

## Additional Evidence for a Quantitative Hierarchical Model of Mood and Anxiety Disorders for *DSM–V*: The Context of Personality Structure

Jennifer L. Tackett  
University of Toronto

Lena C. Quilty  
University of Toronto and Centre for Addiction  
and Mental Health

Martin Sellbom  
Kent State University

Neil A. Rector and R. Michael Bagby  
University of Toronto and Centre for Addiction  
and Mental Health

Recent progress toward the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* includes a proposed quantitative hierarchical structure of internalizing pathology with substantial, supportive evidence (D. Watson, 2005). Questions about such a taxonomic shift remain, however, particularly regarding how best to account for and use existing diagnostic categories and models of personality structure. In this study, the authors use a large sample of psychiatric patients with internalizing diagnoses ( $N = 1,319$ ) as well as a community sample ( $N = 856$ ) to answer some of these questions. Specifically, the authors investigate how the diagnoses of obsessive-compulsive disorder (OCD) and bipolar disorder compare with the other internalizing categories at successive levels of the personality hierarchy. Results suggest unique profiles for bipolar disorder and OCD and highlight the important contribution of a 5-factor model of personality in conceptualizing internalizing pathology. Implications for personality-psychopathology models and research on personality structure are discussed.

**Keywords:** internalizing disorders, five-factor model, *DSM–V*, personality-psychopathology

**Supplemental materials:** <http://dx.doi.org/10.1037/a0013795.supp>

Historically, prominent researchers interested in psychopathology have acknowledged the relevance of individual differences for a comprehensive understanding of mental disorders (Clark, 2005; Maher & Maher, 1994). For some period of time, however, research on abnormal and personality psychology was conducted largely in parallel. Over the last quarter century, psychopathology researchers have shown increasing attention to personality-psychopathology relationships (Krueger & Tackett, 2006). This resurgence of interest in how personality relates to psychiatric disorders was substantially driven by researchers interested in depression (Akiskal, Hirschfeld, & Yerevanian, 1983; Clark, 2005; Widiger, Verheul, & van den Brink, 1999). This increased attention to both theoretical and empirical work has implicated person-

ality as representing risk and resiliency factors for the development of mental disorders, as sharing underlying causal influences with psychopathology, and as playing a role in treatment outcome. As the fields of psychology and psychiatry continue preparations for the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM–V)*, models of personality-psychopathology relationships have been proposed to play a substantial role in changes to the psychiatric nosology (e.g., Clark, 2005, 2007; Widiger & Simonsen, 2005).

One such proposal for innovation in *DSM–V* concerns the classification of the internalizing disorders, or disorders relating to disturbances in mood, affect, and anxiety (Watson, 2005). Specifically, Watson (2005) has proposed a substantial reorganization of these disorders that is informed by empirical evidence on disorder co-occurrence, shared genetic vulnerability, and connections with personality. The present study was conducted within this personality-internalizing pathology framework and seeks to extend existing knowledge of personality-internalizing connections. We begin by selectively reviewing evidence for specific relationships between personality and internalizing disorders, turning next to more comprehensive personality-internalizing pathology models that have been proposed, including Watson's (2005) recent proposal for *DSM–V*. Finally, we discuss recent innovations in research on personality structure that informed the hypotheses in the present study regarding information provided by successive levels of the personality hierarchy.

---

Jennifer L. Tackett, Department of Psychology, University of Toronto, Toronto, Ontario, Canada; Lena Quilty, Neil A. Rector, and R. Michael Bagby, Department of Psychiatry, University of Toronto, and Centre for Addiction and Mental Health, Toronto, Ontario, Canada; Martin Sellbom, Department of Psychology, Kent State University.

We thank Kristian E. Markon for helpful comments on an earlier version of this article. We also thank Lewis R. Goldberg for his generosity in making data available from the Eugene–Springfield community sample.

Correspondence concerning this article should be addressed to Jennifer L. Tackett, Department of Psychology, University of Toronto, 100 St. George Street, Toronto, Ontario M5S 3G3, Canada. E-mail: [tackett@psych.utoronto.ca](mailto:tackett@psych.utoronto.ca)

### Specific Relationships Between Personality and Internalizing Disorders

The largest collective body of work in this domain has investigated connections between personality traits and specific internalizing disorders. Much of this work has been incorporated into broader integrated models, which are discussed below. Thus, an extensive review of these specific connections is not presented here (see Enns & Cox, 1997, and Vachon & Bagby, in press). However, we point out some of the more common findings in this work with particular attention paid to disorders not as well incorporated into the comprehensive integrated models to date. We primarily refer to personality traits as defined by the five-factor model (FFM; see Goldberg, 1993; McCrae & Costa, 1999): that is, Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C). We use the FFM to provide our framework for reviewing the literature presented here to promote a common language across studies.

#### *Depression*

A large body of research has supported connections between depression and high N/negative affect and low E/positive affect (e.g., Bagby, Quilty, & Ryder, 2008; Brown, Chorpita, & Barlow, 1998; Clark, Watson, & Mineka, 1994; Parker, Manicavasagar, Crawford, Tully, & Gladstone, 2006). Some work has also suggested that depression is connected with lower levels on C (see Bagby & Ryder, 2000; Harkness, Bagby, Joffe, & Levitt, 2002; Krueger, Caspi, Moffitt, Silva, & McGee, 1996; Trull & Sher, 1994), although evidence for a systematic connection is often considered questionable (e.g., Gamez, Watson, & Doebbeling, 2007).

#### *OCD*

Investigations of the relationship between obsessive-compulsive disorder (OCD) and personality have often focused on OCD relationships with obsessive-compulsive personality disorder (OCPD; Wu, Clark, & Watson, 2006). Studies in which individuals with OCD have been compared with individuals without OCD have consistently demonstrated elevated levels on N with fairly consistent evidence for low levels on E relative to both patient and nonpatient comparison groups (Samuels et al., 2000; Rector, Hood, Richter, & Bagby, 2002; Bienvenu et al., 2004; Wu et al., 2006). Less consistent evidence has suggested that OCD may be associated with higher levels on A (Samuels et al., 2000; Wu et al., 2006) and lower levels on C (Rector et al., 2002). Connections with O have been mixed (Bienvenu et al., 2004; Wu et al., 2006).

Researchers interested in connections between personality and OCD have also called attention to the potential of symptom heterogeneity within the disorder. Specifically, researchers have proposed multifactorial solutions that emphasize differential symptom content (e.g., Calamari, Rector, Woodard, Cohen, & Chik, in press; Watson et al., 2005). In one study conducted with an undergraduate sample, N showed the strongest relationship with checking behaviors (Wu & Watson, 2005). Another study in which the authors specifically examined hoarding in a SCID-diagnosed OCD sample found a negative association with C and a positive association with N (LaSalle-Ricci et al., 2006).

#### *Bipolar Disorder*

Research examining connections between personality and bipolar disorder is sparse. Studies on bipolar disorder have often found higher levels on N relative to nonclinical comparison groups, although this finding does not tend to hold when nonbipolar clinical groups are used as the comparison (Akiskal et al., 2006; Hirschfeld, Klerman, Keller, Andreasen, & Clayton, 1986). The most robust personality connection for bipolar disorder is higher levels on E compared with nonbipolar patient groups (Akiskal et al., 2006; Bagby et al., 1996; Bagby et al., 1997). Recent studies have demonstrated a connection between high levels on E and bipolar disorder features (Murray, Goldstone, & Cunningham, 2007; Quilty, Sellbom, Tackett, & Bagby, in press). Less consistent associations have been reported with higher levels on O (Bagby et al., 1996; Bagby et al., 1997), lower levels on C (Lozano & Johnson, 2001), and lower levels on A (Murray et al., 2007; Quilty et al., 2008). Related issues of symptom heterogeneity within the syndrome have included the proposal that bipolar disorder may be best conceptualized as a two-dimensional syndrome, separating depressive and manic symptoms, each of which might have unique personality correlates (Lozano & Johnson, 2001; Quilty et al., 2008).

#### *Other Internalizing Disorders*

Recent work investigating connections between personality and posttraumatic stress disorder (PTSD) have emphasized the issue of symptom heterogeneity within the disorder. PTSD is defined by distinct symptom clusters, each of which may have unique relationships to personality traits that may not be fully understood when aggregating them into a unitary PTSD construct. Factor analytic investigations of PTSD symptoms have yielded a four-factor structure (Simms, Watson, & Doebbeling, 2002) of which one, labeled *dysphoria* is particularly associated with negative affectivity/N, although significant associations with negative affectivity/N are also found for the other three factors—intrusions, hyperarousal, and avoidance (Watson et al., 2005).

Research has suggested that social phobia shows relations to personality similar to those with depression, such that it is connected with high levels on N and low levels on E (Bienvenu et al., 2004; Brown, 2007; Brown et al., 1998; Clark et al., 1994; Kotov, Watson, Robles, & Schmidt, 2007; Sellbom, Ben-Porath, & Bagby, 2008; Trull & Sher, 1994). Studies that have investigated personality profiles of other internalizing disorders have supported an overall increase on N among internalizing individuals (e.g., Bienvenu et al., 2001, 2004; Brown et al., 1998; Kotov et al., 2007; Krueger et al., 1996; Trull & Sher, 1994). Some research has also demonstrated that agoraphobia and dysthymia show low levels on E (Bienvenu et al., 2001, 2004; Trull & Sher, 1994).

### Comprehensive Models of Personality and Internalizing Disorders

#### *The Tripartite Model*

One integrative model of personality-internalizing pathology connections that has received substantial attention is the tripartite model (Clark & Watson, 1991). According to this model, the extensive comorbidity between mood and anxiety disorders can be

largely explained by increased negative affect or N, whereas specific factors of low positive affectivity or E and high physiological hyperarousal differentiate mood and anxiety disorders, respectively (Clark, Watson, & Mineka, 1994). The tripartite model has received support in samples of children and adolescents as well (e.g., Chorpita, Plummer, & Moffitt, 2000; Lonigan, Phillips, & Hooe, 2003).

