

## Anxiety is associated with impulsivity in bipolar disorder

Charles T. Taylor, Dina R. Hirshfeld-Becker, Michael J. Ostacher, Candice W. Chow,  
Richard T. LeBeau, Mark H. Pollack, Andrew A. Nierenberg, Naomi M. Simon\*

*Department of Psychiatry, Center for Anxiety and Traumatic Stress Disorders,  
Massachusetts General Hospital and Harvard Medical School, United States*

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### Abstract

Impulsivity and anxiety, common features of bipolar disorder (BD), are each associated with a number of negative outcomes in BD. The relationship between anxiety and impulsivity, however, has not been a focus of study in BD. In this paper, we present data regarding the association between anxiety and impulsivity as measured by the Barratt impulsiveness scale (BIS-11) in 114 outpatients with BD. Results revealed that patients with a comorbid anxiety disorder displayed significantly higher levels of impulsivity relative to patients without an anxiety disorder. Moreover, a broad range of anxiety-related symptom domains was associated with greater impulsivity. Exploratory analyses also revealed that baseline anxiety symptoms were associated with elevated impulsivity at 9-month follow-up, although these relationships were less robust after covariate adjustment. These data demonstrate that anxiety is positively associated with impulsivity in patients with BD. Further studies are needed to elucidate the implications of and reasons for this association.

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### 1. Introduction

A growing literature indicates that anxiety comorbidity is common and disabling in individuals with bipolar disorder (BD) (Kessler, Rubirow, Holmes, Abelson, & Zhao, 1997; McElroy et al., 2001). In a recent large-scale investigation, more than half (51.2%) of patients with BD were identified as having a co-occurring anxiety disorder at some point in their lifetime, while 30.5% were diagnosed as having a

current anxiety disorder (Simon et al., 2004). Anxiety disorder comorbidity in BD is associated with a number of negative sequelae, including greater bipolar severity, reduced duration of euthymic episodes, elevated substance abuse, greater functional impairment, and an overall diminished quality of life (Cassano, Pini, Saettoni, & Dell'Osso, 1999; Simon et al., 2004; Young, Cooke, Robb, Levitt, & Joffe, 1993). Moreover, anxiety comorbidity bodes poorly for the prognosis of BD and its treatment outcome (Feske et al., 2000), and both anxiety disorders and anxiety symptoms have been clearly linked to increased risk of suicidal ideation and attempts (Engstrom, Brandstrom, Sigvardsson, Cloninger, & Nylander, 2004; Fawcett et al., 1990; Frank et al., 2002; Simon et al., 2004, 2007a).

Impulsivity is a core feature of bipolar disorder (APA, 1994; Moeller, Barratt, Dougherty, Schmitz, & Swann,

\* Corresponding author at: Department of Psychiatry, Center for Anxiety and Traumatic Stress Disorders, Massachusetts General Hospital, Simches Research Building, 185 Cambridge Street, Suite 2200, Boston, MA 02114, United States. Tel.: +1 617 726 7913; fax: +1 617 643 3080.

*E-mail address:* nsimon@partners.org (N.M. Simon).

2001; Najt et al., 2007). Broadly defined, impulsivity refers to “a predisposition toward rapid, unplanned reactions to internal or external stimuli without regard to negative consequences of these reactions to themselves or others” (Moeller et al., 2001).

Impulsivity includes a range of cognitive and behavioral tendencies such as difficulties delaying or inhibiting voluntary responding, a short threshold for response, lack of reflection, deficiencies in delaying gratification, and problems with attention (Ho, Mobini, Chiang, Bradshaw, & Szabadi, 1999; Logue, 1995). Although impulsivity is especially prominent during manic episodes, trait-dependent measures of impulsivity have also been shown to be elevated during euthymic and other mood phases compared to control participants (Moeller et al., 2001; Swann, Anderson, Dougherty, & Moeller, 2001; Swann, Pazzaglia, Nicholls, Dougherty, & Moeller, 2003).

