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Can personality traits predict increases in manic and depressive symptoms?

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Abstract

Background—There has been limited research investigating personality traits as predictors of manic and depressive symptoms in bipolar individuals. The present study investigated the relation between personality traits and the course of bipolar disorder. The purpose of this study was to identify specific personality traits that predict the course of manic and depressive symptoms experienced by bipolar individuals.

Methods—The sample consisted of 39 participants with bipolar I disorder assessed by the Structured Clinical Interview for DSM-IV. Personality was assessed using the NEO Five-Factor Inventory. The Modified Hamilton Rating Scale for Depression and the Bech–Rafaelsen Mania Rating Scale were used to assess symptom severity on a monthly basis.

Results—Consistent with previous research on unipolar depression, high Neuroticism predicted increases in depressive symptoms across time while controlling for baseline symptoms. Additionally, high Conscientiousness, particularly the Achievement Striving facet, predicted increases in manic symptoms across time.

Limitations—The current study was limited by the small number of participants, the reliance on a shortened version of a self-report personality measure, and the potential state-dependency of the personality measures.

Conclusions—Specific personality traits may assist in predicting bipolar symptoms across time. Further studies are needed to tease apart the state-dependency of personality.

Keywords

Bipolar; Mania; Depression; Personality; Achievement striving

1. Introduction

Despite considerable advances in the understanding and treatment of bipolar disorder, recent studies have suggested that many individuals endure a severe course of bipolar illness even with adequate psychopharmacological treatment (Keller et al., 1992). For example, in the year following a hospitalization, as many as 41% of bipolar patients are rehospitalized (Goldberg et al., 1995), and 40%–50% experience significant difficulties in occupational and social functioning (Harrow et al., 1990).

In the search for factors to explain the incredible variability in course, investigators have considered whether specific personality traits are associated with bipolar disorder, and whether individual differences in these personality traits help explain course. There is a long

history of theory on the role of personality in the course of affective disorders. Much of the research has been in the area of unipolar depression, and results have suggested that personality traits may be associated with greater severity of symptoms, more frequent relapse, and overall worse outcome. For example, among patients diagnosed with major depression, obsessiveness and neuroticism appear consistently tied to poor outcome, including chronicity and impaired social adjustment (Duggan et al., 1990; Scott et al., 1995).

Numerous descriptive studies have attempted to identify personality traits that are distinctly associated with bipolar disorder. For example, Solomon et al. (1996) found that participants with remitted bipolar I disorder scored nearly twice as high as controls on the Neuroticism and Hysterical Factor scales (neediness), and significantly lower on the Emotional Stability, Objectivity, Ego Resiliency, and Ego Control scales. The findings of Solomon et al. (1996) are in agreement with those of Hirschfeld et al. (1986), who identified a similar profile in participants with bipolar I disorder compared to controls. Research has also suggested that individuals with a hyperthymic temperament and those with bipolar disorder may be alike in rapid eye movement (REM) latency disturbances and familial rates of bipolar disorder (Akiskal, 1984).

Using the Five-Factor model of personality, Bagby et al. (1996) found that euthymic bipolar patients differed most significantly from unipolar patients on the Feelings facet of the Openness to Experience domain, a subscale measuring the intensity with which individuals experience both positive and negative emotions. Furthermore, even after controlling for depressive symptoms, the Positive Emotions facet of the Extraversion domain discriminated bipolar from unipolar individuals. The authors suggested that the capacity to experience positive affect might be what distinguishes euthymic bipolar individuals from unipolar individuals. Interestingly, whereas both bipolar and unipolar participants demonstrated higher Neuroticism compared to the normative sample, there was no difference between the two groups on this domain. In contrast to the above studies, two studies have failed to identify personality traits which differentiate bipolar individuals from either unipolar individuals or individuals with no psychiatric conditions (Clayton et al., 1994; Akiskal et al., 1995).

