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On the Structure of Personality Disorder Traits: Conjoint Analyses of the CAT-PD, PID-5, and NEO-PI-3 Trait Models

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The current study examines the relations among contemporary models of pathological and normal range personality traits. Specifically, we report on (a) conjoint exploratory factor analyses of the *Computerized Adaptive Test of Personality Disorder* static form (CAT-PD-SF) with the *Personality Inventory for the Diagnostic and Statistical Manual of Mental Disorders, fifth edition* and *NEO Personality Inventory-3 First Half*, and (b) unfolding hierarchical analyses of the three measures in a large general psychiatric outpatient sample (n = 628; 64% Female). A five-factor solution provided conceptually coherent alignment among the CAT-PD-SF, PID-5, and NEO-PI-3FH scales. Hierarchical solutions suggested that higher-order factors bear strong resemblance to dimensions that emerge from structural models of psychopathology (e.g., Internalizing and Externalizing spectra). These results demonstrate that the CAT-PD-SF adheres to the consensual structure of broad trait domains at the five-factor level. Additionally, patterns of scale loadings further inform questions of structure and bipolarity of facet and domain level constructs. Finally, hierarchical analyses strengthen the argument for using broad dimensions that span normative and pathological functioning to scaffold a quantitatively derived phenotypic structure of psychopathology to orient future research on explanatory, etiological, and maintenance mechanisms.

Keywords: personality traits, personality disorders, personality pathology, hierarchical trait models

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For more than 30 years, the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) has used a discrete categorical model to characterize individual differences in the phenotypic manifestations of personality pathology. Extensive research demonstrates that this model of personality disorders (PD) is flawed in a number of ways that detract from its clinical utility and stymie important research efforts to identify etiological and maintenance mechanisms (Livesley et al., 1994; Widiger & Trull, 2007). The well-documented problems include high rates of diagnostic covariation, lack of adequate content coverage, within-disorder heterogeneity, arbitrary boundary definitions, and no clear conceptual relationship with basic personality science (Krueger & Eaton, 2010; Livesley, 2001). Consistent with early emerging data (i.e., pre–*DSM-IV*), suggestions arose that a model based on broad transdiagnostic dimensions or spectra might be able to resolve many of these problematic clinical and scientific issues (see, e.g., Clark, Livesley, & Morey, 1997 for a review; Wiggins & Pincus, 1989). Ultimately, this line of research and reasoning resulted in a dimensional trait model being proposed as the basis for characterizing individual differences in PD for *DSM-5*. However, even though this model was forwarded by the *DSM-5* Workgroup for Personality and Personality Disorders and supported by the *DSM* Task Force, the American Psychiatric Association's (APA) Board of Trustees ultimately voted in favor of retaining the current system in Section II (*Essential Elements: Diagnostic Criteria and Codes*) of the manual. At the same time, the new model has been included in Section III (*Emerging Models and Measures*), which calls for additional research to evaluate and hone the proposed dimensional model.

Although this deferment maintains what has long been known to be a clinically and scientifically problematic model, it has the potential to focus personality psychopathologists on lingering questions related to dimensional trait models (Krueger et al., 2011) to refine the *DSM-5* Section III model for subsequent revisions of the manual (e.g., *DSM-5.1*). Among the most common arguments against a dimensional trait model, and the one tacitly offered in the *DSM-IV-TR* (APA, 2000), is that with myriad personality models available, no single one can assume primacy and serve as the framework for replacing the current PD model. However, this is a mostly superficial criticism, and each of the major alternative models is more alike than dissimilar—especially at the primary domain level of analysis (e.g., Markon, Kruger, & Watson, 2005; Widiger & Simonsen, 2005). For instance, Widiger and Simonsen (2005) reviewed 18 different models of normal and maladaptive personality and concluded that although there are differences in the precise make-up of the lower-order scales, all models either contain or can be accommodated by four broad domains: Extraversion versus Introversion/Detachment, Agreeableness versus Antagonism, Emotional Stability versus Neuroticism/Emotional Dysregulation, and Constraint/Conscientiousness versus Disinhibition. The

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conceptual similarities articulated by Widiger and Simonsen (2005) have been borne out in numerous empirical studies that have examined these models alone (e.g., Calabrese et al., 2012; Kushner et al., 2011) or in combination with each other (e.g., Clark et al., 1996; Markon et al., 2005).

Despite the fact that a general consensus exists about the major domains important for personality and its pathology, several interpenetrating issues remain to be fully resolved. Krueger and colleagues (2011) recently summarized these as involving *structure*, *bipolarity*, *hierarchy*, and *range*. We briefly review issues related to the first three of these concepts—as will become evident, they are all walls of the same house, and it is difficult to discuss each of them as truly distinct.[1] Structure is among the most attractive rationales for adopting a dimensional trait model. Beyond basic diagnostic issues (e.g., rampant poly diagnosis, arbitrary cutoffs), a model rooted in the broad dimensions listed above can provide scientific integration of PDs with (a) basic personality and (b) the broader accumulation of psychiatric syndromes (e.g., mood, anxiety, substance use, and psychotic disorders; Harkness et al., 2012). This is because broad domains of personality have demonstrated replicable relations not only to the PDs (Samuel & Widiger, 2008), but also to common mental disorders (Kotov et al., 2010; Lahey, 2009). Moreover, quantitative modeling of mental disorders suggests they are undergirded by liability spectra that bear a striking conceptual resemblance to the dimensions outlined above (e.g., Kotov et al., 2011; Krueger, 1999; Markon, 2010).

However, the exact links between trait dimensions identified as central to pathological or maladaptive expressions of personality and basic traits remain somewhat unclear. A comprehensive mapping of clinically relevant personality domains necessarily invokes new content because basic trait models generally do not provide adequate coverage of specific areas of impairment (Trull, 2005). The relationship between pathological facets and normal traits can be complex. For example, when items of normal range trait measures are modified to reflect maladaptive functioning, the pattern of covariation among domains is altered (Haigler & Widiger, 2001). It appears that as extremity or maladaptivity is increased, content has a tendency to be altered as well. This is particularly evident in the specific composition of scales related to Disinhibition, Constraint, and Antagonism (Krueger et al., 2011). On the one hand, Disinhibition and Constraint are theoretical opposite maladaptive poles of the same dimension (i.e., Conscientiousness; e.g., Samuel, 2011; Widiger, Livesley, & Clark, 2009; Widiger & Mullins-Sweatt, 2009). However, in different structural analyses of traits, Disinhibition and Constraint sometimes emerge as opposing poles (e.g., Markon et al., 2005; Watson, Clark, & Chmielewski, 2008) and sometimes as separate domains (e.g., De Clercq et al., 2006; Morey, Krueger, & Skodol, in press). Further, when these domains do separate, Disinhibition scales often join Antagonism scales to form a dimension that more closely resembles the Externalizing spectrum (e.g., Krueger et al., 2007; Morey et al., in press). Undoubtedly measurement issues are involved in addition to substantive structural questions (e.g., Samuel & Widiger, 2010), but further research to clarify the joint structure of normal and abnormal traits is warranted. A second structural issue involves a fifth personality domain. In normal range trait models there is broad support for the domain of Openness to Experience/Intellect (Goldberg, 1993), whereas in maladaptive models, a dimension related to oddity, peculiarity, aberrant thinking, or psychoticism has been suggested to capture content related to schizotypy (Harkness & McNulty, 1994; Harkness et al., 2012; Tackett et al., 2008; Watson, Clark, & Chmielewski, 2008). Evidence is somewhat mixed on whether these can be conceptually and empirically integrated (e.g., Piedmont et al., 2009; Watson et al., 2008; Wiggins & Pincus, 1989).