Impulsivity is associated with a number of negative outcomes in patients with BD. The most consistent finding in BD is a positive association between impulsivity and suicide (Maser et al., 2002; Michaelis et al., 2003, 2004; Swann et al., 2005). For instance, Maser et al. (2002) found that impulsivity was one of the most robust long-term predictors of suicide attempts and completion in patients with an affective disorder. Self-reported and behavioral measures of impulsivity are also significantly associated with substance abuse (Swann, Dougherty, Pazzaglia, Pham, & Moeller, 2004), and with increased aggression and affective instability (Harmon-Jones, Barratt, & Cindy, 1997; Henry et al., 2001; Plutchik & Van Praag, 1989).

While relatively little attention has been paid to the relationship between impulsivity and anxiety in general, traditional conceptualizations suggest that impulsivity might display a negative relationship with anxiety (Askenazy, Caci, Myquel, Darcourt, & Lecrubier, 2000; Caci et al., 1998; Mobini, Pearce, Grant, Mills, & Yeomans, 2006). Anxiety is thought to alert the individual to potential danger, and operates to inhibit behavior under conditions of heightened threat (Gray, 1982). Characteristic features of anxiety such as behavioral inhibition, harm avoidance, safety-seeking, and anxious apprehension (Brown, 1996; Zinbarg & Barlow, 1996) may seem initially inconsistent with characteristics of impulsivity, such as increased risk-seeking, acting without forethought, and decreased anticipation of the consequences of one's behavior. Thus, others have speculated that anxiety might serve as a protective factor against disinhibited, potentially dangerous activities or behaviors that could lead to early mortality (Lee, Wadsworth, & Hotopf, 2006; Slama

et al., 2004), and one might hypothesize that anxiety would be protective against impulsivity in BD. Epidemiological data, however, reveals high rates of comorbidity between anxiety disorders and impulse control disorders, conditions characterized by high levels of impulsivity (Kessler, Chiu, Demler, Merikangas, & Walters, 2005). Moreover, individuals with an impulse control disorder typically feel an increasing sense of tension or arousal before committing an impulsive act (APA, 1994), suggesting a direct link between anxiety and impulsivity that might also be relevant in BD. The relationship between anxiety and impulsivity in bipolar individuals has not, however, been a focus of study.

In this paper, we examine the relationship between anxiety and impulsivity in a well-defined sample of outpatients with BD. We address the following three issues: (1) Do BD patients with and without a co-occurring anxiety disorder differ in levels of impulsivity? (2) Are specific anxiety symptoms associated with different facets of impulsivity? (3) Do symptoms of anxiety predict levels of impulsivity over time? In contrast to theories that anxiety might be protective against impulsivity in general, but in keeping with the previously reported association of anxiety disorders with problems of impulse control (Askenazy et al., 1998; Summerfeldt, Kloosterman, Antony, Richter, & Swinson, 2004), and anxiety with bipolar severity and suicidality, we hypothesized that patients with BD and at least one co-occurring anxiety disorder would score higher on a measure of impulsivity relative to patients without a comorbid anxiety disorder. Similarly, we hypothesized that specific dimensions of anxiety including panic, phobic avoidance, social fear of negative evaluation, anxiety sensitivity and worry, would be positively associated with impulsivity scores and that these same dimensions would be significant predictors of impulsivity at 9-month follow-up.

## 2. Methods

### 2.1. Participants

The present study was part of a larger investigation of predictors of suicidality designed as an ancillary project to the NIMH naturalistic study of bipolar disorder, the Systematic Treatment Enhancement Program for Bipolar Disorder (STEP-BD). Accordingly, demographic and diagnostic data were provided from the STEP-BD database. Procedural details of the STEP-BD method of recruitment and assessment, and of this ancillary study sample, have been published elsewhere (Sachs et al., 2003; Simon et al., 2005). Briefly, participant diagnostic

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