Whereas previous research has suggested that specific personality traits influence the course and outcome of unipolar depression, researchers have only recently prospectively examined whether personality traits influence the course and outcome of bipolar disorder. For example, higher Novelty-Seeking scores (particularly the subscales of Impulsiveness and Disorderliness), as measured using the Tridimensional Personality Questionnaire, predicted a lack of functional recovery in the 6 months following a first episode of mania for 27 patients (Strakowski et al., 1993). In another study of 6 bipolar individuals, self- and family-reported neuroticism predicted frequency and severity of relapses, quality of remission, and chronicity of symptoms, over a 3 year period (Heerlein et al., 1998). In short, the few existing studies on personality traits as predictors of bipolar course have yielded inconsistent findings.

Despite the inconsistency in empirical findings, there is a strong theoretical basis for linking personality and the outcome of mania. Depue and others have hypothesized that mania is the outcome of dysregulation in the behavioral facilitation or behavioral activation system (BAS; Depue et al., 1994, 1996; Gray, 1994; Johnson and Roberts, 1995). BAS is conceptualized as a system that modulates approach behavior in the face of cues for reinforcement. A series of studies suggest that BAS is mediated by dopamine pathways from the ventral tegmental area (Winters et al., 2000). BAS is hypothesized to regulate a broad band of goal-seeking behaviors and characteristics in support of appetitive motivation, including positive affectivity, energy, sleep, and attention. Individuals high in BAS are

expected to demonstrate more positive affect and energy, and less sleep in the context of cues for reinforcement. BAS appears centrally tied to personality traits of positive affect, extraversion, and achievement striving, as well as variability within these traits (Depue and Collins, 1999). High activity within this system has been seen as the underlying basis for mania.

Recent evidence has begun to support the applicability of BAS to understanding the etiology of bipolar disorder. Studies have suggested correlations between self-reported behavioral activation and indices of hypomania among undergraduates (Meyer et al., 1999), as well as between behavioral activation and the propensity towards manic symptoms among bipolar I individuals (Meyer et al., under review). Additionally, BAS-relevant life events involving goal-attainment trigger increases in manic symptoms (Johnson et al., under review).

Although the BAS model would suggest that positive affect, extraversion, and achievement striving should be tied to increased levels of mania across time among bipolar individuals, little research has utilized traditional measures of personality to examine this model. Within this study, we examine the role of personality traits in the prediction of manic and depressive symptoms within bipolar disorder. We hypothesized that positive affect, extraversion, and achievement striving would predict increased vulnerability to manic symptoms across time. Additionally, drawing from research on unipolar depression, we hypothesized that neuroticism would predict increases in depressive symptoms. The NEO Five-Factor Inventory scale was used to assess personality traits among participants with bipolar I disorder.

2. Methods

2.1. Participants

The sample consisted of 39 participants with a DSM-IV diagnosis of bipolar I disorder as assessed by the Structured Clinical Interview for DSM-IV (SCID; First et al., 1996). Participants were recruited from hospitals, outpatient clinics, support groups, and through advertising in South Florida. Individuals with organic brain syndrome, alcohol abuse or dependence in the past year, substance abuse or dependence in the past year, inability to speak English or independently complete self-report measures were excluded from the study. Previous reports have described the impact of life events, social support, and self-esteem on the course of manic and depressive symptoms within this sample (Johnson et al., 1999; Johnson et al., in press).

Within the present sample, age ranged from 26 to 65, with a mean of 42.82 and a standard deviation of 10.13. The number of years of education ranged from 9 years to advanced degrees, with a mean of 15.08 and a standard deviation of 2.84. Based on Hollingshead (1957) occupational criteria, 35% of the current sample had recently held a job meeting criteria for higher executives, business managers, and administrative personnel. Upon study entry, 33.3% participants were in a manic episode, 44.4% in a depressed episode, 22.3% cycling, mixed, or not in a full episode. On average, individuals reported approximately 30 previous episodes ($S.D. = 30.62$).

2.2. Procedures

Permission to approach any potential participants in a treatment center was obtained from the attending psychiatrist. Individuals were given a brief description of the study and, if interested in participating, completed written informed consent. Potential participants were interviewed using the SCID and symptom severity measures to ensure they met criteria for the study. Participants completed symptom severity measures monthly by phone.

To allow time for the acute episode to remit, participants did not complete the NEO Five-Factor Inventory (NEO-FFI) until the 6-month interview. If an individual remained too ill to complete an assessment even 6 months after entering the study, they were rescheduled to prevent any disorganized thinking from interfering with the quality or validity of assessments.