Extensions of the tripartite model include the recognition that low E or positive affectivity is not unique to depression and shows robust connections with social phobia (Brown, 2007; Brown et al., 1998; Watson et al., 1988, 2005). In addition, the physiological hyperarousal component appears to be a specific marker of panic disorder, rather than a feature of all anxiety disorders (Brown et al., 1998; Clark et al., 1994; Mineka, Watson, & Clark, 1998). Studies have supported the hypothesis that much of the covariance among myriad internalizing disorders can be explained by connections to E and N (e.g., Brown et al., 1998). The substantial comorbidity between major depressive disorder (MDD) and generalized anxiety disorder (GAD) is largely due to shared genetic influences, which partially overlap with genetic influences on N (Kendler, Gardner, Gatz, & Pedersen, 2007). Further, a recent study demonstrated that temporal covariance between depression, social phobia, and GAD was entirely accounted for by changes in N/behavioral inhibition (Brown, 2007).

More recent extensions of this model have emphasized the differential importance of N and E in connection with various disorders (Brown, 2007; Brown et al., 1998; Mineka et al., 1998; Sellbom et al., 2008; Watson, 2005). That is, the common factor of N appears to account for different amounts of variance in different disorders. Specifically, N has been shown to relate more strongly to depression and GAD but less strongly to OCD, social phobia, and specific phobia (Brown, 2007; Gamez et al., 2007; Mineka et al., 1998). Furthermore, the strength of these connections in addition to recent structural analyses has provided further empirical support for conceptualizing PTSD as a distress disorder (Gamez et al., 2007; Sellbom et al., 2008; Slade & Watson, 2006).

### *Watson's (2005) Conceptualization*

Watson (2005) recently integrated structural evidence for connections and distinctions among internalizing disorders in an updated review. He proposed that the domain of internalizing disorders be divided into three sections: (a) bipolar disorders (consisting of bipolar I, bipolar II, and cyclothymia), (b) distress disorders (consisting of major depression, dysthymia, generalized anxiety, and PTSD), and (c) fear disorders (consisting of panic, agoraphobia, social phobia, and specific phobia), providing support for this three-factor structure from both phenotypic and genetic studies. Advantages of hierarchical models such as the model proposed by Watson (2005) and the others reviewed here include addressing the presence of extensive comorbidity, accounting for heterogeneity existing within disorders, and elucidating both common and specific components of pathology to aid investigations of common and unique biological correlates.

One limitation of previous work in this area has been the exclusion of certain disorders, particularly those disorders with low base rates that typically do not show enough variance to be amenable to statistical analyses (Watson, 2005). Two such disorders highlighted in recent work are bipolar disorder and OCD, both

of which are included in the analyses presented here. A recent structural study that did have sufficient prevalence rates to include OCD presented evidence that OCD might be best conceptualized as a fear disorder (Slade & Watson, 2006), but the authors noted the need for further investigations including OCD to better realize its place in a comprehensive structural model.

### Recent Advances in Research on Personality Structure

Recent advances in research on personality structure have also focused attention on the usefulness of a quantitative hierarchical structure, similar to the psychopathology research reviewed above. Personality structure has often been conceptualized as hierarchical in nature, with broader traits occupying higher levels of the hierarchy, which represent wider levels of abstraction and subsume more specific, narrowly defined traits at lower levels of the hierarchy. Historically, models of personality structure differed in large part based on the number of higher order traits they measured. Proponents for two-, three-, four-, and five-factor structures advocated the use of different measures, which led to a fragmented literature and impaired communication across researchers.

Markon, Krueger, & Watson (2005) recently offered a comprehensive hierarchical model of personality structure. Moving beyond demonstrated connections between higher order traits, Markon et al. provided evidence that major models of personality structure can be integrated into a unified hierarchical structure. Specifically, results from a meta-analysis and an empirical study converged on evidence that two- through five-factor models are empirically related in a hierarchical manner, and evidence for each prominent trait model existed at successive levels of the hierarchy. This work demonstrated that these models need not be considered mutually exclusive, but left open the question of which level provides maximal information in predicting various behavioral criteria.

In particular, much work investigating the connections between personality and psychopathology has suggested that a 4-factor model consisting of N, E, A, and C is sufficient for capturing meaningful variance in psychopathological constructs at the higher order level of personality structure (e.g., Costa & Widiger, 2002; Krueger & Tackett, 2003). Similarly, prominent dimensional models of personality pathology measure a four-factor structure (e.g., Clark, Livesley, Schroeder, & Irish, 1996; Widiger & Simonsen, 2005). Some personality-psychopathology researchers have suggested that O may not have a useful place in a personality conceptualization of mental disorders (see Chmielewski & Watson, 2008; Parker et al., 2006; Tackett, Silberschmidt, Sponheim, & Krueger, 2008). Research investigating connections of the FFM to internalizing disorders have also frequently failed to find significant connections with O (e.g., Watson et al., 2005), and results from some studies comparing broadly generalized patient groups with normative samples have been conflicting (e.g., Trull & Sher, 1994; Wu et al., 2006).

Some psychopathology studies that have failed to find associations with O at the higher order level have found facets of O to provide more discriminating information (e.g., Rector et al., 2002; Samuels et al., 2000). As reviewed previously, limited research has suggested that higher levels of O may be connected to OCD and bipolar disorder; although this finding has been largely inconsistent across studies. Thus, the usefulness of the higher order construct remains to be demonstrated. By investigating multiple levels

of the personality hierarchy in relation to internalizing disorders in this study, we can explicitly investigate whether a five-factor structure provides meaningful information beyond a four-factor structure in conceptualizing internalizing pathology.

### Comprehensive Integrated Hierarchical Understanding of Personality Relations to Internalizing Pathology

In the present study, we examined whether successive levels of the hierarchy would provide additional personality information about these primary internalizing groups relative to a nonclinical population sample. Specifically, we had two broad goals: Our first goal was to investigate the contribution of successive levels of the personality hierarchy to information about different types of internalizing pathology. That is, do more complex higher order models of personality provide any additional information in differentiating distress, fear, OCD, and bipolar patients from the normal population? Our second goal was to contribute to current efforts in constructing a comprehensive structural model of internalizing disorders by expanding this model to disorders not yet fully incorporated into previous work. Specifically, we included OCD and bipolar disorder, which are typically excluded from personality-psychopathology studies, in order to examine whether they appeared more similar to the distress group or the fear group or whether they appeared to be distinct from both. To the best of our knowledge, this is the first integrated study of personality-psychopathology relationships with sizeable patient groups for both OCD and bipolar disorder, offering the first comprehensive empirical integration of these disorders into a model of personality and internalizing disorders.

## Method

### Participants

**Psychiatric sample.** Participants were part of a large personality database maintained at a tertiary care, university-affiliated psychiatric center. A total of 1,629 psychiatric patients completed the Revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992) between 1995 and 2007; 310 were culled due to the absence of a specific internalizing diagnosis (e.g., depression and anxiety, not otherwise specified, were excluded) as the remaining cases were too heterogeneous to make a meaningful comparison group. This resulted in a final sample of 1,319 psychiatric patients (55% women; mean age = 39.27 years,  $SD = 11.39$ ). Some participants were referred to the psychological assessment service at this facility for diagnostic clarification ( $n = 349$ ); some participants were involved in randomized control trials ( $n = 179$ ); some participants were involved in other clinical research projects ( $n = 791$ ). Thus, participants completed diagnostic and personality assessment in the context of clinical research or practice, as well as prior to, during, or in the absence of treatment, resulting in diverse symptoms, treatment status, and clinical course. Current participant internalizing diagnoses as assessed with the Structured Clinical Interview for *DSM-IV*, Axis I Disorders, Patient Version (SCID-I/P; First, Spitzer, Gibbon, & William, 1995) were major depressive disorder ( $n = 959$ ); dysthymic disorder ( $n = 57$ ); bipolar disorder ( $n = 87$ ); panic disorder with agoraphobia ( $n = 91$ ); agoraphobia without panic disorder ( $n = 15$ ); social phobia ( $n = 96$ ); specific phobia ( $n = 32$ ); OCD ( $n = 66$ ); posttraumatic stress

disorder ( $n = 133$ ); and generalized anxiety disorder ( $n = 49$ ). The sum of participants with each diagnosis exceeds the final sample size, as some participants met criteria for more than one diagnosis. Comorbid diagnoses were present in 15.7% of participants and resulted in the presence of the following additional noninternalizing disorders: schizophrenia and other psychotic disorders ( $n = 6$ ); substance-related disorders ( $n = 22$ ); and impulse-control disorders not elsewhere classified ( $n = 14$ ). The design of many of the clinical research projects contributing to this database, namely recruitment (e.g., the targeted recruitment of participants with a specific primary Axis I diagnosis) and inclusion and/or exclusion criteria (e.g., the exclusion of participants with psychotic or substance dependence disorders), may have contributed to comorbidity rates inconsistent with existing epidemiological research.

**Goldberg community sample.** Participants were members of the Eugene-Springfield community sample, a dataset maintained by the Oregon Research Institute. They were recruited by mail from lists of homeowners and agreed to complete questionnaires in return for financial compensation. Data are provided to researchers on request, and is part of a large-scale effort by L. Goldberg to facilitate collaboration and communication in the field of individual differences research (Goldberg et al., 2006). The means on the five domains of the FFM reported in the NEO PI-R manual are well within the 95% confidence intervals for the Goldberg sample.<sup>1</sup> A total of 857 participants completed the NEO PI-R in 1994 (56% women; mean age = 50.81 years,  $SD = 13.20$ ). There was no difference between the two groups in gender,  $\chi^2(1, N = 2108) = 0.26, p = .61$ ; the Goldberg sample was significantly older than was the clinical sample,  $t(1671) = 20.75, p < .001$ .