As described above, certain aspects of pathological personality functioning are theorized to be extreme poles of the same dimension (Samuel, 2011; Widiger et al., 2009; Widiger & Mullins-Sweatt, 2009). Although there is evidence to suggest that many domains operate in this way (e.g., Extraversion/Detachment; Markon et al., 2005; Watson et al., 2008), some domains, Disinhibition/Constraint in particular, are more variable across studies. This can be observed in certain external correlates, where both poles manifest positive correlations (e.g., with obsessive–compulsive disorder, Kotov et al., 2010). Other domains, such as Antagonism/Agreeableness, have specific content that is hypothesized to fall at one end of the dimension, but instead shift domains (e.g., dependency and attachment anxiety frequently shift to Negative Affectivity; Markon et al., 2005). The question of uni- versus bipolarity remains an understudied issue in large part because most personality trait inventories measure, or are keyed in the direction of, a single pole of the primary trait domains. For instance, it is common for normal range inventories to provide scales that tap Agreeableness but not Antagonism. Yet normal range and pathological trait inventories tend to be complementary in this regard, and therefore when studied together more of the poles receive measurement coverage.

Some discrepant results across studies can be clarified by refining our understanding of trait hierarchies. That is to say, traits exist at varying levels of specificity and generality, and patterns of covariation among traits may suggest a link at one level (e.g., higher-order domains) and unique specificity at another (e.g., facet level). To illustrate, a robust finding is that among normal trait models, Agreeableness, Conscientiousness, and Emotional Stability share variance that gives rise to a higher-order factor termed "Alpha" or "Stability," whereas Openness and Extraversion serve as markers for "Beta" or "Plasticity" (DeYoung, 2006; Digman, 1997). When similar analyses are applied to pathological trait models, the higher-order factors frequently resemble those that emerge from quantitative models of mental disorders, namely Internalizing and Externalizing Spectra (e.g., De Clercq et al., 2006; Krueger, 1999; Kushner et al., 2011; Morey et al., in press; Wright, Thomas, et al., 2012). Fewer studies have examined higher-order factors that emerge from combined analyses of normal range and pathological trait models. Yet these have the potential to be informative given that the normal range "metafactor" of "Alpha" is broadly (i.e., indiscriminately) important for personality pathology, but "Beta" less so. Further, this level of analysis holds the promise of informing the relationship between personality traits and psychopathology spectra (Krueger et al., 2011).

[1] We limit our review to structure, bipolarity, and hierarchy, because these are the focus of our analyses. Range, although important, generally requires the application of item response theory techniques, which are not currently applicable to fully dimensional scales. Nevertheless, a number of recent studies have started to examine range in personality scales, and we direct the reader to Watson and colleagues (2008), Samuel and Widiger (2010), and Stepp and colleagues (2012).

The Current Study

Leading up to the *DSM-5*, two major independent efforts were undertaken to develop comprehensive sets of maladaptive personality traits that could serve as the basis for models and measures of personality pathology. One effort was part of the official *DSM-5* revision process, and an enumeration of constructs thought to be central to PD by the workgroup members and their consultants led to an initial list of 37 lower-order constructs that were hypothesized to represent markers for six higher-order domains. These were subsequently psychometrically winnowed down to 25 that were found to load on five higher-order domains (Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism), bearing strong resemblance to Harkness' Personality Psychopathology – 5 model (PSY-5; Harkness & McNulty, 1994) or maladaptive variants of the five-factor model. This final set constitutes the model printed in *DSM-5*'s Section III, and forms the basis of the Personality Inventory for the *DSM-5* (PID-5; Krueger et al., 2012). A considerable body of research has emerged evaluating the structural (De Fruyt et al., 2013; Gore & Widiger, in press; Wright, Thomas, et al., 2012), concurrent (Hopwood et al., 2012; Wright et al., 2013), and content validity (Anderson et al., 2013; Ashton et al., 2012; Hopwood, Schade et al., 2013; Hopwood, Wright et al., 2013; Wright, Pincus, et al., 2012) of the PID-5 trait model. This early work suggests the PID-5 is a promising new personality pathology inventory.

Concurrently, the Computerized Adaptive Test of Personality Disorder (CAT-PD; see Simms et al., 2011) project set out to independently develop a comprehensive model and efficient measure of PD traits, organized a priori within a PSY-5 framework. Similar to the PID-5, early efforts involved the enumeration of lower-order domains that are characteristic of PD, followed by psychometric work in community and patient samples to refine the structure (see below for details). In total, the CAT-PD model contains 33 lower-order scales that are hypothesized to load on five higher-order factors consistent with the PSY-5 model. Therefore it offers an alternative representation consistent with the model currently in Section III of *DSM-5*.

Although in theory there should be strong points of convergence between the PID-5 and CAT-PD, this has not yet been examined. Doing so will provide important information about the ability for the CAT-PD to serve as an independent instrument to complement existing tools in the measure of the *DSM-5* model. Moreover, understanding the points of convergence and divergence across models intending to measure the same constructs will undoubtedly prove informative vis-à-vis adequate content coverage and structure. There also is an opportunity to further inform the structural questions outlined by Krueger and colleagues (2011) by examining the performance of these scales in conjunction with normal range traits. This is especially so because each measure individually, but especially in tandem, provides much needed density of measurement for many of the pathological domains. It is well known that the factor structure that emerges from an analysis is dependent on the content of the scales included in the analyses. A criticism that can be leveled at earlier studies is that they contained a relative lack of representation in certain pathological features leading to potentially less than optimal conclusions about structural matters.