2.3. Personality measurement

The NEO Five-Factor Inventory (NEO PI-R; Costa and McCrae, 1992) was administered at the 6-month interview. The NEO-FFI is a shortened version of Form S of the NEO PI-R. The inventory is comprised of 60 self-descriptive statements in which participants, using a 5-point scale, rate the extent to which each statement describes them. The five dimensions of personality measured by this instrument are Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C). Correlations between the NEO-FFI and the longer NEO PI-R domains were 0.92, 0.90, 0.91, 0.77, and 0.87 for N, E, O, A, and C, respectively. Internal consistency coefficients for the NEO-FFI scales were 0.86, 0.77, 0.73, 0.68, and 0.81 for N, E, O, A, and C, respectively (Costa and McCrae, 1992). For 24 individuals in the current sample, one year test-retest correlation coefficients for the NEO-FFI were 0.88, 0.74, 0.90, 0.63, 0.73 for N, E, O, A, and C, respectively.

The structure of the NEO-FFI differs from most other personality scales in including achievement striving as part of Conscientiousness rather than Extraversion. Psychometric studies suggest that achievement striving may cohere more with other positive affect items (Watson and Clark, 1992). Given the importance of goal regulation in theoretical models of mania (Depue et al., 1996), these items were examined separately. The items under the Conscientiousness domain refer to participants' orientation toward Order, Dutifulness, Achievement Striving, and Self-Discipline. The items referring to Achievement Striving are "I have a clear set of goals and work toward them in an orderly fashion," "I work hard to accomplish my goals," and "I strive for excellence in everything I do." Psychometric characteristics for this shorter scale were less optimal than for the domain scores above; α for the Achievement Striving facet was 0.71, and the one-year test-retest correlation was 0.45.

2.4. Diagnosis

Diagnosis was confirmed using the Structured Clinical Interview for DSM-IV (SCID; First et al., 1996). The SCID achieves strong inter-rater reliability; κ for bipolar disorder has been shown to be 0.84 for bipolar disorder (Williams et al., 1992). Within our team, inter-rater reliability has been high ($\kappa = 1.0$ for mania in seven interviews evaluated by two raters, $r = 0.94$ for the specific symptoms of mania, $N = 74$, $P < 0.0001$). All diagnoses were reviewed to verify that they met DSM-IV criteria. A psychologist supervised all diagnostic decisions.

2.5. Symptom severity

Symptom severity and treatment status measures were completed monthly. The Modified Hamilton Rating Scale for Depression (MHRSD) was utilised to assess the severity of depressive symptoms (Miller et al., 1985). This modification of the Hamilton Rating Scale for Depression includes a standard interview format and behavioral anchors for ratings. Inter-rater reliability for this scale is high (intra-class correlations = 0.93). The Bech-Rafaelsen Mania Rating Scale (BRMS) was used to assess the severity of manic symptoms (Bech et al., 1979). Inter-rater reliability for this scale has ranged from 0.97 to 0.99. Our inter-rater reliability, calculated using methods defined by Shrout and Fleiss (1979), was high (intra-class correlations = 0.95 and 0.92 for the MHRSD and BRMS, respectively). Baseline measures of mania and depression were assessed at the 6-month interview. Outcome measures of mania and depression were assessed across the 6 months following

administration of the NEO-FFI (months 7 through 12). Symptom severity scales were used to assess the most severe week of symptoms during each month. Prior to completing any research interviews, all staff members were required to obtain correlation coefficients and percent agreements greater than 0.90 consensus ratings from a team of experts. Routine supervision was performed to maintain reliability. Regular team meetings were scheduled to rate tapes utilizing consensus.

3. Analysis plan

Before conducting primary analyses, we examined bivariate correlations of NEO-FFI domains with potentially confounding clinical and demographic variables. We also examined whether potentially confounding variables were correlated with follow-up symptoms.