### Measures: Revised NEO Personality Inventory (NEO PI-R)

The NEO PI-R is a self-report questionnaire designed to assess the FFM of personality (Costa & McCrae, 1992). This measure yields subscale scores for five domains of personality: N, E, O, A, and C. Evidence for its reliability, validity, and clinical utility is summarized in the professional manual (Costa & McCrae, 1992).

## Results

### Evidence for the Higher Order Hierarchy Within the NEO PI-R

**Goldberg's (2006) "bass-ackwards" method.** To investigate relationships between the higher order personality hierarchy and internalizing disorders, we first had to establish evidence for the hierarchical structure within the NEO PI-R (Costa & McCrae, 1992). We did this using the combined sample of all individuals from both the clinical group and Goldberg's community sample to ensure broad variance in endorsement of the

<sup>1</sup> The means and standard deviations on the NEO PI-R domain scores as reported in the NEO PI-R manual in comparison with the means and standard deviations for the Goldberg community sample, respectively, are as follows: N ( $M = 79.1, SD = 21.2$ ); E ( $M = 80.04, SD = 23.19$ ); O ( $M = 109.4, SD = 18.4$ ); A ( $M = 107.01, SD = 19.90$ ); C ( $M = 110.6, SD = 17.3$ ); N ( $M = 113.64, SD = 21.34$ ); E ( $M = 124.3, SD = 15.8$ ); O ( $M = 124.72, SD = 17.42$ ); A ( $M = 123.1, SD = 17.6$ ); C ( $M = 123.33, SD = 19.28$ ).

personality items. To examine the hierarchy within the NEO PI-R, we followed the “bass-ackwards” approach outlined by Goldberg (2006) for elucidating the hierarchical structure of a set of variables from the top down, as opposed to the bottom up tradition that first identifies lower order trait structure and then defines higher order traits based on the patterns of covariation among them. Following Goldberg’s recommendations, we subjected the 240 NEO PI-R items to principal components analyses with varimax rotation, beginning with the first principal component and iteratively extracting successive levels of the hierarchy. Factor scores at each level were saved and later correlated to provide path estimates between factors at contiguous levels of the hierarchy. Because we were specifically interested in the hierarchy established by Markon et al. (2005), we extracted Levels 1–5 and examined the resulting factors and relationships between levels.<sup>2</sup> See Figure 1. The results from our item-level analyses are comparable with the hierarchy proposed by Markon et al. (2005). At Level 2 in the hierarchy, two broad traits emerge that primarily reflect a combination of N, A, and C (Component 1) and a combination of E and O (Component 2). At Level 3 in the hierarchy, a disinhibition component emerges that is heavily weighted by disagreeable disinhibition as indicated by items loading most highly on this component (more narrowly defined in terms of agreeableness than the analog component in Markon et al., 2005). Differentiation between disagreeable disinhibition (e.g., manipulates people) and unconscientious disinhibition (coded here in the reverse direction; e.g., accomplishes goals) occurs at Level 4 of the hierarchy. Finally, at the fifth level, E and O split into separate components to reveal a five-factor structure that appears strongly related to the FFM. Detailed results of these analyses are available on request.

*Scale construction analyses.* To investigate personality-psychopathology relations for each level of the hierarchy, we created scales based on the resulting components for each level. Summed scales show greater robustness to sample-specific variance than do regression-based factor scores, thus maximizing generalizability of the results (Gorsuch, 1997). Specifically, we summed all items loading  $> .40$  on each component to create the corresponding scale (reverse-coding items that loaded negatively on a component). The number of items on each scale ranged from 16 items (A at Level 3) to 75 items (N at Level 2), with an average of 32.6 items per scale. Scale items were nonoverlapping within levels of the hierarchy. Cronbach’s alpha statistics for the resulting scales averaged .89 (range = .81 – .97). Scales were examined for skewness and kurtosis; all were normally distributed. Scales at Level 5 of the hierarchy were strongly related to the FFM. Level 5 scales correlated between .86 and .95 ( $M = .91$ ) with the analogous regression-based factor scores. Similarly, Level 5 scales correlated between .81 and .97 ( $M = .89$ ) with the analogous FFM dimension in the NEO PI-R, demonstrating a strong connection between the hierarchical model presented here and the standard FFM scores measured by the NEO PI-R.

*Personality Profiles for Pure Distress, Pure Fear, Distress–Fear Comorbid, Bipolar, and OCD at Successive Levels of the Hierarchy*

Distress and fear groups were created based on Watson’s (2005) model with the following disorders included in the distress group:

major depressive disorder ( $n = 959$ ), dysthymic disorder ( $n = 57$ ), generalized anxiety disorder ( $n = 49$ ), and posttraumatic stress disorder ( $n = 133$ ). The following disorders were included in the fear group: panic disorder ( $n = 91$ ), agoraphobia ( $n = 15$ ), social phobia ( $n = 96$ ), and specific phobia ( $n = 32$ ). To identify specific connections with distress and fear groups, these categories were further differentiated into pure distress ( $n = 966$ ), pure fear ( $n = 144$ ), and distress–fear comorbid ( $n = 80$ ). The pure distress and pure fear groups were considered pure for these analyses as long as comorbid fear or distress disorders, respectively, were not present. Commensurate with the SCID approach to diagnosis, all psychopathology variables were coded as present or absent for each individual in the clinical sample such that individuals with more than one diagnosis would be represented in more than one clinical category. *Z* scores were computed for each personality scale within the combined sample to increase interpretability of results. A series of multivariate analyses of covariance (MANCOVAs) were conducted to compare each diagnostic group (pure distress, pure fear, distress–fear comorbid, OCD, and bipolar) with Goldberg’s community sample on the personality dimensions while controlling for gender. Separate MANCOVAs were conducted for each level of the personality hierarchy.

*Level 2.* At Level 2 of the hierarchy, MANCOVAs indicated that all psychopathology groups differed significantly from the Goldberg community sample (see Table 1). Post hoc univariate tests revealed the highest levels for the N/A/C component relative to the Goldberg community sample for the distress–fear comorbid group and the OCD group (see Table 2), although all effect sizes were large (i.e.,  $d > .80$ ; Cohen, 1988), whereas the bipolar group showed substantially higher levels of the E/O component relative to the community sample. See Figure 2.

*Level 3.* At Level 3 of the hierarchy, all psychopathology groups again differed significantly from the Goldberg community sample (see Table 1). Post hoc univariate tests revealed again that the highest levels on the N component, in comparison with the Goldberg sample, were seen in the distress–fear comorbid and OCD groups (see Table 2). For the E/O component, only the bipolar group had a large effect size regarding higher scores than the Goldberg sample. Finally, the distress–fear comorbid group scored higher than the Goldberg sample on the A component with a large effect size. See Figure 3.

*Level 4.* All multivariate tests at Level 4 again supported significant differences between all psychopathology groups and the Goldberg community sample (see Table 1). Post hoc univariate tests revealed the same pattern regarding highest levels on N for the distress–fear comorbid and OCD groups (see Table 2). The bipolar group again scored significantly higher on the E/O component relative to the Goldberg sample, with a large effect size. The distress–fear comorbid and the OCD groups produced the lowest scores on the C component relative to the community sample. See Figure 4.

*Level 5.* At Level 5, all multivariate tests suggested significantly different personality profiles between all psychopathology

<sup>2</sup> All structural analyses were repeated with a reduced Goldberg community sample that was age-matched to the clinical sample. All overall patterns were identical to the results presented here, with strong convergence also evidenced at the item level. Results of these analyses are available upon request.

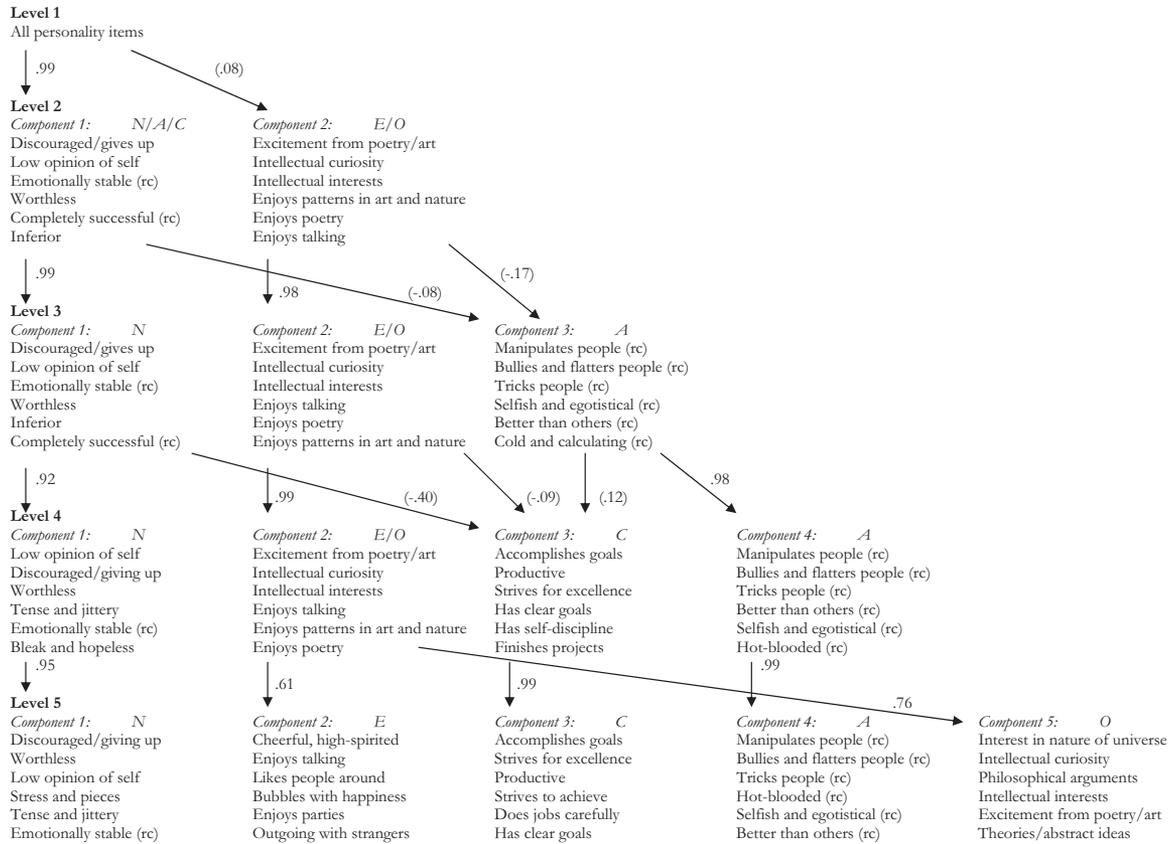


Figure 1. First five levels of the personality hierarchy extracted from the NEO PI-R with Goldberg’s (2006) “bass-ackwards” method in an item-level analysis. Correlations > .40 are presented between levels for clarity of pathways. Additional correlations required for comprehensiveness are presented in parentheses. All correlations are significant at  $p < .01$ . N = Neuroticism; E/O = Extraversion/Openness to Experience; A = Agreeableness; C = Conscientiousness; rc = reverse coded.

