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The Hierarchical Structure of DSM-5 Pathological Personality Traits

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Abstract

A multidimensional trait system has been proposed for representing personality disorder (PD) features in DSM-5 to address problematic classification issues such as comorbidity. In this model, which may also assist in providing scaffolding for the underlying structure of major forms of psychopathology more generally, 25 primary traits are organized by 5 higher order dimensions: Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism. We examined a) the generalizability of the structure proposed for DSM-5 PD traits and b) the potential for an integrative hierarchy based upon DSM-5 PD traits to represent the dimensions scaffolding psychopathology more generally. A large sample of student participants (N=2,461) completed the *Personality Inventory for DSM-5*, which operationalizes the DSM-5 traits. Exploratory factor analysis replicated the initially reported five-factor structure as indicated by high factor congruencies. The two-, three-, and four- factor solutions estimated in the hierarchy of the DSM-5 traits bear close resemblance to existing models of common mental disorders, temperament, and personality pathology. Thus, beyond the description of individual differences in personality disorder, the trait dimensions might provide a framework for the metastructure of psychopathology in the DSM-5 and the integration of a number of ostensibly competing models of personality trait covariation.

In order to address various concerns with the personality disorder (PD) categories in use since the third edition of *Diagnostic and Statistical Manual of Mental Disorders* (DSM; APA, 1980), such as extensive comorbidity, arbitrary criterion cutoffs, and temporal instability (Widiger & Trull, 2007), a dimensional maladaptive personality trait system has been proposed to articulate individual differences in PD expression in DSM-5 (http://www.dsm5.org/proposedrevision/Pages/PersonalityDisorders.aspx). In addition to

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addressing problematic classification issues, the proposed DSM-5 traits may provide orienting dimensions for the structure of psychopathology more broadly. This is because underlying personality dimensions confer risk for psychopathology in coherent ways (e.g., neuroticism confers risk for diverse forms of behavioral dysfunction; Lahey, 2009). Here we evaluate the DSM-5 trait structure's suitability for this purpose by (a) testing whether the proposed structure replicates in an independent sample, and (b) exploring the hierarchical structure of the trait system. The latter exploration is important at this juncture given that, in previous DSM revision processes, concerns were expressed that various trait models might be incommensurate because they contain differing numbers of major trait dimensions and possibly tap different levels of the trait hierarchy (Widiger & Simonsen, 2005).

The proposed approach to PD diagnosis in the DSM-5 is a two-step process, with an initial determination of impairment in self and interpersonal functioning (Criterion A), followed by a description of the associated suite of pathological traits (Criterion B). These proposed personality traits were initially generated based on the expert opinions of the DSM-5 Personality and Personality Disorder Workgroup and Workgroup consultants (Krueger et al., 2011). A measurement instrument was created and vetted in a sample of individuals who had sought mental health care and a sample representative of the general U.S. population (Krueger et al., in press). Five dimensions emerged labeled Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism which bear close conceptual resemblance to the Big-Five/Five-Factor Model in personality research (Costa & McCrae, 1992; Goldberg, 1993), or maladaptive variants of these basic dimensions (the Personality Psychopathology-5 [PSY-5] model; Harkness & McNulty, 1994). The PD traits and dimensions proposed for use in the DSM-5 represent a shift in the nosology that has been called for since before DSM-IV's publication in 1994 (Clark, Livesley, & Morey, 1997). Reasons for not adopting a dimensional approach sooner were numerous, but chief among them was the large number of competing dimensional personality trait models articulated in the literature (APA, 2000; Widiger & Simonsen, 2005).

An additional effort underway in the development of DSM-5 is to establish an empirically defensible organization of mental disorders with a chapter order that places diagnostic domains in proximity to those domains with related features (http://dsm5.org/proposedrevision/Pages/proposed-dsm5-organizational-structure-and-disorder-names.aspx). This may ultimately result in a hierarchical structure with disorders nested in metaclusters that share similar underpinnings, etiology, and processes rather than relying solely on similar symptomatic features. For example, one such proposal (Andrews et al., 2009) would organize disorders in terms of neurocognitive impairment (e.g., dementia), neurodevelopmental problems (e.g., pervasive developmental disorder), a psychosis metacluster (e.g., schizophrenia, schizotypal PD), emotional disorders or an internalizing metacluster (e.g., unipolar depression, social phobia) and disinhibitory disorders or an externalizing metacluster (e.g., antisocial PD, substance dependence).