For our primary analyses, we conducted simple bivariate correlations of NEO-FFI domain and Achievement Striving scores with baseline and follow-up manic and depressive symptoms. Next, we conducted two parallel hierarchical multiple regression analyses (one for depression and one for mania) to examine how personality domain scores related to follow-up symptoms after controlling for baseline symptoms. We conducted a third regression analysis to examine how Achievement Striving related to manic symptoms at follow-up, after controlling for baseline manic symptoms. All tests were two-tailed, with α set at 0.05.

4. Results

We first examined the clinical characteristics of the sample (see Table 1). Several aspects of this table deserve mention. First, the mean level of symptoms on the BRMS and the HRSD by our 6-month baseline assessment were both well below clinical cut-offs, suggesting that waiting 6 months after the acute episode was an effective strategy for capturing individuals at a period of relative remission. Nonetheless, based on clinical cut-off scores of 17 for the MHRSD and 16 for the BRMS, a few individuals maintained clinical levels of symptoms. In regard to the follow-up symptoms, there was substantial variability for the personality domain scores and the depression and mania follow-up scores, as evidenced by the relatively high standard deviations. Of the 4 depressed individuals at the time of personality assessment, only 1 remained depressed at follow-up, but 1 more individual became depressed. Of the 2 manic individuals at baseline, only 1 remained manic through the follow-up and 1 other individual became manic during the follow-up period.

The NEO-FFI means of the current sample differed from the means of the normative sample (Costa and McCrae, 1992). Bipolar individuals, compared to the normative sample, appeared significantly higher on the Neuroticism and Openness to Experience domain scores, and significantly lower on the Agreeableness domain scores (see Table 1).

Potential confounds were considered by examining correlations between follow-up manic and depressive symptoms and the following clinical and demographic variables: number of hospitalizations, number of episodes, number of depressions, age of illness onset, number of years of education, and Hollingshead Occupational Code. Age of illness onset was negatively correlated with BRMS follow-up ($r = -0.32, P < 0.05$). To determine whether age of onset could explain personality-symptom relations, we examined the correlations of onset age with personality domain scores and Achievement Striving. Only Openness to Experience correlated with age of onset ($r = -0.29, P < 0.05$). Given this, we decided to examine age of onset as a potential mediator of any significant results pertaining to the Openness to Experience domain.

Before conducting regression analyses, simple bivariate correlations of personality traits and symptoms were examined (see Table 2). As one would expect given the low levels of symptoms at the baseline evaluation, baseline mania scores were not related to Neuroticism, Extraversion, Openness to Experience, Conscientiousness, nor Achievement Striving. Baseline mania levels were tied to decreased Agreeableness. Baseline levels of depression were related to higher Neuroticism, less Agreeableness, and less Achievement Striving. Follow-up depression scores were related to increased Neuroticism, decreased Extraversion, Conscientiousness, and decreased Achievement Striving. Follow-up mania scores were related to increased Openness to Experience and Conscientiousness.

Given the correlation of even subsyndromal symptoms of depression and mania with personality scores at baseline, it is important to control for baseline symptoms in understanding links between personality and follow-up symptoms. One hierarchical multiple regression analysis was conducted to examine the relation between personality traits and mania, and a parallel model was used to examine depression. As the first block in each hierarchical regression analysis, baseline symptom severity (6 month) was entered to control for the influence of baseline symptoms on personality assessment. In the second block, we included all five domain scores of the NEO-FFI (N, E, O, A, and C). Forward selection was used to identify significant personality predictors. Procedures outlined by Cohen and Cohen (1983) were used in conducting regression analyses.

In the analysis for depression, significant effects were observed for baseline MHRSD and Neuroticism (see Table 3). As predicted, high baseline depression and neuroticism were associated with increases in depression over time. None of the other personality domain scores predicted follow-up MHRSD scores after accounting for these variables.

With regard to mania, significant effects for baseline BRMS and Conscientiousness emerged. None of the other personality domain scores predicted follow-up BRMS scores after accounting for these variables.

A separate analysis was performed to examine the effect of the Achievement Striving facet of Conscientiousness on mania. After accounting for baseline mania (R^2 change = 0.20, F change (1, 37) = 9.26, P = 0.004), Achievement Striving predicted a significant increase in mania (R^2 change = 0.10, F change (1, 36) = 4.89, P = 0.03). As a whole, these two variables accounted for 30% of the variance in mania over the next 6 months (F (2, 36) = 7.56, P = 0.002).