groups and the Goldberg sample (see Table 1). N scores were again highest for the distress–fear comorbid and the OCD groups at Level 5 (see Table 2). For the distinct E component, the distress–fear comorbid group showed the lowest levels, whereas the OCD group showed the lowest levels on C relative to the community sample. The most substantial distinction for A was seen in the distress–fear comorbid group, which scored significantly higher than the Goldberg sample with a moderate effect size. Finally, the bipolar group scored substantially higher on the O dimension relative to the other groups. See Figure 5.

To further address the distinction between Level 4 and Level 5 of the hierarchy, we repeated all the Level 5 MANCOVAs without the O component as a dependent variable. All multivariate tests were significant at  $p < .001$ , and univariate tests showed an identical pattern of results for the remaining dependent variables and the Level 5 results reported above. The Level 5 model including the O component explained more variance in the diagnostic groups than a Level 5 model excluding the O component. This additional information primarily accounted for variance in the bipolar group ( $R^2 = .23$ ), which evidenced an additional 8% of the variance explained when O is included, with only small increases for the OCD ( $R^2 = .37, \Delta R^2 = .01$ ), distress–fear comorbid ( $R^2 =$

$.55, \Delta R^2 = .01$ ), pure fear ( $R^2 = .45, \Delta R^2 = .01$ ), and pure distress ( $R^2 = .57, \Delta R^2 = .02$ ) diagnostic groups.

### Between-Disorders Analyses

We conducted additional analyses between disorders within the distress and fear categories to provide a more comprehensive picture of the internalizing spectrum. Some of the specific disorder groups were small, so we did not have specific predictions regarding the extent of discrimination we might find. In order to maximize between-groups differentiation in these analyses, we extracted five principal components with varimax rotation (identical to the procedure used with Level 5 above), within the clinical sample, alone, for these analyses (see Table 3). This was done to estimate maximally informative factors to potentially detect between-disorders distinctions.

A series of MANCOVAs were conducted to compare the five-factor score profiles of each diagnostic group with other diagnoses in the same category while controlling for gender. Additional MANCOVAs were used to compare the OCD and bipolar groups with each of the other eight disorders, again controlling for gender. Results supported some between disorders distinctions as indicated

Table 1  
Results of the Multivariate Tests Comparing Pure Distress, Pure Fear, Distress-Fear Comorbid, OCD, and Bipolar Groups to the Goldberg Community Sample Controlling for Gender

Level	Pure distress			Pure fear			Distress-fear comorbid			OCD			Bipolar							
	HT	df	F	R <sup>2</sup>	HT	df	F	R <sup>2</sup>	HT	df	F	R <sup>2</sup>	HT	df	F	R <sup>2</sup>				
2	0.51**	2, 1818	464.30	0.34	0.41**	2, 996	205.75	0.29	0.41**	2, 932	189.24	0.30	0.30**	2, 918	137.78	0.23	0.27**	2, 939	125.34	0.22
3	0.63**	3, 1817	382.00	0.40	0.47**	3, 995	15.46	0.37	0.53**	3, 931	165.21	0.41	0.32**	3, 917	98.11	0.29	0.31**	3, 938	95.54	0.29
4	0.67**	4, 1816	302.70	0.50	0.52**	4, 994	129.65	0.42	0.54**	4, 930	125.93	0.47	0.31**	4, 916	71.44	0.36	0.33**	4, 937	77.20	0.32
5	0.66**	5, 1815	238.33	0.58	0.50**	5, 993	98.96	0.46	0.55**	5, 929	97.74	0.56	0.31**	5, 915	55.76	0.38	0.34**	5, 936	63.31	0.31

Note. Statistical significance for each diagnostic group is as compared to the Goldberg sample. OCD = obsessive-compulsive disorder; HT = Hotelling's T. \*\*  $p < .001$ .

in Table 2.<sup>3</sup> Overall, more differences were found among the distress disorders than the fear disorders, reflecting the relatively smaller sample sizes in specific fear disorder categories. N showed the most distinctions between disorders, but all five factors showed some discriminatory information. Specifically, PTSD showed the lowest levels on N within distress disorders, whereas dysthymia and GAD groups showed the highest levels, with a similar pattern seen in fear disorders in which specific phobia showed the lowest levels on N with social phobia showing the highest levels. OCD showed significant differences from other disorders on four of the five factors, with the exception of C. In addition, these differences were balanced across disorders in the distress and fear categories. Bipolar disorder showed an overwhelming pattern of higher scores on E and O compared with virtually all of the other disorders, with some additional deviations on N relative to dysthymia, GAD, and social phobia (all of which were higher than the bipolar group).<sup>4</sup>

### Discussion

These results support the hypothesis that successive levels of the higher order personality hierarchy provide additional differentiation of internalizing pathology. Specifically, each level of the personality hierarchy succeeded in significantly differentiating the internalizing groups from the population sample. Further, at Level 5, all five factors demonstrated unique differentiation of internalizing pathology from a population sample, suggesting that of the levels investigated here, the FFM may be the most comprehensive higher order personality model when one is seeking to understand relationships between personality and internalizing disorders. That is, when E and O split at Level 5, the resulting E and O factors showed unique relations with the internalizing groups in this study (E was significantly lower than the community sample in all diagnostic groups but the bipolar group, whereas O was substantially higher than the community sample primarily in the bipolar group). Additionally, the proportion of variance explained between Levels 4 and 5 increased for multiple diagnostic categories, suggesting that the differentiation between E and O that occurs at Level 5 adds important explanatory information about the nature of these diagnostic groups. A related point is that the Level 5 model without O explained substantially less variance for bipolar disorder in particular than did the full FFM. Taken together, these findings add important insight to previous the suggestions that four factors are adequate to capture psychopathology variance and the question over whether O is a relevant trait in understanding mental disorders (e.g., Malouff, Thorsteinsson, & Schutte, 2005). This evidence suggests that O has an important place in our understanding of psychopathology.

One of our specific goals was to investigate the personality connections with bipolar disorder and OCD relative to other internalizing disorders. These results provide support from an

<sup>3</sup> Descriptive statistics presented in Table 2 are based on whole diagnostic groups. For the between-disorders MANCOVAs, individuals with both disorders in a given pairing were excluded in order to create comparison groups, such that specific disorder group *N*s changed slightly in the different analyses.

<sup>4</sup> Parallel between-disorders analyses were conducted for Levels 2, 3, and 4 of the personality hierarchy. These results are made available as supplementary information.

Table 2

Results of the Post Hoc Univariate Tests Comparing Pure Distress, Pure Fear, Distress–Fear Comorbid, OCD, and Bipolar Groups to the Goldberg Community Sample Controlling for Gender

Factor	Pure distress			Pure fear			Distress–fear comorbid			OCD			Bipolar			Goldberg	
	<i>M</i>	<i>SD</i>	<i>d</i>	<i>M</i>	<i>SD</i>	<i>d</i>	<i>M</i>	<i>SD</i>	<i>d</i>	<i>M</i>	<i>SD</i>	<i>d</i>	<i>M</i>	<i>SD</i>	<i>d</i>	<i>M</i>	<i>SD</i>
Level 2																	
1. N	0.45**	0.96	1.43	0.40**	0.97	1.78	0.60**	0.85	2.28	0.48**	0.90	2.06	0.11**	1.16	1.31	−0.72	0.55
2. E/O	−0.03	1.13	0.03	0.13**	0.99	0.24	−0.26*	1.11	0.27	0.21**	1.04	0.35	0.80**	1.13	1.10	−0.05	0.73
Level 3																	
1. N	0.46**	0.96	1.44	0.39**	0.97	1.78	0.60**	0.85	2.28	0.49**	0.89	2.08	0.13**	1.16	1.35	−0.72	0.55
2. E/O	−0.02	1.13	0.04	0.12**	1.02	0.24	−0.20	1.06	0.18	0.16*	1.09	0.29	0.78**	1.15	1.08	−0.06	0.73
3. A	0.13**	1.12	0.35	0.10**	1.07	0.42	0.44**	1.08	0.89	−0.12	1.31	0.10	−0.11	1.26	0.08	−0.19	0.77
Level 4																	
1. N	0.47**	0.93	1.52	0.44**	0.93	1.89	0.65**	0.82	2.36	0.46**	0.83	2.05	0.16**	1.13	1.41	−0.75	0.57
2. E/O	−0.02	1.14	0.05	0.11*	1.03	0.23	−0.18	1.06	0.16	0.13*	1.10	0.26	0.77**	1.16	1.09	−0.06	0.71
3. C	−0.25**	1.13	0.63	−0.09**	1.04	0.66	−0.28**	1.08	0.98	−0.36**	1.25	1.10	0.02**	1.25	0.49	0.34	0.57
4. A	0.08**	1.14	0.20	0.03*	1.06	0.21	0.38**	1.07	0.67	−0.17	1.29	0.08	−0.16	1.24	0.09	−0.11	0.71
Level 5																	
1. N	0.46**	0.94	1.48	0.44**	0.93	1.84	0.60**	0.82	2.22	0.49**	0.83	2.04	0.23**	1.15	1.47	−0.74	0.58
2. E	−0.29**	1.09	0.71	−0.14**	1.08	0.70	−0.57**	1.00	1.39	−0.10**	1.05	0.70	0.52	1.14	0.20	0.37	0.65
3. C	−0.22**	1.15	0.55	−0.09**	1.06	0.59	−0.23**	1.07	0.86	−0.32**	1.30	0.96	0.06**	1.28	0.37	0.30	0.56
4. A	0.08**	1.14	0.20	0.03*	1.06	0.21	0.38**	1.07	0.67	−0.17	1.29	0.08	−0.16	1.24	0.09	−0.11	0.71
5. O	0.05**	1.12	0.18	0.10**	1.01	0.29	−0.20	1.06	0.09	0.17**	1.11	0.39	0.65**	1.10	0.98	−0.13	0.76