Here we seek to further these aims by examining the structural relations among the lower-order scales of the CAT-PD, PID-5, and NEO-PI-3 (McCrae, Costa & Martin, 2005) trait models. To understand the structure of the primary domains and bipolarity, we subject all of the observed scales to exploratory factor analysis (EFA) in a large clinical sample. We anticipate that a recognizable five-factor structure will emerge as the optimal solution, although by analyzing the relations among these instruments at the facet-level, we aim to examine the alignment of individual lower-order constructs. Specifically, we will evaluate whether the normal range traits of the NEO-PI-3 model align with their conceptually opposite poles to form bipolar dimensions (e.g., Agreeableness vs. Antagonism), or whether these decompose into distinct dimensions. Of particular interest will be the relations among NEO-PI-3 Openness, PID-5 Psychoticism scales, and CAT-PD scales designed to tap peculiarity and unusual thinking and perceptions. Significant controversy remains about the association among these domains (e.g., Piedmont et al., 2009; Watson et al., 2008; Wiggins & Pincus, 1989).

Finally, we investigate the hierarchical unfolding of traits (Markon et al., 2005; Goldberg, 2006). Similar to Wright, Thomas, et al. (2012), we expect that the higher-order dimensions will resemble variants of other contemporary dimensional models. For example, at the two-factor level, we expected domains to appear similar to the Internalizing and Externalizing spectra (e.g., Krueger, 1999), at the three-factor level, a variation of Eysenck's (1994) "Big Three," and at the four-factor level, the "Pathological Big Four" (Widiger & Simonsen, 2005).

Method

Participants and Procedures

The present study used responses collected from the CAT-PD project (see Simms et al., 2011), which is a broader study designed to develop an integrative model and efficient measure of PD traits. Participants for the present study—who were recruited by distributing flyers at mental health clinics across Western New York—were eligible to participate if they reported psychiatric treatment within the past two years. The final sample included 628 participants with a *M* age of 43.2 years (*SD* = 12.5) and was 64% female.[2] The sample identified primarily as Caucasian (63%) or African American (34%), with the remaining participants identifying as American Indian or Alaskan Native (2%), Asian (.5%), and Native Hawaiian or Other Pacific Islander (.2%). The majority of the sample was currently in treatment (80%) or had been within the last one (10%) to two (5%) years.

Participants completed a full battery of self-report and interview-based measures during a 4-hr session. For the present study, we analyzed responses to the Personality Inventory for *DSM-5* (PID-5; Krueger et al., 2012), NEO Personality Inventory-3 First Half (NEO PI-3FH; McCrae, Costa, & Martin, 2005; McCrae & Costa, 2007), and the static form of the Computerized Adaptive Test of Personality Disorder (CAT-PD-SF).

[2] The total sample comprised 695 participants. Participants were excluded if (a) preliminary analyses indicated excessively inconsistent responding based on ad hoc inconsistency indices, (b) they had excessive missing CAT-PD responses (i.e., more than 50%), or (c) they exhibited behaviors in session that suggested that their responses were not trustworthy (e.g., they were under the influence of substances).

Participants completed all measures in the laboratory on computers that were shielded for privacy. Sessions were scheduled such that participants first completed some screening measures, followed by a subset of the full CAT-PD item pool, a structured diagnostic interview, and finally the PID-5, NEO-PI-3FH, and other self-report measures.

Not all scales were completed by all participants, for two reasons. First, given its large size, a balanced incomplete block design (BIBD) was used to administer the full CAT-PD item pool. A BIBD is a planned-missingness design in which each participant completes only a portion of the items. Our BIBD approach optimized the pairwise sample size for conceptually similar traits. In this design, traits and items were assigned to a series of nine item blocks such that conceptually similar traits appeared in the same block. Item blocks then were assigned to 12 "booklets" in a completely balanced manner: Each booklet was composed of exactly three blocks, and each block was assigned to exactly four booklets. This design led to pairwise sample sizes of approximately 200 within item blocks and approximately 50 across item blocks. Second, given time constraints and the length of the full battery, a subset of participants did not complete the PID-5 and NEO-PI-3FH measures. A total of 463 (74%) and 381 (66%) participants completed the PID-5 and NEO-PI-3FH, respectively. Data analytic procedures for accommodating these two forms of missingness are described below.

Participants were compensated $50 plus transportation costs. All procedures were reviewed and approved by the Social and Behavioral Sciences Institutional Review Board at the University at Buffalo.

Measures

PID-5. The PID-5 (Krueger et al., 2012) assesses the maladaptive traits proposed in Section III of *DSM-5*. The measure includes 220 self-report items tapping 25 PD traits, organized based on factor analytic evidence into five broad domains: Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism. Each trait facet is measured by 4 to 14 items. PID-5 items are rated on a four-point scale ranging from 0 (*very false or often false*) to 3 (*very true or often true*). Higher scale scores are indicative of greater personality pathology. Krueger et al. reported adequate to good internal consistencies based on a US representative sample, *Mdn* α = .86; *range* = .72 to .96 across scales. Accumulating evidence supports the construct validity of the PID-5 as a broad measure of PD-relevant traits (Anderson et al., 2013; Hopwood, Schade, et al., 2013; Hopwood, Wright et al., 2013; Wright, Pincus, et al., 2012; Wright, Thomas, et al., 2012).

NEO-PI-3FH. The NEO-PI-3 (McCrae et al., 2005) is an updated version of the NEO-PI-R (Costa & McCrae, 1992) that was designed to improve the readability and item-total correlations for a subset of NEO PI-R items. In total, 37 items were updated, and the resultant NEO-PI-3 demonstrates similar reliability, validity, and internal structure to the NEO-PI-R (McCrae et al., 2005). The full NEO-PI-3 includes of 240 statements to which respondents rate their level of agreement using a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Items are organized into 30 facet scales that comprise five broad domains: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. In the present study, we used a 120-item short form composed of the first half of the full NEO-PI-3 (NEO-PI-3FH; McCrae & Costa, 2007) to balance our need for efficient measurement with reasonable coverage of the lower-order facets. This version includes four items for each of the 30 facets. McCrae and Costa (2007) reported adequate internal consistencies for the shortened facet scales (*Mdn* α = .64 in adult participants) as well as good fidelity with the full-length facet scales (*Mdn r* = .91), self-other agreement (*Mdn r* = .44), and structural similarity with the full-length scales (congruence coefficients range from .96 to .98 across the five domains).

CAT-PD-SF. The CAT-PD-SF is a brief measure drawn from the full CAT-PD item pool. The CAT-PD project yielded 33 scales tapping an integrative set of PD traits. Initial construct development details are described elsewhere (Simms et al., 2011). In brief, literature reviews and consultations with PD experts yielded 59 candidate constructs measured by a total of 2,589 items, 1,570 items from the International Personality Item Pool (IPIP: Goldberg, 1999; Goldberg et al., 2006) as well as 1,019 new items written to fill construct and severity gaps in the IPIP. Responses to these items were collected in a community sample (n = 1,268) and the present patient sample (n = 628). The final 33 scales were formed following data collection through an iterative series of factor- and content-analytic procedures.