5. Discussion

Within this paper, we theorized that personality traits influence the course of bipolar disorder. Elevations of specific personality traits may induce certain maladaptive behavioral components, which increase vulnerability to symptoms of mania and depression. As described above, few studies have examined personality traits as predictors of bipolar symptoms, and results to date have been discordant (Strakowski et al., 1993; Clayton et al., 1994; Akiskal et al., 1995; Heerlein et al., 1998).

Participants with high Neuroticism appeared more susceptible to increases in depressive symptoms, consistent with previous research on unipolar depression. In some ways, this finding is not surprising, because neuroticism has been shown to correlate with such a broad range of outcomes (Duggan et al., 1990; Scott et al., 1995; Heerlein et al., 1998). Thus, this finding extends neuroticism findings from unipolar depression and other psychopathologies to bipolar disorder. Additionally, participants with high Conscientiousness, and more specifically high Achievement Striving, are more likely to experience increases in manic symptoms.

The present study has several limitations. We followed a small number of participants for a brief period, limiting power to detect personality–symptom relations. Relatedly, the small number of full episodes suggests that current results are more meaningful in regard to subsyndromal symptom changes. A shortened version of a single personality measure limited our ability to assess more specific facets, such as Achievement Striving. Further, even lingering subsyndromal symptoms at the 6-month interview could have biased self-reported personality traits: Neuroticism correlated with baseline depression, congruent with previous research (Hirschfeld et al., 1983). To control for the potential influence of symptom status on personality assessment, regression models examined the role of personality after accounting for baseline symptom levels. Nonetheless, the state-dependent nature of some personality self-descriptions must be acknowledged as a limitation. Each of these limitations suggests a need for replication. This need is accentuated by several previous studies that have failed to document personality as a predictor of subsequent manic or depressive symptomatology in bipolar I disorder (Clayton et al., 1994; Akiskal et al., 1995).

Our findings regarding Conscientiousness and manic symptoms were not predicted, nor were they in an expected direction. We explored several potential explanations. First, conscientiousness could be used as a coping strategy in response to recurrent manic episodes or hospitalizations. Correlation analyses were performed to account for any influence from previous course, such as number and severity of manic and depressive episodes, age of illness onset, number of years ill, hospitalizations and level of pharmacotherapy adequacy. These variables did not appear responsible for the suggested relation between Conscientiousness and mania. Alternatively, individuals who are conscientious may be more likely to accurately recall and report symptoms of mania. In this case, the cross-sectional correlation of Conscientiousness and mania should reflect such a bias; the low nature of this correlation suggests this is not an adequate explanation of these findings.

Previous research has found that the Achievement Striving facet of Conscientiousness could be conceptualized as an important aspect of positive affect regulation. Watson and Clark (1992) found that Conscientiousness was significantly associated with Positive Affect on the Expanded Form of the Positive and Negative Affect Schedule, and more specifically that only the Achievement Striving facet of the Conscientiousness domain was robustly related to positive affects. As previously mentioned, the NEOFFI is unique among personality scales for placing Achievement Striving under the Conscientiousness domain rather than Extraversion. The findings of Watson and Clark (1992) assist in the interpretation of the present findings regarding conscientiousness. Congruent with theory, the Achievement Striving facet of Conscientiousness was a significant predictor of mania. This connection between Achievement Striving and manic symptoms appears tentatively congruent with the BAS model of mania, described earlier.

Although current results await replication with more careful methodologies, intriguing links between achievement and bipolar disorder have emerged in previous research. Coryell et al. (1989) found that first-degree relatives of probands with bipolar disorder had higher educational and occupational attainment than did those of probands with nonbipolar major depression.