Note. For pure distress,  $n = 966$ ; for pure fear,  $n = 144$ ; for distress–fear comorbid,  $n = 80$ ; for obsessive-compulsive disorder (OCD),  $n = 66$ ; for bipolar,  $n = 87$ ; and for Goldberg,  $n = 856$ . Averages (*M*) and standard deviations (*SD*) of *z* scores for diagnostic groups and the Goldberg sample on each scale are shown. Cohen's *d* and statistical significance for each diagnostic group is as compared to the Goldberg sample. N = Neuroticism; E/O = Extraversion/Openness to Experience; A = Agreeableness; C = Conscientiousness.

\*  $p < .01$ . \*\*  $p < .001$ .

derlying personological perspective for Watson's (2005) proposal to separate bipolar disorder from distress and fear. The significant differences between the bipolar disorder group and the population sample at Level 5 were higher levels on N, higher levels on O, and lower levels on C, with E and A showing no differences from a population sample, a drastic contrast to the personality profiles for the other internalizing groups. Furthermore, the bipolar disorder group showed an overwhelming pattern of higher E and O compared with other diagnostic groups, with some evidence for lower levels on N relative to specific disorders. OCD showed much stronger convergence with the distress and fear groups with a profile of high N, low E, low C, and high O relative to the Goldberg community sample. OCD showed large effect sizes for high N and low C, comparable primarily to the distress–fear comorbid group. In the between-disorders analyses, OCD showed a number of specific differences from other disorders on N, E, A, and O, but these differences appeared across both distress and fear categories. That is, based on the between-disorders analyses, a clear pattern suggesting that OCD was more similar to either distress or fear failed to emerge. Although the burden rests on future research to solidify our understanding of how OCD is best characterized, these results are somewhat consistent with the suggestion that OCD, although connected to the internalizing disorders, may not correspond strongly with either fear or distress disorders specifically (Sellbom et al., 2008).

Another differentiated connection that stands out is the finding for the A component. It is important to note that the A component

derived in this study is heavily weighted with antagonistic aspects of the factor. The heavy weighting of items related to interpersonal dominance and hostility was found regardless of whether the clinical and community samples were factored together or separately. Thus, the A component in this study might be viewed as "Nonantagonistic" rather than "Agreeable." In that context, the interpretation of the higher levels of Nonantagonistic, specifically for the distress–fear comorbid group, might be more straightforward. That is, individuals with more extreme presentations of distress and fear disorders may be particularly wary and cautious about distress and conflict, resulting in behavior that is nonargumentative and conflict avoidant. Understanding this relationship may require a theoretical network beyond the FFM constructs. If this relationship is related to conflict avoidance, potential constructs that may help explicate the severe internalizing pathology–low antagonism link include dependency or sociotropy (Beck, 1983; Blatt, D'Afflitti, & Quinlan, 1976), low power motive (Emmons & McAdams, 1991), and low agency (Wiggins & Pincus, 1992), all of which have theoretical links to internalizing pathology (Acton, 2005). This finding is further consistent with a recent meta-analysis that demonstrated a positive correlation between A and anxiety disorders (Malouff et al., 2005).

These results also provide some information regarding recent attempts to shift attention to the differential magnitude of personality–psychopathology relationships (e.g., Mineka et al., 1998; Watson, 2005). Although the primary purpose of the present study was not to directly test differences in the magnitude of each

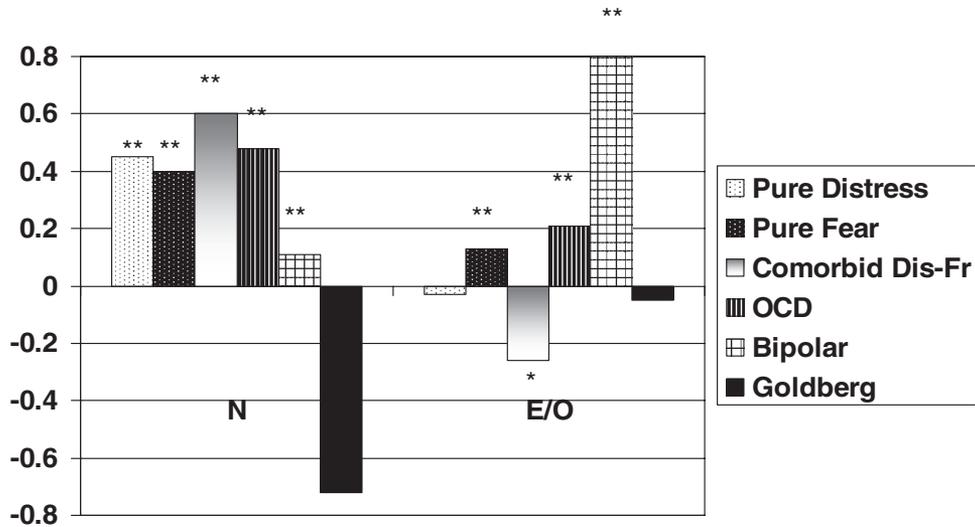


Figure 2. Z score averages for the pure distress, pure fear, comorbid distress–fear (Dis/Fr), obsessive-compulsive disorder (OCD), bipolar groups, and the Goldberg community sample at the two-factor personality level. N = Neuroticism; E/O = Extraversion/Openness to Experience. \*  $p < .01$ . \*\*  $p < .001$ .

relationship, differential relationships did emerge. For example, although the O component at Level 5 showed associations with bipolar disorder, OCD, pure distress, and pure fear groups, the connection with bipolar disorder is much stronger as evidenced by the large effect size in comparison with the population sample and the results of the between-disorders analyses. Evidence such as this will be useful in formulating a more nuanced comprehensive model of personality and internalizing disorders which recognizes not only common and unique components, but also the differential saturation levels of such components. Along these lines, the results for the pure distress and pure fear groups were remarkably similar, although studies with more fine-tuned measures of distress and

fear (e.g., dimensional measures) would likely yield stronger evidence of differentiated relationships. Indeed, we started unpacking some of these apparent similarities at the distress and fear group level in the between-disorders analyses, which demonstrate more saturation of N within both distress (i.e., dysthymia and GAD) and fear (i.e., social phobia) in combination with less saturation of N in both groups as well (i.e., distress: PTSD, fear: specific phobia). Similarly, moving to lower levels of the personality hierarchy may prove useful in attempts to more clearly differentiate distress and fear within a personality context.

These results provide an interesting demonstration of the various higher order factor structures that emerge from the items of the

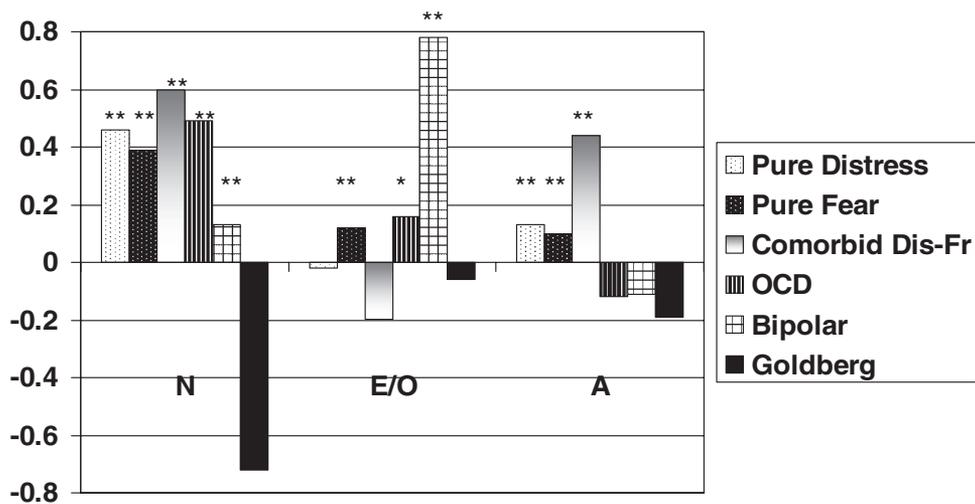


Figure 3. Z score averages for the pure distress, pure fear, comorbid distress–fear (Dis/Fr), obsessive-compulsive disorder (OCD), bipolar groups, and the Goldberg community sample at the three-factor personality level. N = Neuroticism; E/O = Extraversion/Openness to Experience; A = Agreeableness. \*  $p < .01$ . \*\*  $p < .001$ .