The full CAT-PD scales are long by design—1,366 total items; *M* scale length = 44 items (*SD* = 12)—to be amenable for computerized adaptive testing. However, a shorter static form (CAT-PD-SF), used here, was developed using a combination of statistical and content validity considerations to facilitate quick and standardized assessment across studies. The static form measures all 33 traits using 212 items. Responses to items are given on a 5-point scale ranging from 1 (*very untrue of me*) to 5 (*very true of me*). The static scales demonstrate good internal consistency, Med alphas = .83 and .85 in the community and patient samples, respectively. Visual inspection of the scales suggests good convergence between the CAT-PD and PID-5 scale sets, but also some areas of uniqueness (e.g., the CAT-PD measures numerous traits not tapped by the PID-5). However, this will be the first study to empirically consider the points of overlap and distinctiveness between these measures.

Results

Missing Data

Missing data were handled using full information maximum likelihood (FIML) in Mplus 7 (Muthén & Muthén, 2012). Patterns of missingness that resulted from the BIBD administration of the CAT-PD can be considered to be completely at random (MCAR). Under these conditions, FIML is appropriate and has been shown to provide unbiased parameter estimates (Enders, 2010; Graham, 2009) and planned missingness is often treated in this way (e.g., Gibbons et al., 2012). However, we could not assume that missing data on the PID-5 and NEO-PI-3FH was MCAR or even missing at random (MAR), which is a requirement of FIML. Indeed, we found missingness to be related to demographics (age, education, income). To ensure parameter estimates were unbiased by missing data, we reran models including key demographic variables in the model such that they would now be MAR (Enders, 2010), and

parameter values were virtually identical (e.g., factor congruences across models uniformly = 1.00).

Exploratory Factor Analyses

To examine the conjoint structure of the CAT-PD-SF, PID-5, and NEO-PI-3FH trait models, the primary scales of each measure were subjected to a series of exploratory factor analyses (EFAs). All EFA models were estimated in Mplus 7 (Muthén & Muthén, 2012) using an oblique Geomin rotation due to its desirable weighting of factor complexity and interpretability (Browne, 2001; Sass & Schmitt, 2010). To determine the optimal number of factors to retain we considered the results of a parallel analysis (Horn, 1965) as well as theory and the interpretability of the resultant factors. The eigenvalues of the estimated correlation matrix exceeded the random data generated eigenvalues through the first six factors (first seven empirical eigenvalues = 25.12, 9.04, 5.84, 4.31, 3.51, 2.76, and 2.18; first seven random data eigenvalues = 3.33, 3.04, 2.88, 2.73, 2.63, 2.52, and 2.45), suggesting a maximum of six factors should be considered. Given the five-factor structure of the NEO-PI-3 and the now replicated five-factor structure of the PID-5, we anticipated that a five-factor solution would be ideal, but we also considered alternative four- and six-factor solutions.

The five-factor solution (accounting for 54.34% of the variance) provided the most compelling solution, with a recognizable pattern of loadings (detailed below), which included factors that reasonably could be labeled Negative Affectivity, Antagonism, Detachment, Disinhibition, and Psychoticism. In the four-factor solution, scales related to peculiarity, oddity, and aberrant perceptions combined with scales measuring negative affectivity. The additional factor in the six-factor solution was composed primarily of loadings that were narrowly related to anger and hostility (e.g., NEO-PI-3FH Angry-Hostility; CAT-PD-SF Hostile Aggression, Anger; PID-5 Hostility). Therefore, we retained the five-factor solution because of its theoretical coherence while also being the most comprehensive yet parsimonious structure.

To ensure that patterns of covariation were not overly influenced by any methodological artifacts, we conducted final analyses using exploratory structural equation modeling (ESEM). ESEM is a technique that permits the simultaneous estimation of exploratory and confirmatory factors within the same model. Here we specified orthogonal method factors for each of the trait measures to account for measure specific variance, such that all scales from a given inventory were allowed to load on the corresponding measure specific factor (e.g., all NEO-PI-3FH scales loaded on a single factor). In the same model, all scales contributed to an oblique (Geomin) five-factor exploratory structure. Patterns of factor loadings for the five factors were highly congruent across the EFA and ESEM approaches (Congruence coefficients = .99, 1.00, .97, 1.00, and .91 for the Negative Affectivity, Antagonism, Disinhibition, Detachment, and Psychoticism factors, respectively) but values of specific scale loadings differed to some degree. Loadings on the method factors mostly were modest but significant (M = .19; *Range* = .07–.37).

Table 1 presents the factor loadings from the final ESEM based factor model. The solution yielded clearly interpretable factors that we labeled using common higher-order maladaptive trait names. The first factor, labeled Antagonism, was marked by core PID-5 Antagonism scales (e.g., Deceitfulness, Manipulativeness, Callousness), negative loadings from the NEO-PI-3FH Agreeableness domain (e.g., Straightforwardness, Altruism, Compliance), and strong loadings from the CAT-PD-SF scales of Manipulativeness, Hostile Aggression, and Domineering among others. Additional notable loadings came from scales with sensation seeking content (e.g., PID-5 Risk Taking; CAT-PD-SF Risk Taking; NEO-PI-3FH Excitement Seeking) and scales measuring anger/hostility that cross-loaded on Negative Affectivity.

We labeled the second factor Negative Affectivity because of prominent loadings by the scales from the PID-5 factor of the same name (e.g., Anxiousness, Emotional Lability), the NEO-PI-3FH Neuroticism scales (e.g., Anxiety, Vulnerability), and CAT-PD-SF scales with similar content (e.g., Affective Lability, Anxiousness). Scales measuring trait depressive affect loaded strongly on this factor (e.g., CAT-PD-SF Depressiveness, NEO-PI-3FH, Depression, PID-5 Depressivity) but also tended to cross-load on the Disinhibition factor.

The strongest loadings on the Disinhibition factor came from negative loadings of NEO-PI-3FH Conscientiousness scales (e.g., Self-Discipline, Achievement Striving, Competence), some of the PID-5 Disinhibition scales (e.g., Distractibility, Irresponsibility), and the CAT-PD-SF scales of Irresponsibility, Non-Perseverance, and Non-Planfulness. Also, in addition to secondary loadings from Depression-related scales, measures of vulnerability to emotional fluctuations also exhibited secondary loadings on Disinhibition (e.g., PID-5 Emotional Lability, CAT-PD-SF Affective Lability, and NEO-PI-3FH Vulnerability) perhaps reflecting impulsivity in the context of emotional dysregulation or negative urgency.

