Hierarchical personality traits and the distinction between unipolar and bipolar disorders

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Abstract
Background: The association between personality and psychopathology can provide an insight into the structure of mental disorders and the shared etiology and pathophysiology underlying diagnoses with overlapping symptomatology. The majority of personality-psychopathology research pertinent to the mood disorders has focused upon traits at the higher-order levels of the personality hierarchy, rather than those at intermediate or lower levels. The purpose of the current investigation was to investigate whether unipolar and bipolar mood disorders, and the severity of depressive and manic symptoms, show differential associations with traits at multiple levels of the personality hierarchy.

Methods: Participants (N = 275; 63% women; mean age 42.95 years) with depressive disorders (n = 139) and bipolar disorders (n = 136), as assessed by the Structured Clinical Interview for DSM-IV, Axis I Disorders, Patient Version (SCID-I/P; First et al., 1995), completed the Hamilton Depression Rating Scale, Young Mania Scale, Revised NEO Personality Inventory and Big Five Aspect Scales.

Results: Results support the hypothesis that lower levels of the personality hierarchy provide additional differentiation of affective pathology. As compared to the widespread association of depressive symptoms with traits across the personality hierarchy, manic symptoms demonstrated more specific associations with traits at lower levels of the personality hierarchy.

Limitations: Patients with severe mania were excluded, thus the full range of mania is not represented in the current sample.

Conclusions: These results support the use of lower-order personality traits to discriminate between unipolar versus bipolar mood disorder, and are consistent with changes proposed to the psychiatric nosology to increase diagnostic precision.

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1. Introduction

The approaching publication of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) has occasioned extensive research into the structure of psychopathology and the shared etiology and pathophysiology underlying disorders with overlapping symptomatology (Krueger et al., 2011). The proposed changes to the structure and content of the DSM-5 have the potential to result in a diagnostic system reflecting observed patterns of comorbidity across axis I and II disorders (e.g., Markon, 2010), and directing research towards treatments addressing shared, causal processes underlying related conditions. Unipolar versus bipolar mood disorders are currently differentiated by the lifetime presence of hypomania or mania (American Psychiatric Association, 2000). The resulting heterogeneous diagnostic groups have been criticized for being biased towards polarity while neglecting cyclicity and recurrence of symptoms common to both disorders (Goodwin and Jamison, 2007). Moreover, the emphasis on mania as the defining feature of bipolar mood disorders overlooks the predominance of depressive symptoms within the bipolar disorder spectrum (e.g., Judd et al., 2003; Swann et al., 2001), which contributes to the difficulties in differentiating between unipolar versus bipolar mood disorders in practice (Mitchell et al., 2011).

Current hierarchical models of personality may serve a vital function in the derivation of diagnostic entities that are grounded in empirical research: “This is because the organization of psychopathological tendencies has notable parallels with the organization of the personality dimensions that underlie those tendencies” (Krueger et al., 2011, p. 325). Mania and depression demonstrate a distinctive symptom presentation and course (Forty et al., 2008; Mitchell et al., 2008). Furthermore, mania...
and depression differ considerably in their optimal clinical management and long-term prognosis (Perlis et al., 2006a; see Cuellar et al., 2005 for a review). Personality constructs may contribute to the further delineation of common and unique components of these forms of psychopathology (e.g., Mendlewicz et al., 2005; Sasayama et al., 2011). There is a need to compare and contrast both mood disorder diagnoses and manic and depressive symptom severity across a full range of personality traits with a solid foundation in theory and neuroscience (Insel et al., 2010).