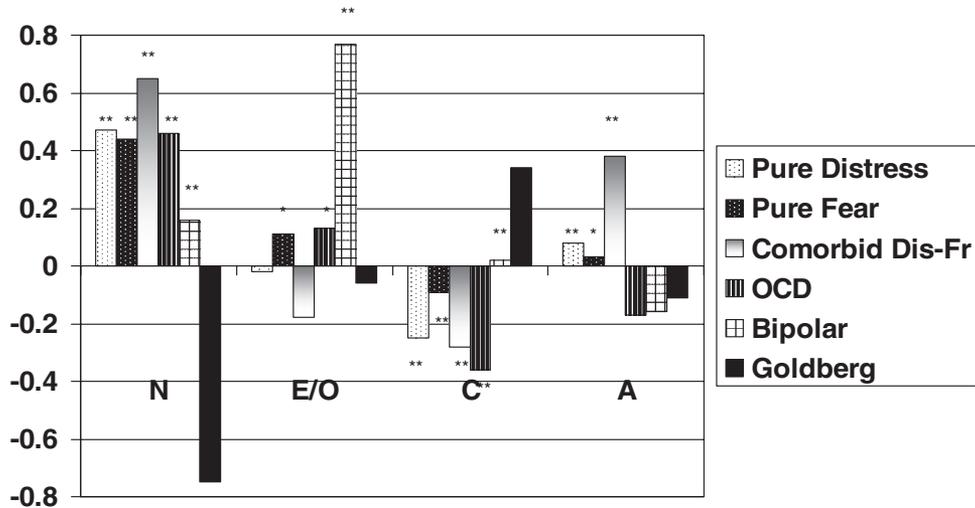


Figure 4. Z score averages for the pure distress, pure fear, comorbid distress–fear (Dis/Fr), obsessive-compulsive disorder (OCD), bipolar groups, and the Goldberg community sample at the four-factor personality level. N = Neuroticism; E/O = Extraversion/Openness to Experience; A = Agreeableness; C = Conscientiousness. \*  $p < .01$ . \*\*  $p < .001$ .

NEO PI-R, one of the most widely used measures of the FFM. Specifically, these results largely replicate the hierarchical structure demonstrated by Markon et al. (2005). In addition, this replication is notable because the sample was heavily weighted with a clinical population, whereas the NEO PI-R is typically conceptualized as a normal personality measure. The strong convergence between Level 5 and the domain scales as defined by the NEO PI-R provides an impressive anchoring of our structure within the classic five-factor structure. Although the structure produced by Markon et al. (2005) provided an eloquent, empirically supported demonstration of how major two-, three-, four-, and five-factor models are related to one another, one remaining question for

researchers is when to use which level. The results of this study suggest that the five-factor level continues to provide interesting and important information about personality-psychopathology relationships in internalizing disorders beyond the preceding levels.

Limitations

Heterogeneity within disorders has been noted and identified as a barrier to a clear understanding of personality-psychopathology relationships when not accounted for, particularly for disorders such as OCD (e.g., Wu & Watson, 2005). In this study, we used SCID-based diagnoses, which, although considered the gold standard in much

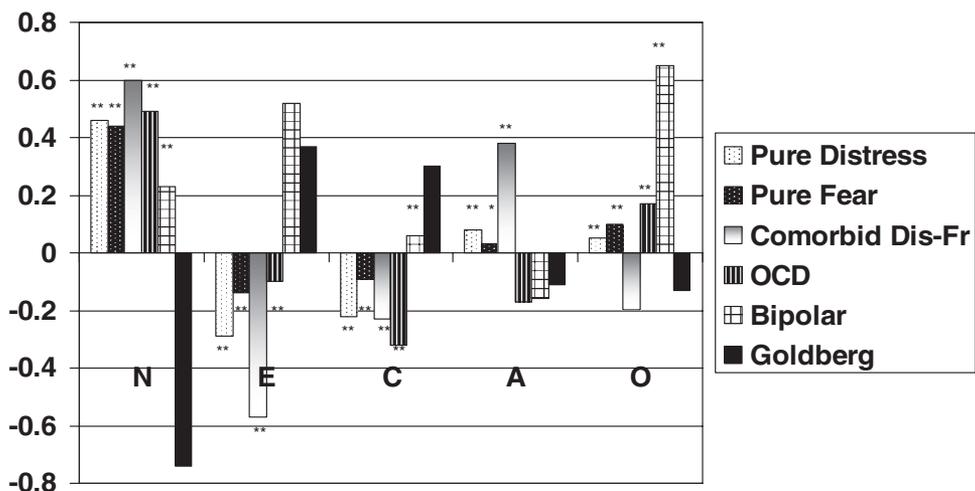


Figure 5. Z score averages for the pure distress, pure fear, comorbid distress–fear (Dis/Fr), obsessive-compulsive disorder (OCD), bipolar groups, and the Goldberg community sample at the five-factor personality level. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness. \*  $p < .01$ . \*\*  $p < .001$ .

Table 3  
Results of the Between-Diagnosis Analyses for Distress and Fear Disorders

Disorder	F1 – N		F2 – E		F3 – C		F4 – A		F5 – O	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Distress										
MDD	.00 <sup>a, b, c</sup>	.96	-.09 <sup>c, s</sup>	.98	-.04	1.01	.01 <sup>d</sup>	1.00	.02 <sup>f</sup>	.97
Dysthymia	.41 <sup>a, g, #</sup>	.87	-.14 <sup>t</sup>	1.07	-.09 <sup>h</sup>	1.10	.03	1.28	-.21 <sup>i</sup>	1.06
GAD	.33 <sup>b, j, @</sup>	.82	.07 <sup>c</sup>	.96	.09	.99	-.25 <sup>d, k</sup>	.96	-.19 <sup>l</sup>	1.14
PTSD	-.22 <sup>c, g, j</sup>	1.10	-.10 <sup>u</sup>	.94	.30 <sup>h</sup>	.90	.21 <sup>k, v</sup>	1.04	-.61 <sup>f, i, l, w</sup>	.96
Fear										
Panic	.10 <sup>n, o</sup>	1.00	.09	.86	.26 <sup>m</sup>	.83	.18	.94	-.15	1.06
Agora	.07	.66	-.03	1.23	-.24 <sup>m, p</sup>	.82	.09	.93	.23	.86
Social	.41 <sup>n, q, x, %</sup>	.84	-.17 <sup>y</sup>	.98	.05	.90	-.06 <sup>r</sup>	.92	-.27	.87
Specific	-.31 <sup>o, q, z</sup>	1.09	-.02	1.01	.22 <sup>p</sup>	.86	.29 <sup>r, s</sup>	.79	-.16	.98
OCD	0.13 <sup>x, z</sup>	0.91	0.23 <sup>s, t, u, y</sup>	1.00	-.01	1.18	-.10 <sup>v, s</sup>	1.05	-.06 <sup>w</sup>	1.08
Bipolar	-.10 <sup>#, @, %</sup>	1.17	0.65 <sup>†</sup>	0.99	0.12	1.13	0.11	1.13	0.40 <sup>‡</sup>	1.01

Note. Averages (*M*) and standard deviations (*SD*) of factor scores from a five-factor principal components analysis with varimax rotation on the clinical-only sample. Significant distinctions between disorders as indicated by post-hoc univariate analyses are noted by shared superscripts. N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; OCD = obsessive-compulsive disorder; Agora = agoraphobia; PTSD = posttraumatic stress disorder. F1 = Factor 1; F2 = Factor 2; F3 = Factor 3; F4 = Factor 4; F5 = Factor 5. a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z, #, @, %, § Significantly differed at  $p < .05$ .

† Bipolar disorder was significantly higher on Extraversion than all other disorders at  $p < .05$ . ‡ Bipolar disorder was significantly higher on Openness than all disorders other than Agoraphobia at  $p < .05$ .

psychiatric research, do not allow us to differentiate these identified symptom clusters within diagnostic categories. Related to this point, connections between personality and the disorders presented are likely attenuated due to the loss of information that occurs when the diagnostic variables are dichotomized according to the SCID protocol (Watson et al., 2005). An additional limitation of the use of SCID data in the present study was the lack of information about interrater reliability for diagnostic decisions. Due to the extensive nature of data collection and the span of time over which these data were collected, such information was not available.

Due to the varied sources of the database used in the current investigation, participants completed the NEO PI-R at various stages of treatment, including prior to treatment, during treatment, or in the absence of treatment. It is therefore possible that participants may have varied to some degree in symptomatology and mood. The personality profile analyses conducted are therefore limited by the lack of information regarding and statistical control for clinical characteristics such as clinical course, treatment history and status, and current affect. Although these results remained robust across demographic variables such as gender, replication taking such clinical characteristics into account is warranted. It is, however, of note that empirical work within the depression literature has demonstrated that although overall levels of self-reported personality can vary with psychopathology and affect, relative standing on self-reported personality is very high in the face of Axis I pathology and treatment change (De Fruyt, Van Leeuwen, Bagby, Rolland, & Rouillon, 2006). Moreover, personality change and depression change over the course of treatment are only modestly correlated (Costa, Bagby, Herbst, & McCrae, 2005; Santor, Bagby, & Joffe, 1997; De Fruyt et al., 2006). Related work incorporating anxiety symptoms provides corroborating evidence for the validity of personality assessment in this context (Trull & Goodwin, 1993). The hierarchical analyses conducted are therefore supported by the high relative stability of self-report personality measures.

### Implications and Future Directions

An area for future study regards investigations of the nature of these relationships. Such investigations have been limited by multiple methodological factors such as the use of undergraduate samples, narrow measurement, and reliance on cross-sectional designs rather than longitudinal approaches (Brown, 2007). In particular, longitudinal designs are needed to explicate how and why these established personality-psychopathology relationships exist (Bagby et al., 2008; Bienvenu et al., 2004). Multiple reviews of personality-psychopathology relationships have described various models of these associations (e.g., Clark, 2005; Krueger & Tackett, 2003; Nigg, 2006; Tackett, 2006; Widiger et al., 1999). In order to disentangle possible explanations for the personality-psychopathology connections observed in this study and others, more sophisticated longitudinal designs (e.g., those incorporating etiologic measurements and beginning before the onset of psychopathology) are needed. For example, behavior genetic studies can offer information about whether personality-psychopathology connections are the result of shared genetic influences, a hypothesis that has gathered support in relation to internalizing-N relationships (e.g., Hettema, Neale, Myers, Prescott, & Kendler, 2006; Kendler et al., 2007; Kendler, Gatz, Gardner, & Pedersen, 2006).