The fourth factor, which we labeled Detachment, was marked most strongly by scales related to social avoidance and blunted emotions at one end (e.g., PID-5 Withdrawal, PID-5 Restricted Affectivity, CAT-PD-SF Social Withdrawal, CAT-PD-SF Emotional Detachment) and social approach and positive emotionality on the other (e.g., NEO-PI-3FH Warmth, NEO-PI-3FH Positive Emotions, PID-5 Attention Seeking, CAT-PD-SF Exhibitionism). In addition, with the exception of Values, all NEO-PI-3FH Openness scales had their primary loading on this factor. This is understandable in the context of the higher-order structure of the FFM (Digman, 1997; DeYoung, 2006) in which Extraversion and Openness load on to a broader factor sometimes referred to as "Beta" or "Plasticity."

The final factor clearly represented Psychoticism, with strong primary loadings from the three PID-5 Psychoticism Scales and the CAT-PD-SF scales of Unusual Experiences, Unusual Beliefs, and Fantasy Proneness. In contrast, no NEO-PI-3FH scales had primary loadings on this factor, although NEO-PI-3FH Openness scales generally evidenced secondary or tertiary loadings on this factor. Additional secondary loadings were observed from theoretically related scales such as PID-5 Withdrawal and CAT-PD-SF Social Withdrawal and Cognitive Problems.

Table 2 summarizes the latent factor correlations. In general, these were modest to moderate in association, with only two exceeding r = .3. Including normal range traits in the investigation of pathological trait structure appears to have mitigated the frequently observed considerable positive manifold in the correlation among factors.

Table 1
Five-Factor Oblique Rotation Exploratory Factor Model of CAT-PD-SF, PID-5, and NEO-PI-3FH Scales

Scale	Antagonism	Negative affectivity	Disinhibition	Detachment	Psychoticism	Residuals
CAT - Manipulativeness	**.71**	−.15	.23	.18	.00	.33
CAT - Hostile Aggression	**.70**	.20	−.05	.21	.01	.28
NEO - Straightforwardness	**−.70**	−.06	−.06	.16	.12	.51
CAT - Domineering	**.69**	.24	−.02	−.15	−.11	.42
PID - Deceitfulness	**.67**	−.03	.23	−.02	.06	.35
PID - Manipulativeness	**.67**	.01	.07	−.17	.02	.44
PID - Callousness	**.64**	.04	.02	.28	.12	.29
NEO - Altruism	**−.63**	.13	−.07	−.38	−.07	.43
CAT - Callousness	**.63**	−.14	−.05	.36	.21	.28
CAT - Norm Violation	**.63**	.07	.24	.04	.01	.45
NEO - Compliance	**−.59**	**−.53**	.14	.02	.25	.43
PID - Hostility	**.54**	**.54**	.06	.11	−.04	.22
CAT - Grandiosity	**.52**	.08	−.08	−.10	.08	.60
CAT - Rudeness	**.50**	.24	**.30**	−.12	.13	.36
PID - Risk Taking	**.50**	−.12	.09	−.14	.06	.62
CAT - Risk Taking	**.49**	−.14	.21	−.03	.13	.61
PID - Grandiosity	**.46**	.03	−.17	−.02	.29	.51
NEO - Modesty	**−.45**	.05	.25	.35	−.05	.58
NEO - Tender-Mindedness	**−.43**	.04	.07	−.21	.08	.78
PID - Impulsivity	**.41**	.16	**.38**	−.11	.19	.40
NEO - Excitement Seeking	**.34**	−.03	−.11	−.27	−.07	.79
NEO - Values	**−.32**	−.01	.12	−.20	.00	.84
CAT - Anger	**.39**	**.71**	.02	.10	−.24	.29
PID - Anxiety	−.06	**.70**	.23	.03	.10	.23
CAT - Affective Lability	.17	**.65**	**.31**	−.07	.03	.22
CAT - Anxiousness	−.22	**.65**	.16	−.04	**.32**	.25
NEO - Angry Hostility	**.48**	**.63**	.07	−.02	−.21	.35
NEO - Anxiety	−.25	**.63**	.19	−.07	.11	.43
PID - Emotional Lability	.05	**.62**	**.31**	−.11	.11	.27
CAT - Depressiveness	−.11	**.59**	**.41**	.27	−.07	.14
CAT - Mistrust	.28	**.58**	−.16	.29	.21	.28
NEO - Vulnerability	.05	**.55**	**.48**	.00	−.02	.27
PID - Suspiciousness	**.30**	**.54**	−.14	.21	.18	.35
PID - Perfectionism	.07	**.54**	−.27	.09	.24	.54
CAT - Rigidity	**.31**	**.53**	−.06	−.01	.06	.49
NEO - Depression	−.12	**.52**	**.45**	.11	−.13	.34
NEO - Trust	**−.36**	**−.52**	.19	−.27	.00	.48
CAT - Relationship Insecurity	.18	**.51**	.13	.19	.22	.34
CAT - Health Anxiety	.00	**.46**	.17	−.01	.25	.51
PID - Separation Insecurity	.10	**.46**	.23	−.09	.05	.57
PID - Perseveration	.03	**.37**	**.35**	.01	**.31**	.34
NEO - Self-Discipline	−.07	.08	**−.87**	−.03	−.03	.24
CAT - Irresponsibility	.24	−.14	**.75**	.07	.04	.32
NEO - Achievement Striving	−.04	.07	**−.75**	−.21	.09	.40
NEO - Competence	−.17	−.10	**−.71**	−.09	−.05	.33
CAT - Non-Perseverance	.06	.22	**.68**	.03	.08	.26
NEO - Order	.00	**.39**	**−.66**	.06	−.02	.60
CAT - Non-Planfulness	**.32**	−.03	**.61**	−.09	.09	.42
CAT - Submissiveness	−.19	.12	**.59**	.02	.20	.44
PID - Distractibility	−.01	.18	**.59**	.02	**.30**	.28
CAT - Perfectionism	.00	**.56**	**−.57**	−.12	.04	.54
NEO - Dutifulness	**−.40**	.00	**−.56**	.03	.05	.52
PID - Irresponsibility	**.39**	−.01	**.55**	.10	.13	.32
NEO - Activity	.14	−.06	**−.55**	−.32	.12	.52
CAT - Cognitive Problems	−.07	.22	**.53**	.00	**.34**	.31
PID - Depressivity	−.01	**.38**	**.51**	.25	.04	.24
CAT - Workaholism	−.04	.29	**−.48**	.00	.26	.69
NEO - Impulsiveness	.24	.23	**.48**	−.21	−.02	.56
CAT - Anhedonia	−.04	**.42**	**.45**	.41	−.07	.19
PID - Anhedonia	−.05	**.39**	**.45**	.41	−.10	.22
NEO - Deliberation	**−.39**	−.10	**−.43**	.21	.05	.60
PID - Submissiveness	−.27	.06	**.42**	−.09	.17	.65
NEO - Self-Consciousness	−.09	**.40**	**.41**	.22	.03	.44
NEO - Warmth	−.23	−.06	−.04	−.74	−.17	.27
CAT - Social Withdrawal	−.11	.27	.04	.66	**.33**	.21