1.1. Five factor model of personality: domains, aspects, and facets

The five factor model (FFM) of personality, a prominent contemporary model of personality, is one framework by which to clarify the formulation of mood pathology. The FFM is composed of five broad domains of dimensional personality traits that capture consistent patterns of thoughts, moods, and behaviors: neuroticism, extraversion, openness/intellect, agreeableness, and conscientiousness (Goldberg, 1990). Research has demonstrated that personality traits can be organized hierarchically from these broad higher-order constructs to increasingly refined lower-order constructs. This organization is implicit within the measures most commonly used to assess the traits of the FFM, such as the Revised NEO Personality Inventory (NEO PI-R; Costa and McCrae, 1992). Within this instrument, each of the five domains is further defined according to six lower-order facets. An intermediate hierarchical level has also been proposed, based on empirical demonstration that two correlated but distinct factors, known as “aspects,” are subsumed by each of the five domains (DeYoung et al., 2007). Thus, each of the five broad domain traits (e.g., extraversion) can be decomposed into two more narrow aspect traits (e.g., enthusiasm and assertiveness), which can be further deconstructed into even more precisely defined facet traits (e.g., gregariousness, activity, positive emotions). The aspect traits have important advantages over facets, including that they were empirically derived from factor analyses of 15 facets per domain and thus offer a parsimonious and comprehensive model of the covariance among facets (DeYoung et al., 2007). In contrast, there is little empirical evidence or consensus on the number and identity of facets within each domain. Nonetheless, facet-level traits remain useful because of their high degree of specificity. The clinical utility of the traits at each level of the personality hierarchy in the discrimination of mood disorders and symptoms is a research question of significant translational value.

1.2. Personality, mania and depression

Empirical research has demonstrated the relevance of the higher-order domain traits to the mood disorders. Patients with both bipolar and unipolar mood disorder diagnoses consistently demonstrate elevated neuroticism as compared to healthy controls (Akiskal et al., 2006; Bagby et al., 1996, 1997 Barnett et al., 2011; Kotov et al., 2010; Lozano and Johnson, 2001; Nowakowska et al., 2005; Rosellini and Brown, 2011; Tackett et al., 2008). Patients with bipolar mood disorders demonstrate elevated openness/intellect as compared to both healthy controls as well as other psychiatric groups (Bagby et al., 1997; Barnett et al., 2011; Lozano and Johnson, 2001; Nowakowska et al., 2005; Tackett et al., 2008); the openness to feelings facet has been highlighted in this regard (Bagby et al., 1996). Patients with both unipolar and bipolar mood disorders show diminished Conscientiousness as compared to healthy controls (Barnett et al., 2011; Kotov et al., 2010; Nowakowska et al., 2005; Rosellini and Brown, 2011; Tackett et al., 2008). Mixed evidence exists for decreased agreeableness and extraversion in bipolar mood disordered samples (Lozano and Johnson, 2001; Barnett et al., 2011). Yet, the majority of research to date supports normative levels of extraversion in patients with bipolar mood disorders (Akiskal et al., 2006; Bagby et al., 1997), and diminished extraversion in patients with unipolar mood disorders (Kotov et al., 2010; Rosellini and Brown, 2011; Tackett et al., 2008). The positive emotions facet has demonstrated robust effects in this regard (Bagby et al., 1996, 1997).

The associations between FFM traits and mood symptom severity complement the mean levels observed within mood disordered diagnostic groups. Neuroticism has been consistently positively associated with depression severity across clinical and nonclinical samples (Lozano and Johnson, 2001; Murray et al., 2007; Quilty et al., 2009); however, only Quilty et al. (2009) demonstrated a significant association between neuroticism and mania severity. In contrast, agreeableness has been consistently negatively associated with manic severity (Lozano and Johnson, 2001; Murray et al., 2007; Quilty et al., 2009). Mixed evidence exists for extraversion: both Murray et al. (2007) and Quilty et al. (2009) demonstrated a positive association between extraversion and mania, whereas Quilty et al. (2009) demonstrated a negative association between extraversion and depression as well. Analogous research at the facet level has been limited; however, associations between depression and high scores on the angry hostility and depression facets of neuroticism have been highlighted (Chioqueta and Stiles, 2005), as well as low scores on the warmth and positive emotions facets of extraversion (Canuto et al., 2010; Chioqueta and Stiles, 2005). Further, Chioqueta and Stiles (2005) demonstrated a positive association between depression and the aesthetics and feelings facets and a negative association with the actions facet of openness to experience. Mania, in contrast, has been linked to high achievement striving, a facet of conscientiousness (Lozano and Johnson, 2001).