Although not the focus of the present investigation, it will also be important for future work to link these findings to other personality measures and theories. For example, the traits of E and N have been linked to the behavioral activation system (BAS) and the behavioral inhibition system (BIS) that form the core features of Gray's (1987) original reinforcement sensitivity theory (RST; e.g., Brown, 2007; Campbell-Sills, Liverant, & Brown, 2004; Carver & White, 1994). Similarly, the behavioral inhibition system and behavioral activation system have been discussed in connection with mood and anxiety disorders (e.g., Barlow, 2002; Campbell-Sills et al., 2004), and some evidence for these connec-

tions at the psychophysiological level has already emerged (e.g., Kasch, Rottenberg, Arnow, & Gotlib, 2002). The more recent revisions to RST allow for differentiation between fear and anxiety, which may be particularly relevant to understanding these connections and distinctions among the internalizing disorders (e.g., Revelle, 2008). RST is closely linked to biological and physiological functioning, which may offer important avenues for future explorations aiming to understand the biological mechanisms involved in such personality-psychopathology models.

Finally, the focus of the present investigation was to explore various levels of the higher order hierarchy of personality structure. Turning attention to lower order traits and their connection with internalizing disorders may offer more differentiated understanding of personality-psychopathology relationships (e.g., Bienvenu et al., 2001, 2004; Cox, McWilliams, Enns, & Clara, 2004; Gamez et al., 2007; Rector et al., 2002; Rector, Richter, & Bagby, 2005; Rees, Anderson, & Egan, 2005; Samuels et al., 2000). Future research on personality-psychopathology relationships may benefit from thinking more flexibly about appropriate lower order trait structures to use in better understanding specific disorders (Parker et al., 2006). That is, just as we set out to determine whether successive levels of the higher order hierarchy add incremental information about the disorders investigated, researchers should consider the potential hierarchical nature of lower order trait structures and psychometric properties of such traits. Future research with lower order personality traits might examine how various lower order trait structures influence the connection between personality and internalizing pathology, potentially expanding existing quantitative hierarchical models of personality-psychopathology relationships and contributing to our understanding of personality structure and measurement.

## References

- Acton, G. S. (2005). *Generalized interpersonal theory*. Retrieved March 4, 2008, from <http://www.personalityresearch.org/generalized.html>
- Akiskal, H. S., Hirschfeld, R. M., & Yerevanian, B. I. (1983). The relationship of personality to affective disorders. *Archives of General Psychiatry*, *40*, 801–810.
- Akiskal, H. S., Kilzieh, N., Maser, J. D., Clayton, P. J., Schettler, P. J., Shea, M. T., et al. (2006). The distinct temperament profiles of bipolar I, bipolar II, and unipolar patients. *Journal of Affective Disorders*, *92*, 19–33.
- Bagby, R. M., Bindseil, K. D., Schuller, D. R., Rector, N. A., Young, L. T., Cooke, R. G., et al. (1997). Relationship between the five-factor model of personality and unipolar, bipolar, and schizophrenic patients. *Psychiatry Research*, *70*, 83–94.
- Bagby, R. M., Quilty, L. C., & Ryder, A. (2008). Personality and depression. *Canadian Journal of Psychiatry*, *53*, 14–25.
- Bagby, R. M., & Ryder, A. G. (2000). Personality and the affective disorders: Past efforts, current models, and future directions. *Current Psychiatry Reports*, *2*, 465–472.
- Bagby, R. M., Young, L. T., Schuller, D. R., Bindseil, K. D., Cooke, R. G., Dickens, S. E., et al. (1996). Bipolar disorder, unipolar depression, and the five-factor model of personality. *Journal of Affective Disorders*, *41*, 25–32.
- Barlow, D. H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed.). New York: Guilford Press.
- Beck, A. T. (1983). Cognitive therapy of depression: New perspectives. In P. J. Clayton & J. E. Barrett (Eds.), *Treatment of depression: Old controversies and new approaches*. New York: Raven Press.
- Bienvenu, O. J., Nestadt, G., Samuels, J. F., Costa, P. T., Howard, W. T., & Eaton, W. W. (2001). Phobic, panic, and major depressive disorders and the five-factor model of personality. *The Journal of Nervous and Mental Disease*, *189*, 154–161.
- Bienvenu, O. J., Samuels, J. F., Costa, P. T., Reti, I. M., Eaton, W. W., & Nestadt, G. (2004). Anxiety and depressive disorders and the five-factor model of personality: A higher- and lower-order personality trait investigation in a community sample. *Depression and Anxiety*, *20*, 92–97.
- Blatt, S. J., D'Afflitti, J. P., & Quinlan, D. M. (1976). Experiences of depression in normal young adults. *Journal of Abnormal Psychology*, *85*, 383–389.
- Brown, T. A. (2007). Temporal course and structural relationships among dimensions of temperament and DSM-IV anxiety and mood disorder constructs. *Journal of Abnormal Psychology*, *116*, 313–328.
- Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology*, *107*, 179–192.
- Calamari, J. E., Rector, N. A., Woodard, J. L., Cohen, R. J., & Chik, H. M. (in press). Anxiety sensitivity and obsessive-compulsive disorder. *Assessment*.
- Campbell-Sills, L., Liverant, G. I., & Brown, T. A. (2004). Psychometric evaluation of the behavioral inhibition/behavioral activations scales in a large sample of outpatients with anxiety and mood disorders. *Psychological Assessment*, *16*, 244–254.
- Carver, C. S., & White, T. L. (1994). Behavioral inhibition, behavioral activation, and affective responses to impending reward and punishment: The BIS/BAS scales. *Journal of Personality and Social Psychology*, *67*, 319–333.
- Chmielewski, M., & Watson, D. (2008). The heterogeneous structure of schizotypal personality disorder: Item-level factors of the schizotypal personality questionnaire and their associations with obsessive-compulsive disorder symptoms, dissociative tendencies, and normal personality. *Journal of Abnormal Psychology*, *117*, 364–376.
- Chorpita, B. F., Plummer, C. M., & Moffitt, C. E. (2000). Relations of tripartite dimensions of emotion to childhood anxiety and mood disorders. *Journal of Abnormal Child Psychology*, *28*, 299–310.
- Clark, L. A. (2005). Temperament as a unifying basis for personality and psychopathology. *Journal of Abnormal Psychology*, *114*, 505–521.
- Clark, L. A. (2007). Assessment and diagnosis of personality disorder: Perennial issues and an emerging reconceptualization. *Annual Review of Psychology*, *58*, 227–257.
- Clark, L. A., Livesley, W. J., Schroeder, M. L., & Irish, S. L. (1996). Convergence of two systems for assessing specific traits of personality disorder. *Psychological Assessment*, *8*, 294–303.
- Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, *100*, 316–336.
- Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology*, *103*, 103–116.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Costa, P. T., Bagby, R. M., Herbst, J. H., & McCrae, R. R. (2005). Personality self-reports are concurrently reliable and valid during acute depressive episodes. *Journal of Affective Disorders*, *89*, 45–55.
- Costa, P. T., Jr. & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO PI-R) Professional Manual*. Odessa, FL: Psychological Assessment Resources.
- Costa, P. T., Jr. & Widiger, T. A. (2002). *Personality disorders and the five-factor model of personality*, 2nd ed. Washington, DC: American Psychological Association.
- Cox, B. J., McWilliams, L. A., Enns, M. W., & Clara, I. P. (2004). Broad and specific personality dimensions associated with major depression in