Although achievement striving provides one piece of the puzzle, a broader understanding comes from Akiskal's descriptions of the hyperthymic temperament. There is evidence supporting the theory that the hyperthymic personality is a milder form of and precursor to bipolar illness (Akiskal et al., 1977, 1983). The stimulus seeking, driven, and workaholic characteristics found in the hyperthymic temperament seem to overlap with positive affect and achievement oriented behavior and can be linked with the BAS model as precursors to

mania. Akiskal (1996) has suggested that the behavior of the hyperthymic temperament may bring about situations that trigger manic episodes. For example, the excessively driven, workaholic lifestyle may promote sleep deprivation, a common trigger for mania (Wehr, 1991; Malkoff-Schwartz et al., 1998). In short, achievement striving may be part of a pathway that intensifies risk for manic symptoms. As with neuroticism, however, it is extremely difficult to disentangle the direction of these relations; subsyndromal levels of hypomania may increase achievement striving.

The findings of the current study are clinically important, because they suggest one individual difference that may explain why some bipolar individuals experience more frequent manic symptoms. A better understanding of the relation between personality and the neural systems governing positive affect regulation and their influence on the course of bipolar disorder is needed. Future research should attempt to directly study this relation by utilizing specific measures of goals, achievement-oriented behavior, and incentive motivation to predict positive affect and mania over a longer time period with a larger sample. By identifying specific personality traits associated with bipolar disorder, psychosocial interventions can be developed to address maladaptive behavioral components.

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Table 1

Clinical characteristics of the study sample^a

Variable	MIN	MAX	MEAN	S.D.	Normative sample	
					Mean	S.D.
Neuroticism ***	2	47	25.96	12.50	19.07	7.68
Extraversion	14	43	27.15	8.38	27.69	5.85
Openness to Experience ***	17	63	33.51	8.02	27.03	5.84
Agreeableness *	8	45	29.49	8.21	32.84	4.97
Conscientiousness	16	51	32.03	9.50	34.57	5.88
Achievement Striving	0.67	5	2.82	0.92		
MHRSD-baseline	0	29	9.64	6.06		
MHRSD follow-up	0.83	23.67	9.92	5.32		
BRMS-baseline	0	20	4.18	5.53		
BRMS follow-up	0	16.17	5.58	4.92		

** $P < 0.01$ two-tailed^aNote. $n = 39$; MHRSD = Modified Hamilton Rating Scale for Depression; 17-item; BRMS = Bech-Rafaelsen Mania Scale.* $P < 0.05$ two-tailed*** $P < 0.005$ two-tailed.

Table 2Bivariate correlations between personality and follow-up symptoms^a

NEO-FFI Domains	HRSD baseline	BRMS baseline	HRSD follow-up	BRMS follow-up
Neuroticism	0.34*	0.27	0.61**	0.06
Extraversion	-0.25	-0.16	-0.44**	0.15
Openness to experience	-0.01	0.02	0.02	0.32*
Agreeableness	-0.34*	-0.30*	-0.24	-0.11
Conscientiousness	-0.15	-0.15	-0.32*	0.30*
Achievement striving	-0.27*	-0.24	-0.27*	0.19

^aNote. $n = 39$; NEO-FFI = NEO Five-Factor Inventory; MHRSD = Modified Hamilton Rating Scale for Depression; BRMS = Bech-Rafaelsen Mania Scale.

* $P < 0.05$ two-tailed

** $P < 0.01$ two-tailed.

Table 3Multiple regression results^a

Predictors	R ² -change	Total R ²	F-change	Final β coefficients
Dependent variable: MHRSD mean across 6 months				
MHRSD-baseline	0.20	0.20	9.26 ^{***} (1, 37)	0.27 [*]
Neuroticism	0.23	0.43	14.68 ^{***} (1, 36)	0.51 ^{***}
Variables not included in the model:				
Agreeableness				0.06
Conscientiousness				-0.05
Extraversion				-0.16
Openness to experience				-0.20
Dependent variable: BRMS mean across 6 months				
BRMS-baseline	0.20	0.20	9.26 ^{***} (1, 37)	0.50 ^{***}
Conscientiousness	0.14	0.34	7.42 ^{***} (1, 36)	0.37 ^{**}
Variables not included in the model:				
Agreeableness				-0.13
Extraversion				-0.02
Neuroticism				0.15
Openness to experience				0.18

^aNote. MHRSD = Modified Hamilton Rating Scale for Depression; BRMS = Bech-Rafaelsen Mania Scale.

* $P < 0.05$ two-tailed

** $P < 0.01$ two-tailed

*** $P < 0.005$ two-tailed.