, axis-I co-morbidities, co-occurring medical conditions, and illness chronicity, would also contribute to real-world executive functioning impairments.

2. Method

2.1. Participants

Study participants were individuals with bipolar I disorder ($n = 68$). Participants were recruited through the Bipolar Clinic and Research Program at Massachusetts General Hospital (MGH) for studies of individuals in a depressed or euthymic mood state. All participants provided written informed consent prior to participation in the study, in accordance with MGH-approved institutional review board (IRB) consenting procedures. Bipolar diagnoses were determined using the Mini International Neuropsychiatric Interview (MINI). Participants were not eligible for the study if they reported a) a current episode of mania or hypomania on the MINI, b) schizophrenia, schizoaffective disorder, delusional disorder, psychotic disorders not otherwise specified, major depressive disorder, or mood congruent or incongruent psychotic features, c) substance dependence disorders, including alcohol dependence, currently or within the previous 12 months, d) suicidal ideation or severe depressive symptoms requiring a higher level of care, e) history of head injury, or f) current medical conditions affecting the patient's ability to participate in treatment.

2.2. Procedure

After the initial screening visit, participants completed a baseline assessment that included a diagnostic interview, clinician rated measures of depression and mania, and self-report measures of medical problems and cognitive functioning.

2.3. Measures

2.3.1. Diagnosis

A DSM-IV diagnosis of bipolar I disorder was confirmed using the Mini-International Neuropsychiatric Interview (MINI; Sheehan et al., 1998) by a trained interviewer. The measure also contains items to assess demographics and mood episode history.

2.3.2. Depressive symptoms

Severity of depressive symptoms was evaluated using the Hamilton Rating Scale for Depression (HAMD), 17-item version (Hamilton, 1960). Items were rated by a trained interviewer. Scores range from 0 to 54, with higher scores denoting greater depressive symptoms.

2.3.3. Manic symptoms

Severity of manic symptoms was assessed with the Young Mania Rating Scale (YMRS) (Young et al., 1978). Items were rated by a trained interviewer. Scores range from 0 to 56, with higher scores indicating greater symptoms of mania or hypomania.

2.3.4. Subjective executive functioning

Real world executive functioning behaviors were rated on two scales, the Behavior Rating Inventory of Executive Functioning – Adult Version (BRIEF-A) and the Frontal Systems Behavior Rating Scale (FrSBe).

2.3.4.1. BRIEF. This 75-item self report behavior scale rating yields information for nine non-overlapping clinical subscales that measure different aspects of executive functioning (Roth and Gioia, 2005). The subscales are: Inhibit (impulsiveness or distractibility), Shift (cognitive flexibility), Emotional Control (ability to temper one's emotions when necessary), Self-Monitor (ability to think before acting), Initiate (beginning new activities), Working Memory (attention and focus while completing activities), Plan/Organize (prioritizing and goal-setting), Organization of Materials (the ability to regulate belongings and keep things clean), and Task Monitoring (cognizance of quality during completion of tasks). Items are rated as never, sometimes, or often and higher scores indicate greater impairment in functioning.