1.3. The current investigation

The objective of the current investigation was to clarify the understanding of the association between the personality traits of the FFM, and mood disorder diagnoses (e.g., unipolar versus bipolar mood disorder) as well as mood disorder symptom severity (e.g., manic and depressive symptom severity). The comprehensive evaluation of personality associations with diagnoses as well as depressive and manic symptom severity, at different levels of the personality hierarchy, may not only assist in the integration of previous, inconsistent results but also provide concrete direction for clinicians faced with difficult differential diagnostic decisions. Empirical research incorporating lower-order facet traits of the personality hierarchy is limited; moreover, no investigation has evaluated the aspect-level traits of the FFM in this context. The inclusion of the latter is particularly important for three reasons. First, whereas the appropriate number and identity of facet-level traits is uncertain, the two aspect-level factors in each FFM domain were empirically derived and appear to provide a comprehensive description of their level of the FFM hierarchy (DeYoung et al., 2007). Second, they appear to have distinct biological underpinnings (Cunningham et al., 2010; DeYoung et al., 2007, 2009; Jang et al., 2006). These first two considerations suggest that the aspect-level traits are in accord with the stated goal of DSM-5 development to ‘carve nature at its joints’ (Regier et al., 2009). Third, because there are only two traits within each domain at the aspect level, they are ideal for investigating independent predictions in regression without encountering the risk of suppression that occurs with many partially redundant facets.

The objective of the current study was to investigate the association between traits at three hierarchical levels of the FFM (domains, aspects and facets) and (1) a diagnosis of a bipolar...
versus unipolar mood disorder and (2) depression and mania symptom severity. We conducted this investigation in a well-characterized clinical sample, with interview-based diagnoses. Consistent with previous research, we hypothesized that bipolar mood disorder patients would demonstrate elevated extraversion and openness/intellect as compared to unipolar mood disorder patients, including the positive emotion facet of extraversion and the feelings facet of openness/intellect. We further hypothesized that depression symptom severity would be positively associated with neuroticism (including withdrawal, depression and anxiety); negatively associated with extraversion (including positive emotions); and negatively associated with conscientiousness. We finally hypothesized the manic symptom severity would be positively associated with volatility and angry hostility within neuroticism; positively associated with extraversion; and negatively associated with agreeableness.

2. Methods

2.1. Participants

A total of 275 participants (100 men, 175 female) with a lifetime diagnosis of either a unipolar mood disorder (n = 138; major depressive disorder n = 119, dysthymic disorder n = 18, depressive disorder not otherwise specified n = 1) or bipolar mood disorder (n = 137; bipolar I disorder n = 110, bipolar II disorder n = 21, BD not otherwise specified n = 6) completed measures of personality and psychopathology. The mean age was 43.02 years (SD = 11.58). Using Statistics Canada racial groupings, the majority of participants identified as Caucasian (87%; n = 238); the remaining participants identified as Asian (n = 11), African American (n = 10), Arabic/Islamic African (n = 6), Latin American (n = 4), Indian (n = 4), Aboriginal (n = 1), or multiple visible minorities (n = 1). Half of the participants (n = 137) displayed comorbid axis I disorders, including substance use disorders (n = 39), anxiety disorders (n = 108), somatofrom disorders (n = 10), eating disorders (n = 18), adjustment disorder (n = 1) and impule control disorder (n = 1). 56 participants exhibited more than one comorbid diagnosis.