Hierarchies of functioning based on shared processes have a rich history in psychiatry (Achenbach, 1966; Kessler et al., 2011; Kendler et al., 2003; Krueger, 1999; Markon, 2010) and basic personality science (DeYoung, 2006; Digman, 1997; Markon et al., 2005). Among the earliest identified and most replicable solutions for the putative underlying structure of common mental disorders is based on internalizing and externalizing pathology (Achenbach, 1966; Krueger et al., 1999; Kessler et al., 2005 Kendler et al., 2003). Notably, when additional and more extreme forms of psychopathology are included in the models, additional dimensions or spectra of psychopathology such as psychoticism, pathological introversion, and antagonism are found (Kendler et al., 2011; Kotov et al., 2011, Markon, 2010; Roysamb et al., 2011). Widiger and Simonsen (2005) suggested that an integrative hierarchy of PD might contain spectra of Internalizing and Externalizing at the top, under

which would be situated broad dimensions of personality, and finally at the lowest level would be specific trait scales. If this kind of hierarchical model were viable, it could serve as the integrating bridge among personality pathology and syndromal disorders at the level of Internalizing and Externalizing spectra. This would join a large body of research that has convincingly demonstrated that disorders of all types (both PD and syndrome disorders) are related to basic personality (Andersen & Bienvenu, 2011; Kotov et al., 2010). Therefore, it is important to understand the hierarchy of DSM-5 traits to confirm that these established higher-order dimensions emerge, and to articulate the dimensional structure at lower levels of the hierarchy.

The Current Study

Our first aim was to determine whether the five-factor structure of pathological personality trait domains found by Krueger and colleagues (in press) replicated in an independently collected sample that differs demographically from the derivation sample. The second aim was to explore the hierarchical structure of these traits. The structure of the proposed DSM-5 traits at various levels of the hierarchy above the initially reported five-factor level (e.g., 2-factor, 3-factor, etc.) is currently unknown, and, as posited by Widiger and Simonsen (2005), it may be possible to organize spectra of Internalizing and Externalizing psychopathology at the top of a hierarchy that also contains maladaptive variants of the Big-5 traits at a lower level.

Method

Sample and Procedure

This study was conducted in the psychology departments of two large public universities in which 2,916 undergraduates completed self-report questionnaires online for course credit. Of these, 2,461 returned data with fewer than 10% missing items and scored lower than 2.5 standard deviations above the community average on a measure of random or careless responding (*Personality Assessment Inventory* Infrequency scale; Morey, 1991). This subsample was retained for the current analyses. The average age was 19.19 (S.D. = 1.92, range = 18–56); 67% (1652) were women; and 86% (2132) were Caucasian.[1] All participants consented to participate in this IRB-approved research study.

Measure

The *Personality Inventory for DSM-5* (PID-5; Krueger et al., in press), a 220-item questionnaire with a four-point response scale (0 *Very false or often false* to 3 *Very true or often true*), was used to measure the proposed DSM-5 traits. Seventeen (~8%) of 220 items are reverse coded; the majority of the items reflect greater levels of personality pathology. It has 25 primary scales that have been reported to load onto 5 higher-order dimensions. Krueger et al. (in press) provide psychometric details in large treatment-seeking and representative community samples. The descriptive statistics for the 25 primary scales in the current sample can be found in Table 1 of the online supplement. Cronbach's alpha (Median = .86; range = .72–.96) and McDonald's omega (Median = .75; range = .60–.89) suggest that the internal consistencies are adequate to good and the majority of variance of any scale is shared.

[1]Participants removed from analyses did not differ in age from those retained, although they did differ significantly on gender (41% vs. 32% male, respectively) and race (72% vs. 86% white, respectively).