- a nationally representative sample. *Comprehensive Psychiatry*, *45*, 246–253.
- De Fruyt, F., Van Leeuwen, K., Bagby, R. M., Rolland, J. P., & Rouillon, F. (2006). Assessing and interpreting personality change and continuity in patients treated for major depression. *Psychological Assessment*, *18*, 71–80.
- Emmons, R. A., & McAdams, D. P. (1991). Personal strivings and motive dispositions: Exploring the links. *Personality and Social Psychology Bulletin*, *17*, 648–654.
- Enns, M. W., & Cox, B. J. (1997). Personality dimensions and depression: Review and commentary. *Canadian Journal of Psychiatry*, *42*, 274–284.
- First, M.B., Spitzer, R.L., Gibbon, M., & Williams, J.B.W. (1995). *Structured interview for DSM-IV axis I disorders—Patient edition, version 2*. New York: New York Biometric Research Department.
- Gamez, W., Watson, D., & Doebbeling, B. N. (2007). Abnormal personality and the mood and anxiety disorders: Implications for structural models of anxiety and depression. *Journal of Anxiety Disorders*, *21*, 526–539.
- Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist*, *48*, 26–34.
- Goldberg, L. R. (2006). Doing it all bass-ackwards: The development of hierarchical factor structures from the top down. *Journal of Research in Personality*, *40*, 347–358.
- Gorsuch, R. L. (1997). Exploratory factor analysis: Its role in item analysis. *Journal of Personality Assessment*, *68*, 532–560.
- Gray, J.A. (1970). The psychophysiological basis of introversion–extraversion. *Behaviour Research and Therapy*, *8*, 249–266.
- Harkness, K. L., Bagby, R. M., Joffe, R. T., & Levitt, A. (2002). Major depression, chronic minor depression, and the five-factor model of personality. *European Journal of Personality*, *16*, 271–281.
- Hettema, J. M., Neale, M. C., Myers, J. M., Prescott, C. A., & Kendler, K. S. (2006). A population-based twin study of the relationship between neuroticism and internalizing disorders. *The American Journal of Psychiatry*, *163*, 857–864.
- Hirschfeld, R. M. A., Klerman, G. L., Keller, M. B., Andreasen, N. C., & Clayton, P. J. (1986). Personality of recovered patients with bipolar affective disorder. *Journal of Affective Disorders*, *11*, 81–89.
- Kasch, K. L., Rottenberg, J., Arnow, B. A., & Gotlib, I. H. (2002). Behavioral activation and inhibition systems and the severity and course of depression. *Journal of Abnormal Psychology*, *111*, 589–597.
- Kendler, K. S., Gardner, C. O., Gatz, M., & Pedersen, N. L. (2007). The sources of comorbidity between major depression and generalized anxiety disorder in a Swedish national twin sample. *Psychological Medicine*, *37*, 453–362.
- Kendler, K. S., Gatz, M., Gardner, C. O., & Pedersen, N. L. (2006). Personality and major depression. *Archives of General Psychiatry*, *63*, 1113–1120.
- Kotov, R., Watson, D., Robles, J. P., & Schmidt, N. B. (2007). Personality traits and anxiety symptoms: The multilevel trait predictor model. *Behaviour Research and Therapy*, *45*, 1485–1503.
- Krueger, R. F., Caspi, A., Moffitt, T. E., Silva, P. A., & McGee, R. (1996). Personality traits are differentially linked to mental disorders: A multitrait–multidiagnosis study of an adolescent birth cohort. *Journal of Abnormal Psychology*, *105*, 299–312.
- Krueger, R. F., & Tackett, J. L. (2003). Personality and psychopathology: Working toward the bigger picture. *Journal of Personality Disorders*, *17*, 109–128.
- Krueger, R. F., & Tackett, J. L. (Eds.). (2006). *Personality and psychopathology*. New York: Guilford.
- LaSalle-Ricci, V. H., Arnkoff, D. B., Glass, C. R., Crawley, S. A., Ronquillo, J. G., & Murphy, D. L. (2006). The hoarding dimension of OCD: Psychological comorbidity and the five-factor personality model. *Behaviour Research and Therapy*, *44*, 1503–1512.
- Lonigan, C. J., Phillips, B. M., & Hooe, E. S. (2003). Relations of positive and negative affectivity to anxiety and depression in children: Evidence from a latent variable longitudinal study. *Journal of Consulting and Clinical Psychology*, *71*, 465–481.
- Lozano, B. E., & Johnson, S. L. (2001). Can personality traits predict increases in manic and depressive symptoms? *Journal of Affective Disorders*, *63*, 103–111.
- Maher, B. A., & Maher, W. B. (1994). Personality and psychopathology: A historical perspective. *Journal of Abnormal Psychology*, *103*, 72–77.
- Malouff, J. M., Thorsteinsson, E. B., & Schutte, N. S. (2005). The relationship between the five-factor model of personality and symptoms of clinical disorders: A meta-analysis. *Journal of Psychopathology and Behavioral Assessment*, *27*, 101–114.
- Markon, K. E., Krueger, R. F., & Watson, D. (2005). Delineating the structure of normal and abnormal personality: An integrative hierarchical approach. *Journal of Personality and Social Psychology*, *88*, 139–157.
- McCrae, R. R., & Costa, P. T., Jr. (1999). A five-factor theory of personality. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality* (2nd ed., pp. 139–153). New York: Guilford.
- Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology*, *49*, 377–412.
- Murray, G., Goldstone, E., & Cunningham, E. (2007). Personality and the predisposition(s) to bipolar disorder: Heuristic benefits of a two-dimensional model. *Bipolar Disorder*, *9*, 453–461.
- Nigg, J. T. (2006). Temperament and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, *47*, 395–422.
- Parker, G., Manicavasagar, V., Crawford, J., Tully, L., & Gladstone, G. (2006). Assessing personality traits associated with depression: The utility of a tiered model. *Psychological Medicine*, *36*, 1131–1139.
- Quilty, L. C., Sellbom, M., Tackett, J. L., & Bagby, R. M. (in press). Personality trait predictors of bipolar disorder: A replication and extension in a psychiatric sample. *Psychiatry Research*.
- Rector, N. A., Hood, K., Richter, M. A., & Bagby, R. M. (2002). Obsessive-compulsive disorder and the five-factor model of personality: Distinction and overlap with major depressive disorder. *Behaviour Research and Therapy*, *40*, 1205–1219.
- Rector, N. A., Richter, M. A., & Bagby, R. M. (2005). The impact of personality on symptom expression in obsessive-compulsive disorder. *The Journal of Nervous and Mental Disease*, *193*, 231–236.
- Rees, C. S., Anderson, R. A., & Egan, S. J. (2005). Applying the five-factor model of personality to the exploration of the construct of risk-taking in obsessive-compulsive disorder. *Behavioural and Cognitive Psychotherapy*, *34*, 31–42.
- Revelle, W. (2008). The contribution of reinforcement sensitivity theory to personality theory. In P. Corr (Ed.), *Reinforcement sensitivity theory of personality* (pp. 508–527). Cambridge: Cambridge University Press.
- Samuels, J., Nestadt, G., Bienvenu, O. J., Costa, P. T., Jr., Riddle, M. A., Liang, K., et al. (2000). Personality disorders and normal personality dimensions in obsessive-compulsive disorder. *British Journal of Psychiatry*, *177*, 457–462.
- Santor, D. A., Bagby, R. M., & Joffe, R. T. (1997). Evaluating stability and change in personality and depression. *Journal of Personality and Social Psychology*, *73*, 1354–1362.
- Sellbom, M., Ben-Porath, Y. S., & Bagby, R. M. (2008). On the hierarchical structure of mood and anxiety disorders: Confirmatory evidence and elaboration of a model of temperament markers. *Journal of Abnormal Psychology*, *117*, 576–590.
- Simms, L. J., Watson, D., & Doebbeling, B. N. (2002). Confirmatory factor analyses of posttraumatic stress symptoms in deployed and nondeployed veterans of the Gulf War. *Journal of Abnormal Psychology*, *111*, 637–647.
- Slade, T., & Watson, D. (2006). The structure of common DSM-IV and ICD-10 mental disorders in the Australian general population. *Psychological Medicine*, *36*, 1593–1600.

- Tackett, J. L. (2006). Evaluating models of the personality- psychopathology relationship in children and adolescents. *Clinical Psychology Review*, *26*, 584–599.
- Tackett, J. L., Silberschmidt, A., Sponheim, S., & Krueger, R. F. (2008). A dimensional model of personality disorder: Incorporating cluster A characteristics. *Journal of Abnormal Psychology*, *117*, 454–459.
- Trull, T. J., & Goodwin, A. H. (1993). Relationship between mood changes and the report of personality disorder symptoms. *Journal of Personality Assessment*, *61*, 99–111.
- Trull, T. J., & Sher, K. J. (1994). Relationship between the five-factor model of personality and axis I disorders in a nonclinical sample. *Journal of Abnormal Psychology*, *103*, 350–360.
- Vachon, D. D. & Bagby, R. M. (in press). Mood and anxiety disorders: The hierarchical structure of personality and psychopathology. In P. Corr & G. Matthews (Eds.), *Handbook of personality*. Cambridge, England: Cambridge University Press.
- Watson, D. (2005). Rethinking the mood and anxiety disorders: A quantitative hierarchical model for *DSM-V*. *Journal of Abnormal Psychology*, *114*, 522–536.
- Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*, 1063–1070.
- Watson, D., Gamez, W., & Simms, L. J. (2005). Basic dimensions of temperament and their relation to anxiety and depression: A symptom-based perspective. *Journal of Research in Personality*, *39*, 46–66.
- Widiger, T. A., & Simonsen, E. (2005). Alternative dimensional models of personality disorder: Finding a common ground. *Journal of Personality Disorders*, *19*, 110–130.
- Widiger, T. A., Verheul, R., & van den Brink, W. (1999). Personality and psychopathology. L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 347–366). New York: Guilford.
- Wiggins, J.S. & Pincus, A. L. (1992). Personality: Structure and assessment. *Annual Review of Psychology*, *43*, 473–504.
- Wu, K. D., Clark, L. A., & Watson, D. (2006). Relations between obsessive-compulsive disorder and personality: Beyond axis I-axis II comorbidity. *Journal of Anxiety Disorders*, *20*, 695–717.
- Wu, K. D., & Watson, D. (2005). Relations between hoarding and obsessive-compulsive disorder. *Behaviour Research and Therapy*, *43*, 897–921.

Received September 10, 2007

Revision received July 29, 2008

Accepted August 4, 2008 ■

### New Editors Appointed, 2010–2015

The Publications and Communications Board of the American Psychological Association announces the appointment of 4 new editors for 6-year terms beginning in 2010. As of January 1, 2009, manuscripts should be directed as follows:

- *Psychological Assessment* (<http://www.apa.org/journals/pas>), **Cecil R. Reynolds, PhD**, Department of Educational Psychology, Texas A&M University, 704 Harrington Education Center, College Station, TX 77843.
- *Journal of Family Psychology* (<http://www.apa.org/journals/fam>), **Nadine Kaslow, PhD**, Department of Psychiatry and Behavioral Sciences, Grady Health System, 80 Jesse Hill Jr. Drive, SE, Atlanta, GA 30303.
- *Journal of Experimental Psychology: Animal Behavior Processes* (<http://www.apa.org/journals/xan>), **Anthony Dickinson, PhD**, Department of Experimental Psychology, University of Cambridge, Downing Street, Cambridge CB2 3EB, United Kingdom
- *Journal of Personality and Social Psychology: Personality Processes and Individual Differences* (<http://www.apa.org/journals/psp>), **Laura A. King, PhD**, Department of Psychological Sciences, University of Missouri, McAlester Hall, Columbia, MO 65211.

**Electronic manuscript submission:** As of January 1, 2009, manuscripts should be submitted electronically via the journal's Manuscript Submission Portal (see the website listed above with each journal title).

Manuscript submission patterns make the precise date of completion of the 2009 volumes uncertain. Current editors, Milton E. Strauss, PhD, Anne E. Kazak, PhD, Nicholas Mackintosh, PhD, and Charles S. Carver, PhD, will receive and consider manuscripts through December 31, 2008. Should 2009 volumes be completed before that date, manuscripts will be redirected to the new editors for consideration in 2010 volumes.