2.2. Procedure

Participants were recruited via local advertisements for a clinical research project investigating mood disorders. A total of 610 potential participants completed a telephone screen of eligibility criteria, including the presence of a depressive, manic, hypomanic, and/or mixed episode within the past 10 years. Due to the length of the study protocol and to ensure the validity of the study measures, the exclusion criteria for this study consisted of the presence of current severe mania, psychosis or substance use. A total of 368 were eligible for participation; 300 provided oral and written informed consent and completed two five-hour laboratory assessments, including diagnostic interviews (e.g., the Structured Clinical Interview for DSM-IV; SCID-I/P, First et al., 1995) and psychometric instruments. A subset of these (n = 25) were not included within the final sample, due to the determination of exclusion criteria (n = 9) or invalid or inconsistent responding (n = 16) during participation. Financial compensation was provided upon study completion (see Quilty et al., 2011 for further description of study procedures). This protocol was approved by the institutional review board.

2.3. Measures

Hamilton Depression Rating Scale (HamD17; Hamilton, 1960): The HamD17 is the 17-item version of the structured interview widely used in clinical settings and trials to assess the presence and severity of depressive symptomatology in patients. The severity of each symptom is assessed on a scale of 0–2 or 0–4, with higher scores indicating a higher severity level. The HamD17 and associated subscales have accumulated evidence for reliability and validity (Bagby et al., 2004).

Young Mania Scale (YMS; Young et al., 1978): The YMS is an 11-item structured interview designed to assess the presence and severity of current manic symptoms. The severity of each symptom is assessed on a scale of 0–4 or 0–8, with higher scored indicating a higher severity level. The YMS has demonstrated good reliability and validity (Young et al., 1978).

Revised NEO Personality Inventory (NEO PI-R; Costa and McCrae, 1992): The NEO PI-R is a 240-item self-report measure frequently used to assess the FFM higher-order domain traits and thirty facet traits, each assessed by eight items. This measure asked participants to rate statements on a 5-point scale ranging from 1 “strongly disagree” to 5 “strongly agree”. The NEO PI-R has been extensively demonstrated as a reliable and valid measure of the FFM (Costa and McCrae, 1992), including within clinical populations (Costa et al., 2005; De Fruyt et al., 2006).

Big Five Aspect Scales (BFAS; DeYoung et al., 2007): The BFAS is a 100-item self-report measure designed to assess the higher-order domain traits of the FFM, as well as each of their associated aspect traits. This measure asked participants to describe themselves according to statements rated on a 5-point scale ranging from 1 “very inaccurate” to 5 “very accurate”. The BFAS has been demonstrated to be a reliable (internal and test-retest) and valid measure of the ten aspects of the FFM (DeYoung et al., 2007).

2.4. Statistical analysis

First, a series of 15 logistic regression models were performed, with mood disorder diagnosis as determined by SCID-I/P as a criterion variable (dummy-coded as unipolar mood disorder = 0, bipolar mood disorder = 1), and the traits of the FFM as predictor variables. The FFM domains were individually included in five separate models, whereas the two aspects and six facets of each domain were entered simultaneously in 10 additional, separate models. The strength of each independent association to discriminate unipolar from bipolar mood disorder was quantified using odds ratios (OR; probability of unipolar mood diagnosis/probability of bipolar disorder diagnosis). For example, an OR of 2.00 indicates that for every standard deviation increase in the predictor variable, a participant is twice as likely to have a bipolar mood diagnosis rather than a unipolar mood diagnosis.

Second, a series of 15 linear regression models were evaluated in the full sample, with mania severity as assessed by the YMS serving as a dependent variable and the traits of the FFM as predictor variables. Again, the FFM domains were individually entered in five separate models, whereas the two aspects and six facets of each domain were entered simultaneously into 10 additional, separate models. The same series of 15 linear regression models were then evaluated with depression severity as assessed by the HamD17 serving as a dependent variable. p values < .05 were considered statistically significant.