Table 1 (*continued*)

Scale	Antagonism	Negative affectivity	Disinhibition	Detachment	Psychoticism	Residuals
CAT - Emotional Detachment	.03	−.03	.01	.65	.12	.51
PID - Withdrawal	.04	.23	.02	.64	**.30**	.26
NEO - Positive Emotions	−.02	−.26	−.18	−.59	.13	.45
NEO - Gregariousness	.10	−.24	.09	−.58	−.16	.53
PID - Restricted Affectivity	.22	−.22	.02	.57	.27	.43
CAT - Exhibitionism	**.45**	−.09	−.02	−.54	.06	.44
NEO - Feelings	−.18	**.38**	.01	−.54	.13	.59
PID - Attention Seeking	**.47**	.08	.11	−.47	.04	.48
PID - Intimacy Avoidance	.03	−.04	.05	.41	.25	.68
NEO - Assertiveness	**.38**	.02	**−.34**	−.41	−.12	.56
NEO - Fantasy	−.04	−.05	.13	−.40	**.30**	.74
NEO - Aesthetics	−.23	−.01	.02	−.40	.28	.75
CAT - Romantic Disinterest	−.08	−.04	.01	.33	.22	.81
NEO - Actions	−.10	**−.30**	.00	−.32	.20	.75
NEO - Ideas	−.11	−.07	−.07	−.30	.27	.83
CAT - Unusual Experiences	.15	.04	−.10	.09	**.76**	.25
CAT - Unusual Beliefs	.12	−.17	−.16	.04	**.63**	.48
PID - Unusual Beliefs	.19	.02	.02	.00	**.62**	.41
PID - Perceptual Dysregulation	.20	.17	.19	.04	**.57**	.25
PID - Eccentricity	.13	.23	.21	−.01	**.54**	.34
CAT - Fantasy Proneness	.05	.26	.23	−.14	**.53**	.36
CAT - Peculiarity	.04	**.36**	.24	−.04	**.41**	.40
CAT - Self Harm	.03	.18	.20	.02	.21	.75

Note. Factor loadings ≥ |.30| are bolded. CAT = Computerized Adaptive Test of Personality Disorder-Static Form; PID = Personality Inventory for the *DSM-5*; NEO = NEO-PI-3 First Half. Loadings for methods factors not included in table.

Hierarchical Analyses

We used Goldberg's (2006) method for estimating hierarchical factor structures. This method involves the estimation of a series of factor models with an increasing number of factors, the factor scores of which are then correlated. The across-model correlations serve to estimate the paths between levels of the hierarchy. Following the same approach as above, all models were estimated in an ESEM framework with orthogonal method factors pertaining to each measure. Following an initial one-factor model on which all scales freely loaded, we estimated a series of orthogonal Geomin rotated models ranging from two to five factors. We used orthogonal factor rotation for the hierarchical models because unrelated factors maximize the interpretability of relations between adjacent levels of the hierarchy, as the cross-level paths from oblique solutions would not only capture the factors that emerge from a higher-order factor but also be influenced by the within-level covariation.

Figure 1 provides a graphical representation of the estimated trait hierarchy, including cross-level path estimates. Because of the large number of scales in these models, we restrict our description here to the strongest loading scales at each level (for a comprehensive list of factor loadings see Supplemental Appendix). The first two factors resemble the well-validated Internalizing and Externalizing "metafactors," with scales related to negative emotionality and affective dysregulation loading most strongly on the Internalizing factor. Scales related to antagonism, but also extraversion and risk-taking, loaded strongly on the Externalizing factor, whereas scales related to low conscientiousness, impulsivity, and hostility split their variance across the two factors. At the three-factor level, Detachment emerged from both higher-order factors, drawing content related to social withdrawal from Internalizing and negative loadings from extraversion and its maladaptive variations from Externalizing. In addition, NEO-PI-3FH Openness scales demonstrate moderate negative loadings. At the four-factor level Disinhibition emerged primarily from Detachment, but Negative Affectivity and Externalizing also contributed content. The strongest loadings come from NEO-PI-3FH Conscientiousness scales, as well as CAT-PD-SF Perfectionism, Irresponsibility, and Workaholism scales, along with PID-5 Perfectionism. At the final level of the hierarchy, Psychoticism emerged with little relation to the factors at the four-factor level.

The focus here is on the unfolding of factors up to the five-factor level given it is the retained model above and under consideration in *DSM-5* Section III; however, to ensure that lower levels of the hierarchy reflected more narrow constructs, we inspected the emerging factors up through eight factors. Consistent with expectations, new factors appearing at lower levels of the hierarchy were narrower in scope. For example, at the six-factor level an anger/hostility factor appeared, as described above; at the seven-factor level a more circumscribed Low Positive Emotionality factor emerged; finally, at the eight-

Table 2
Factor Intercorrelations From Oblique Factor Model

	I	II	III	IV	V
I. Antagonism	1.00				
II. Negative affectivity	.13	1.00			
III. Disinhibition	.06	.38	1.00		
IV. Detachment	.02	.18	.14	1.00	
V. Psychoticism	.33	.27	.23	.05	1.00