Results

Factor Structure Replication

To examine whether the PID-5 factor structure replicates in an independent sample, we subjected the 25 primary scales to an exploratory factor analysis (EFA) and computed congruences with the resulting factors. EFAs were conducted in Mplus6.11 (Muthén & Muthén, 2011) using maximum likelihood estimation. To determine the appropriate number of factors to retain, we relied on theory and interpretability while also following empirical guides (bootstrapped confidence intervals around the eigenvalues of the correlation matrix, parallel analysis, model fit statistics). Empirical guides suggested 4- (parallel analysis), 5- (bootstrapped eigenvalues), or 6- (fit statistics) factor solutions, with the 5-factor solution providing the most clearly interpretable solution. Thus, five factors were retained and both varimax and target rotated to the solution reported by Krueger and colleagues (in press). The target rotated solution and the factor correlations are presented in Table 1. Factor congruency coefficients for the target (and exploratory) rotations were as follows: Negative Affect, .97 (.91); Detachment, .97 (.89); Antagonism, .99 (.80); Disinhibition, .96 (.82); and Psychoticism, .96 (.76). As previously observed (Krueger et al., in press), a number of scales (Depressivity, Perseveration, Restricted Affectivity, Risk Taking) significantly cross-load.

Structural Hierarchy of DSM-5 Personality Traits

The second goal of this study was to explore the hierarchical structure of the DSM-5 personality traits. We used Goldberg's (2006) method for estimating the hierarchical factor structure of a personality inventory. 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. We conducted a one-factor EFA followed by a series of Varimax rotated EFAs with two to five factors, and regression based factor scores were estimated for each solution. One to five factors were specified as five factors represents the upper bound associated with models in consideration leading up to the development of the DSM-5, as well as the maximum number of interpretable factors in the current data. The factor solutions used in the analysis of the PID-5 hierarchy can be found in the online supplement (Tables 2–4). Factor loadings with an absolute value of .40 and greater were used in the interpretation of these factors. We employed orthogonal factor rotation because unrelated factors provide the cleanest solution of relations between levels of the hierarchy as the cross-level paths from oblique solutions would capture not only the factors that emerge from a higher-order factor, but also be influenced by the within level covariation. Figure 1 illustrates the unfolding dimensional hierarchy and the estimated path coefficients. Paths with values > .10 are depicted in Figure 1. In the one-factor solution, each of the twenty-five primary facets loaded at > .40 with the exception of Submissiveness (.35), Attention-Seeking (.35), Grandiosity (.39), and Risk-Taking (.21), suggesting this single factor captures overall "personality pathology" well.

Two factors emerge from the general factor, labeled Internalizing and Externalizing based on the pattern of loadings. Depressivity, Perseveration, Anxiousness, Withdrawal, and Anhedonia among others load strongly on the factor labeled Internalizing, whereas the Externalizing factor is strongly marked by Manipulativeness, Deceitfulness, Attention Seeking, Grandiosity, Irresponsibility, Impulsivity, and Risk Taking, among others. Moving down the hierarchy to the three-factor solution, the Internalizing factor splits into factors labeled Detachment and Negative Affect, whereas the Externalizing factor maintains its structure. The Detachment factor was so named because the indicators with the highest loadings are Withdrawal, Anhedonia, Restricted Affectivity, Depressivity, and Intimacy Avoidance. The Negative Affect factor is marked by high loadings for Emotional Lability, Anxiousness, Perseveration, and Separation Insecurity. At the next level, Externalizing splits

to form the two factors labeled Antagonism and Disinhibition. These two factors join Detachment and Negative Affect, which maintain their structure across levels. Manipulativeness, Grandiosity, Deceitfulness, Callousness, Attention Seeking, and Hostility each load strongly on Antagonism. The Disinhibition factor is strongly marked by Impulsivity, Risk Taking, Distractibility and Irresponsibility. At the final level of the hierarchy, a Psychoticism factor emerges, marked by the scales of Eccentricity, Perceptual Dysregulation, and Unusual Beliefs.

Discussion

Our results demonstrate that the PID-5 factor structure found by Krueger and colleagues (in press) replicates well and is robust across samples. The five-factor structure is easily recognizable and best interpreted as maladaptive variants or pathological forms of the Big-Five factors (Harkness & McNulty, 1994): Negative Affect (Neuroticism), Detachment (low Extraversion), Disinhibition (low Conscientiousness), Antagonism (low Agreeableness), and Psychoticism (which may be linked to Openness; Piedmont et al., 2009).