3. Results

The mean, standard deviation and range of the personality and clinical variables are displayed in Table 1. Univariate associations between personality trait scores and depression and manic symptom severity are presented in Table 2.
3.1. Logistic regressions

The results of the logistic regression analyses can be found in Table 3. Neuroticism scores did not contribute to the prediction of mood disorder diagnosis at the domain level; however, at the aspect level, increased Volatility and decreased Withdrawal significantly contributed to the prediction of bipolar versus unipolar mood disorder diagnosis. In addition, at the facet level, Impulsiveness scores further differentiated significantly between mood disorder diagnoses. Increased Extraversion contributed to the prediction of mood disorder diagnosis at all levels of personality hierarchy. Extraversion significantly predicted bipolar versus unipolar mood disorder diagnosis at the domain level, as did Enthusiasm at the aspect level, and Assertiveness, Activity, and Positive emotions at the facet level. Openness/Intellect significantly predicted mood disorder diagnosis at the domain level. Although the $\chi^2$ associated with the model including facet traits was significant, none of the $\chi^2$’s associated with individual parameter estimates were significant, suggesting that, although the facets predicted mood disorder diagnosis as a whole (consistent with the significance of the domain-level regression), none of facets were associated with unique predictive variance. Agreeableness was significantly predictive of mood disorder diagnosis at the domain level as well as at the aspect level, where Compassion was associated with increased likelihood of bipolar versus unipolar mood disorder. Finally, Conscientiousness was predictive only at lower levels of personality hierarchy: Industriousness significantly contributed to the prediction of bipolar versus unipolar diagnosis at the aspect level. In addition, Deliberation predicted bipolar versus unipolar mood disorder as the facet level. When all FFM domains were entered as simultaneously predictors of diagnosis, the model was significant, $\chi^2_{\text{model}}=28.44, p<.01$; only Extraversion demonstrated a significant 1.03, 95%CI 1.01–1.04. That is, when all other FFM domains are held constant, higher levels of Extraversion are associated with a greater probability of a bipolar diagnosis as compared to a unipolar diagnosis.
3.2. Linear regressions: depressive symptom severity

The results of the linear regression analyses for depression severity are presented in Table 4. Depression was positively predicted by Neuroticism at the domain level, Withdrawal at the aspect level, and Anxiety, Depression, and Vulnerability at the facet level. In contrast, depression was negatively predicted by Extraversion at the domain level, Enthusiasm at the aspect level, and Actions at the facet level. Depression was also negatively predicted by Intellect at the aspect level and Achievements at the facet level. Depression was positively predicted by Conscientiousness at the domain level, Industriousness at the aspect level, and Self-Discipline at the facet level; in contrast, depression severity was positively predicted by order at the facet level. When all FFM domains were entered as simultaneously predictors of depression severity, the model was significant, $R^2=.36$, $p < .01$; Neuroticism and Extraversion emerged as significant predictors, Neuroticism $\beta=.43$, $t=6.40$, $p < .01$, Extraversion $\beta=-.22$, $t=3.54$, $p < .01$.

3.3. Linear regressions: mania symptom severity

The results of the linear regression analyses for mania severity are presented in Table 5. Mania was positive predicted by Volatility scores at the aspect level and Angry Hostility scores at the facet level of Neuroticism. Further, mania was also positively linked only to Activity at the facet level of Extraversion. No significant relations were found between YMS scores and the traits of Openness/intellect or agreeableness. Finally, mania severity was negatively predicted by Deliberation at the facet level of Conscientiousness. When all FFM domains were entered as simultaneously predictors of mania severity, the model was not significant, $R^2=.03$, $p=11$. 

Note: Significance levels are as follows:
* signifies $p < .05$.
** signifies $p < .01$.
in attempting to understand psychopathology. Sizes the importance of considering lower levels of the personality pattern of differentiation than the domain level, which emphasizes the importance of examining multiple levels of the personality hierarchy.