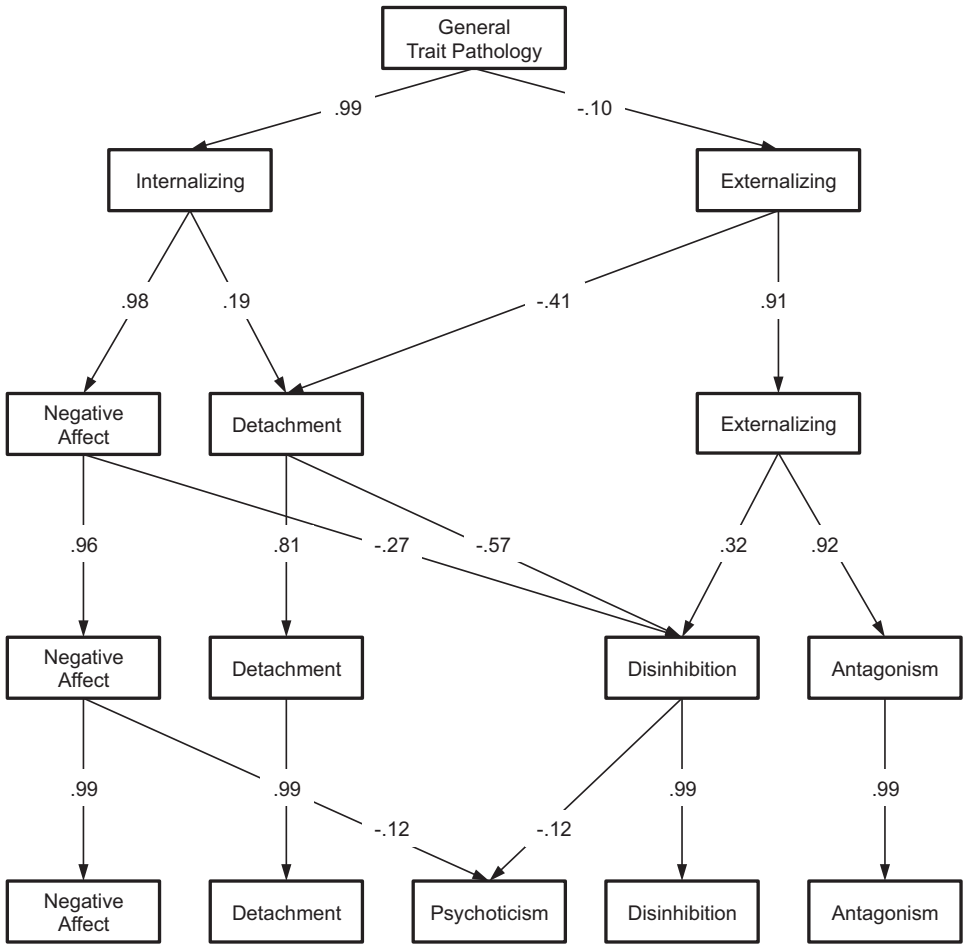

Figure 1. Correlations between superordinate and subordinate factors. Primary and secondary cross-level correlations presented when ≥ |.10|.

factor level an independent factor defined primarily by NEO-PI-3FH Openness scales emerged.

Discussion

We examined the structural relations among the CAT-PD, PID-5, and NEO-PI-3 trait models in an effort to inform ongoing questions related to comprehensive structural models of personality and its pathology. Investigating this structure at this juncture is pressing given that the multidimensional PD trait model proposed for *DSM-5* has been published in Section III of the manual, signaling the need for further research to evaluate the model. For the time being, the much-maligned categorical PD model in place since *DSM-III* is maintained in Section II until sufficient research is accumulated to support a transition to the proposed dimensional model or a variant thereof. Broadly, our findings speak to several key issues in the structural integration of pathological and normative traits, including points of convergence and divergence at the domain and facet levels, bipolarity of domains with maladaptive poles, and the hierarchy of superordinate traits above the primary domain level, while also highlighting areas in need of additional study. We briefly touch on each of these issues in our discussion.

We present the first structural analyses of the CAT-PD-SF scales in conjunction with other prominent trait models, and the results suggest that the measure converges well, particularly with the PID-5, in ways that are conceptually coherent. As expected, a five-factor solution provided the most compelling conjoint structure for these three measures. Although not especially surprising, given the known and/or designed structure of the selected measures, it is noteworthy that five factors were able to account for the majority of the variance in 88 scales of normal and abnormal traits. The interpretation of these factors was mostly unambiguous, but the specific patterning of facet-scale loadings revealed nuances that require further explication.

Some theoretical domains maintained a clear structure across measures, whereas others dispersed or cross-loaded. For example, all of the PID-5 Antagonism Scales and all but one of the NEO-PI-3FH Agreeableness had primary loadings on the same factor. The CAT-PD scales loading on this domain also were those intended to capture antagonistic behavior. Similarly, the

NEO-PI-3FH Conscientiousness scales formed the backbone of one domain. Yet some of the PID-5 and CAT-PD scales that measure disinhibited behavior demonstrated their strongest loadings on the Disinhibition domain, whereas others loaded more strongly on Antagonism. Namely, both PID-5 and CAT-PD-SF Risk Taking scales had their primary loading on Antagonism, which lends to an alternative interpretation of these domains as Externalizing and Constraint, as observed in other work (e.g., Morey et al., in press). Distinguishing the specific content of lower-order scales that splits among these domains remains a challenge requiring further study.

A number of interesting secondary loadings emerged for scales on the Disinhibition domain. Most notable were the PID-5 and CAT-PD-SF scales measuring Anhedonia and Depressivity. Interestingly, similar cross-loadings have been found in other structural analyses of the PID-5 (e.g., De Fruyt et al., 2013; Krueger et al., 2012; Wright et al., 2013), and they replicate here in the context of the NEO-PI-3FH and CAT-PD-SF scales, although the interpretation of this finding remains challenging. Additional secondary loadings on Disinhibition come from scales measuring emotional lability. These are easier to understand in the context of more detailed models of impulsivity (e.g., Urgency; Whiteside & Lynam, 2001).

It is noteworthy that the majority of NEO-PI-3FH Neuroticism scales tended to occupy interstitial spaces between two factors (e.g., Vulnerability, Angry-Hostility, Depression, Self-Consciousness) or shift their primary loadings (e.g., Impulsivity loads cleanly on Disinhibition), perhaps reflecting the fact that much if not all maladaptive content in the NEO's version of the FFM is contained within the Neuroticism domain. The present findings suggest that with greater measurement density of maladaptive personality features, these scales begin to disperse. Notably, we are not the only researchers to observe this phenomenon (see De Fruyt et al., 2013) but it is not always to the same degree (e.g., Markon et al., 2005).

With respect to the relation between Openness and Psychoticism scales, we found that scales intending to measure Psychoticism formed a clear factor, with only secondary loadings from Openness. The highest loadings from Openness scales were with the Detachment domain, giving it a resemblance to Digman's (1997) Beta. Others have observed Openness and Extraversion to join at the five-factor level in conjoint structural models of normative and pathological scales (e.g., Schroeder, Wormworth, & Livesley, 1992). This pattern also is consistent with conceptual articulations of avoidant personality disorder, which includes not only interpersonal avoidance, but also eschewing novel experiences and ideas (Alden et al., 2002).

We found clear evidence of bipolarity in the pattern of loadings on Disinhibition and Detachment, but less so for other domains. On the one hand, normal range and maladaptive scales keyed in the opposite direction (e.g., NEO-PI-3FH Agreeableness and PID-5 Antagonism) demonstrated opposite loadings on the same dimensions. On the other hand, it is not clear that this is sufficient for claims of bipolarity, insofar as it requires an assumption of conceptually opposite maladaptive content loading on the same dimension (e.g., Perfectionism vs. Irresponsibility). It is possible that not all domains can be truly evaluated for bipolarity in the model developed here. This is because we lacked scales that tap the maladaptive poles of certain domains (e.g., low Openness) and few (if any) scales of maladaptive agreeableness, and it is debatable whether a maladaptive opposite of Negative Affectivity exists (Widiger et al., 2009).