In differentiating unipolar from bipolar mood disorder diagnoses, the aspect level provided the most important novel insight. Unsurprisingly, previous research has demonstrated that both unipolar and bipolar mood disorders are associated with elevated Neuroticism. Similarly, in the present research, bipolar and unipolar mood disorder patients were not discriminated by general (high) Neuroticism scores. At the aspect level of Neuroticism, however, increased Volatility and decreased Withdrawal distinguished bipolar from unipolar mood disorders patients, suggesting that the result at the domain level does not optimally demonstrate Neuroticism’s relevance to mood pathology. At the facet level, the fact that the Impulsiveness facet of Neuroticism also differentiated patient groups is consistent with the association of that facet with Volatility (DeYoung et al., 2007). The finding that Volatility predicts bipolar mood disorder, whereas Withdrawal predicts unipolar mood disorder, indicates that, in those with heightened Neuroticism who are at risk for mood disorders generally, the relative balance of the two aspects of Neuroticism may be a crucial determinant of whether unipolar or bipolar disorder develops. Research on the psychological and biological underpinnings of Withdrawal and Volatility may therefore be informative for research on mood disorders.

Table 5: Summary of linear regression analyses of the FFM domains, aspects, and facets prediction of mania severity.

<table>
<thead>
<tr>
<th>FFM domain/aspect/facet</th>
<th>$R^2$</th>
<th>$F$</th>
<th>$\beta$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volatility</td>
<td>.01</td>
<td>1.72(1, 261)</td>
<td>.08</td>
<td>1.31</td>
</tr>
<tr>
<td>Withdrawal</td>
<td>.05</td>
<td>6.30(2, 250)</td>
<td>.31</td>
<td>3.45*</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.04</td>
<td>1.86(6, 256)</td>
<td>.06</td>
<td>.59</td>
</tr>
<tr>
<td>Angry hostility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-consciousness</td>
<td>.01</td>
<td>.07</td>
<td></td>
<td>.96</td>
</tr>
<tr>
<td>Impulsiveness</td>
<td>.04</td>
<td>.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vulnerability</td>
<td>.02</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>.00</td>
<td>.64(1, 261)</td>
<td>.05</td>
<td>.80</td>
</tr>
<tr>
<td>Openness to experience</td>
<td>.00</td>
<td>.81(1, 261)</td>
<td>.06</td>
<td>.58</td>
</tr>
<tr>
<td>Optimism</td>
<td>.00</td>
<td>.26(2, 250)</td>
<td>.01</td>
<td>.19</td>
</tr>
<tr>
<td>Warmth</td>
<td>.03</td>
<td>1.16(6, 256)</td>
<td>.15</td>
<td>1.49</td>
</tr>
<tr>
<td>Gregariousness</td>
<td>.10</td>
<td>.10</td>
<td></td>
<td>.10</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>.01</td>
<td>.01</td>
<td></td>
<td>.10</td>
</tr>
<tr>
<td>Activity</td>
<td>.14</td>
<td>.19</td>
<td></td>
<td>.19</td>
</tr>
<tr>
<td>Excitement-seeking</td>
<td>.01</td>
<td>.11</td>
<td></td>
<td>.11</td>
</tr>
<tr>
<td>Positive emotions</td>
<td>.00</td>
<td>.03</td>
<td></td>
<td>.03</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>.01</td>
<td>2.62(1, 261)</td>
<td>.10</td>
<td>1.62</td>
</tr>
<tr>
<td>Intelect</td>
<td>.02</td>
<td>2.77(2, 250)</td>
<td>.04</td>
<td>.60</td>
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<tr>
<td>Politeness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>.03</td>
<td>1.17(6, 256)</td>
<td>.12</td>
<td>1.57</td>
</tr>
<tr>
<td>Straightforwardness</td>
<td>.02</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altruisim</td>
<td>.06</td>
<td>.78</td>
<td></td>
<td></td>
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<tr>
<td>Compliance</td>
<td>.11</td>
<td>.14</td>
<td></td>
<td>.14</td>
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<tr>
<td>Modesty</td>
<td>.04</td>
<td>.56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tender-mindedness</td>
<td>.03</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>.00</td>
<td>.92(1, 261)</td>
<td>.06</td>
<td>.96</td>
</tr>
<tr>
<td>Industriousness</td>
<td>.00</td>
<td>.31(2, 250)</td>
<td>.03</td>
<td>.45</td>
</tr>
<tr>
<td>Orderliness</td>
<td>.06</td>
<td>2.88(6, 256)</td>
<td>.08</td>
<td>.91</td>
</tr>
<tr>
<td>Competence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order</td>
<td>.03</td>
<td>.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutifulness</td>
<td>.14</td>
<td>.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Achievement striving</td>
<td>.08</td>
<td>.95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-discipline</td>
<td>.02</td>
<td>.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliberation</td>
<td>.25</td>
<td>3.43*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Significance levels are as follows:
* signifies $p < .05$. ** signifies $p < .01$.

4. Discussion

The goals of this study were (1) to investigate the ability of personality traits to discriminate between the diagnosis of bipolar versus unipolar mood disorder and (2) to examine the association of personality traits with depression and mania severity in a sample with mood disorders. In contrast to previous research on this question, the present study utilized three hierarchical levels of the FFM (domains, aspects and facets). All three levels were capable of differentiating unipolar from bipolar mood disorders, and showed differential associations with depression and mania. However, the aspect and facet levels showed a more extensive pattern of differentiation than the domain level, which emphasizes the importance of considering lower levels of the personality hierarchy in attempting to understand psychopathology.

In differentiating unipolar from bipolar mood disorder diagnoses, the aspect level provided the most important novel insight. Unsurprisingly, previous research has demonstrated that both unipolar and bipolar mood disorders are associated with elevated Neuroticism. Similarly, in the present research, bipolar and unipolar mood disorder patients were not discriminated by general (high) Neuroticism scores. At the aspect level of Neuroticism, however, increased Volatility and decreased Withdrawal distinguished bipolar from unipolar mood disorders patients, suggesting that the result at the domain level does not optimally demonstrate Neuroticism’s relevance to mood pathology. At the facet level, the fact that the Impulsiveness facet of Neuroticism also differentiated patient groups is consistent with the association of that facet with Volatility (DeYoung et al., 2007). The finding that Volatility predicts bipolar mood disorder, whereas Withdrawal predicts unipolar mood disorder, indicates that, in those with heightened Neuroticism who are at risk for mood disorders generally, the relative balance of the two aspects of Neuroticism may be a crucial determinant of whether unipolar or bipolar disorder develops. Research on the psychological and biological underpinnings of Withdrawal and Volatility may therefore be informative for research on mood disorders.

Traits in the other four domains also differentiated unipolar and bipolar diagnoses. At the domain level, Extraversion was positively associated with bipolar versus unipolar diagnosis. At the aspect level, bipolar was associated with Enthusiasm, and at the facet level bipolar was associated with increased Activity and Positive Emotions. Unexpectedly, one facet of Extraversion, Assertiveness, showed a negative association with bipolar relative to unipolar mood disorder. As expected, higher Openness/Intellect scores at the domain level were associated with greater likelihood of bipolar versus unipolar mood disorder. However, our preliminary hypotheses at the facet level of Openness/Intellect (i.e., that Feelings would predict bipolar diagnosis) based on Bagby et al. (1996) were not confirmed. Further, significant results emerged at the domain level for Agreeableness, which predicted bipolar relative to unipolar disorder. At the aspect level, Compassion predicted bipolar positively, but no facet-level traits were significant predictors, which is consistent with the fact that the NEO PI-R contains no facets that are good pure markers of Compasion (DeYoung et al., 2007). Finally, for Conscientiousness, there was no effect at the domain level, but the Industriousness aspect positively predicted bipolar, and at the facet level Competence positively predicted bipolar, whereas Deliberation negatively predicted bipolar. As with Neuroticism, this demonstrates how a lack of effect at the domain level can reflect effects in opposite directions at lower levels. This highlights the importance of examining multiple levels of the personality hierarchy.