Hierarchical Analyses

The hierarchy of domains that emerged from these three measures is both highly consistent with previous work on maladaptive trait hierarchies and also distinct in certain ways. For instance, at the two-factor level, we found broad domains that reflect emotional dysregulation and dissocial behavior, which we labeled Internalizing and Externalizing respectively, given patterns of scale loadings that demonstrate clear links to the higher-order domains of psychopathology. Similar conclusions have been reached by others (e.g., Kushner et al., 2011; Morey et al., in press; Wright, Thomas, et al., 2012). Of note is that our results differ to some degree at this level from two prior studies that have combined a large number of normal range and maladaptive trait models (Markon et al., 2005; Watson et al., 2008). In previous models, the patterning of loadings at this level favored an interpretation more consistent with Digman's (1997) Alpha (Neuroticism, Conscientiousness, Agreeableness) and Beta (Extraversion, Openness). Here, however, the NEO-PI-3FH Openness scales had very low loadings on both factors, as did scales relevant to low Extraversion (e.g., CAT-PD-SF Emotional Detachment, Romantic Disinterest, and PID-5 Restricted Affectivity, Intimacy Avoidance). What differentiates prior conjoint analyses (Markon et al., 2005; Watson et al., 2008) and ours is that the predominance of scales from normal-range models, whereas our admixture of scales included grater saturation of pathology, likely driving the finding that the domains reflect Internalizing and Externalizing content. It has been argued that these two domains may serve as the natural integration point between PDs and clinical syndromes (Widiger & Simonsen, 2005). However, as structural models of psychopathology have expanded to include more diagnoses (e.g., Kotov et al., 2011; Markon, 2010; Wright et al., 2013), it appears that additional crosscutting dimensions reflected lower in the trait hierarchy are necessary to achieve a complete model.

The three-factor level is highly concordant with other studies that have found a "Big Three" of negative affectivity, dissocial/disinhibited behavior, and interpersonal detachment/low positive emotionality (e.g., Kushner et al., 2011; Markon et al., 2005; Morey et al., in press; Watson et al., 2008; Wright, Thomas, et al., 2012) and is reminiscent of Eyesenck's (1994) model which was intended to capture both normative and maladaptive individual differences. These dimensions also resemble the Big Three of the temperament literature (Clark & Watson, 2008; Rothbart, 2007; Tellegen, 1985), which provides a clear link to developmental theories often invoked in hypothesized etiological models of PD (e.g., Clarkin et al., 2006; Linehan, 1993). Our analyses differ from previous work in the cross-level pathways in that Detachment emerges from both Externalizing and Internalizing, with the larger pathway coming from Externalizing.

At the four-factor level, the results are mostly as we expected, with the emergence of a Constraint/Disinhibition factor that draws on content from Negative Affectivity, Detachment, and Externalizing. This particular patterns is highly consistent with "the consensual big four" (Widiger, 1998; Widiger & Simonsen, 2005) or maladaptive variants thereof. Again, the cross-level paths are

somewhat unexpected, which is difficult to fully account for, other than to note that the content of the newly emerging dimension is strongly infused by competence and achievement striving that is associated with negative affect and detachment. Finally, at the five-factor level a Psychoticism factor emerges, with little influence from the higher-order factors.

Hierarchical analyses such as these here serve to further clarify the trait structure and can help resolve differences across models. As Guilford (1975) noted, some discrepancies between personality models can be understood as reflecting different levels of generality, such that, depending on the specific mixture of observed indicators, factors may emerge in the same model that differ in their level of generality (e.g., Beta vs. distinct Extraversion and Openness; Externalizing vs. clearly differentiated Antagonism and Disinhibition/Constraint). The most appropriate level of generality will likely vary across situations and goals. For example, knowing a patient's level of Negative Affectivity is likely sufficient for determining psychopharmacological interventions (at this juncture), but psychotherapists are likely to require a more fine-grained understanding of the patient's pathology. Thinking hierarchically about an individual's expression of pathology likely will lead to more efficient assessment and treatment. Moreover, an understanding of hierarchies such as these hold promise for organizing mechanistic research on etiology and maintenance processes which have been hobbled by focusing on individual disorders that simultaneously encapsulate heterogeneous groupings of individuals and clearly share mechanisms with other supposedly distinct disorders.

Limitations and Future Directions

A number of limitations remain to be addressed with future research. Our use of self-report measures is consistent with the overwhelming majority of research on PDs (Bornstein, 2003) and personality traits more generally. However, moving forward it will be important to understand whether these structural models vary across informant and clinician report, and also develop and refine informant and clinician report versions of maladaptive trait measures suitable for clinical practice. Some of these efforts have begun with respect to the *DSM-5* model (Markon et al., 2013; Morey et al., in press) and are similarly planned for the CAT-PD model.

A general question for any structural model of personality and its pathology is whether all important constructs have received adequate measurement, the answer to which is almost always "no." Here we accounted for key prior limitations by including ample measurement of Psychoticism, and we used a variant of the NEO-PI-3, which is the most frequently used and well-studied measure of normal traits. Nevertheless, additional measures of normal and pathological range traits contain important information not in the current suite of scales. In particular, maladaptive affiliation lacks coverage in these analyses (e.g., Wright, Pincus, et al., 2012), and future work is needed to infuse structural modeling with such content. This has direct bearing on the issues of bipolarity and range, which can be evaluated only with scales hypothesized to tap more "extreme" behavior. However, it also is possible that normative and maladaptive traits may not reflect different points along a simple linear dimension, but rather differences in the dynamic processes in the behavioral manifestation of the traits (Wright, 2011).

A strength of the current study is that it uses a clinical sample with high rates of psychopathology. However, even among patient populations, some maladaptive behaviors are rare. Specifically, there was relatively low endorsement of the CAT-PD-SF Self-harm scale, which may have attenuated relations with the higher-order domains. High uniqueness for self-harm scales is common (e.g., Markon et al., 2005), and future research is warranted in samples with higher rates of self-harm. Because of the clinical importance of these behaviors, a scale for self-injurious behavior is indicated even if it may be structurally ambiguous. Finally, our analyses used the static CAT-PD measure, and therefore cannot speak to the performance of the adaptive form of the measure, although we would expect them to yield similar results.

Conclusion

A large body of scientific work supports the transition to a hierarchical multidimensional model to describe individual differences in the phenotypic manifestation of personality pathology. Including such a model as part of the *DSM-5* Section III PD model represents a first step toward adopting a scientifically defensible dimensional nosology of PDs. Looking ahead to future revisions of the manual, the current iteration of the new model provides an initial framework to empirically evaluate and refine. Toward this aim, we examined various structural questions related to the normative and pathological traits. Our results highlight strong convergence between the CAT-PD and PID-5 domains and to a large extent the NEO-PI-3 model as well. Finally, the results of the hierarchical analyses strengthen the argument for using broad dimensions that span normative and pathological functioning to scaffold a quantitatively derived phenotypic structure of psychopathology to orient future mechanistic research.

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