Manic and depression symptom severity demonstrated differential associations with FFM traits, which provides complementary information to that described above. Consistent with our hypotheses, positive associations with depression were revealed for the Neuroticism domain as well as the Depression and Anxiety facets. Additionally, positive associations emerged for the Withdrawal aspect and the Vulnerability facet. Consistent with previous findings and our hypotheses, the Extraversion hierarchy demonstrated negative associations with depression at the domain (Extraversion), aspect (Enthusiasm) and facet (Positive Emotions) levels. Contrary to previous findings by Choiqueta and Stiles (2005), the facet scales of Aesthetics and Feelings of Openness/Intellect did not reach significance; however, the Intellect aspect and Actions facet demonstrated negative associations with depression scores. Depression was negatively associated with the Agreeableness domain, Compassion aspect, and Trust facet, as well as positively associated with the Modesty facet. Finally, associations emerged for Conscientiousness whereby the Conscientiousness domain, Industriousness aspect and Self-Discipline facet were negatively associated with depression, whereas the Order facet showed a unique positive association with depression.

Mania severity demonstrated a much more restricted range of associations. Global Neuroticism was not significantly associated with mania severity; however, Volatility and Angry Hostility were
both positively associated with mania scores. Beyond the Neuroticism domain, the Activity facet of Extraversion was positively associated with mania, whereas the Deliberation facet of Conscientiousness was negatively associated.

The findings of the current study extend previous research on the ability of FFM traits to differentiate between bipolar and unipolar mood disorders and to differentiate symptoms of depression and mania. The results indicate that all domains of the FFM and all levels of the FFM hierarchy included provide valuable information regarding the personality traits associated with affective disorders. More importantly, no single level of the FFM hierarchy dominated in this regard: lower-level traits not only helped to identify the precise traits driving the results seen at higher levels, but also demonstrated unique associations that are not observably salient at higher levels. Of note, although three domain traits predicted diagnostic group membership at a statistically significant level, the clinical significance of these effects remains to be confirmed (odds ratios were 1.02–1.03). Greater effect sizes were apparent at lower levels of the hierarchy. Within the analysis of depression and mania symptom severity, the results of this study demonstrate that depression severity was predicted by a wide range of traits at all levels of the personality hierarchy, whereas mania severity was related to fewer traits, located predominantly at the lower levels. These results support the DSM-5 separation of depressive and bipolar disorders into separate chapters and the inclusion of increased activity or energy as part of the core criteria for mania and hypomania.

Depressive and bipolar disorders are currently distinguished by the occurrence of hypomanic or manic episodes; however, such episodes may be under-reported by patients presenting in a depressive episode, or may have yet to occur (2006b). Given the clinical difficulties in diagnosing bipolar mood disorders, then, the use of the FFM and its hierarchical structure could serve as an effective and efficient tool (e.g., the BFAS takes approximately 10–15 min to administer) to supplement clinical interviews.

5. Limitations

Several limitations should be considered when interpreting the findings of this study. First, the exclusion criteria, which consisted of the presence of current severe mania, psychosis or substance use, may have limited our sample by restricting bipolar mood disorder patients to those with less severe of manic symptoms than could be observed in the full range of the overall clinical population. In addition, the grouping of bipolar I and bipolar II patients may have weakened the results or further underrepresented the severity of mania in the bipolar spectrum.

Conflict of interest

All authors declare that they have no conflicts of interest.

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