Leading up to the development of the DSM-5 concern was expressed about the large number of seemingly competing dimensional models of personality/temperament. This concern is implicit in the text of the DSM-IV-TR, which states, “There have been many different attempts to identify the most fundamental dimensions that underlie the entire domain of normal and pathological personality functioning.” (APA, 2000, p. 689). Widiger and Simonsen (2005) suggested that a hierarchical integration of the disparate approaches with higher-order dimensions of Internalizing and Externalizing under which were located three to five broad dimensions might represent an acceptable solution. Our results suggest that the 25 proposed traits delineate a model that connects well with structures from various literatures at different levels of the hierarchy (e.g., common psychopathology, temperament, PD traits, Five-Factor Model).

The two-factor solution closely resembles the frequently replicated Internalizing and Externalizing dimensions of psychopathology (Achenbach, 1966; Kendler et al., 2003; Kessler et al., 2005; Krueger, 1999). These two dimensions are broadly recognized in psychopathology research across the lifespan capturing shared features and processes in common mental disorders. At this level of the hierarchy, the proposed traits appear to provide an integrative bridge between PD and many common clinical syndromes in DSM-5.

We interpret the three dimensional level of the hierarchy to be concordant with the “Big-Three” of the temperament literature (Clark & Watson, 2008; Eysenck, 1994; Rothbart, 2007; Tellegen, 1985), albeit their pathological manifestations. The Negative Affect factor mirrors the Big-Three’s Negative Temperament, the Withdrawal factor is akin to Positive Temperament, but reverse scored. Although broader in content, the Externalizing factor clearly shares content with Constraint (again reverse scored) in the form of Impulsivity, Risk Taking, and Irresponsibility, and is consistent with the Psychoticism factor from Eysenck’s (1994) model which, despite its name, is characterized by antagonism and low constraint. Thus, within the hierarchy of DSM-5 traits the “Big-Three” model of temperament might be well represented at the level with the same number of dimensions.

Factors at the four dimensional level of the hierarchy bear close resemblance to variants of the “pathological big-four” or pathological variants of the “consensus big-four” (Livesley, Jang, & Vernon, 1998; Widiger & Simonsen, 2005). Furthermore, the current structure accords well with empirical solutions from existing dimensional models of pathological personality traits, such as the DAPP-BQ which has factors labeled as Emotional

Dysregulation, Inhibitedness, Dissocial Behavior, and Compulsivity (Kushner et al., 2011; Livesley & Jang, 2009).

The final level of the hierarchy can be distinguished from the four-factor level by the emergence of the Psychoticism factor as a standalone dimension. These five factors are highly similar to the PSY-5 dimensions (Harkness & McNulty, 1994), which include a factor related to aberrant cognitions and oddity. Four of these five factors overlap with the four domains found by Markon (2010) in a comprehensive symptom level analysis of both Axis I and Axis II mental disorders. The primary distinction is that in Markon's (2010) study there was no clear bifurcation of externalizing disorders into Antagonism and Disinhibition, as is found here. The resemblance between the five-factor level of the hierarchy and maladaptive variants of the Five-Factor Model of normative personality is encouraging, particularly given the large literature relating PDs to this normative model (Samuel & Widiger, 2008; Wiggins & Pincus, 1989).

Implications for the DSM-5 Trait Proposal and Metastructure

The results of the current study have important implications because the constructs are direct articulations of those proposed for implementation in DSM-5. The current DSM-5 proposal suggests reordering the chapters of the DSM to more closely reflect empirical findings suggesting that the discrete categories currently recognized may be better represented by broad crosscutting spectra (e.g., anxiety disorders next to unipolar affective disorders; Bernstein, 2011). These spectra would represent, among other things, patterns of comorbidity, shared temperamental liability, common processes, and putatively shared genetic diatheses (Hyman, 2010). Moreover, some have suggested the organization could be hierarchical, with disorders nested within metaclusters (Andrews et al., 2009). The generally recognized clusters are composed of those disorders associated with psychotic features (e.g., schizophrenia spectrum), those disorders that share Internalizing features (e.g., depression, generalized anxiety disorder), and those that share Externalizing features (e.g., conduct disorder, substance abuse). In the hierarchy examined here, dimensions related to these metaclusters emerged at the two-factor level (i.e., Internalizing and Externalizing) and at the five-factor level (i.e., Psychoticism). Thus, it may be that the DSM-5 traits could serve the dual purpose of delineating the individual differences in PD while also providing the orienting dimensions for the manual's metastructure. This dimensional framework could serve to synthesize the symptom syndromes with personality pathology, an existing nosological distinction that much empirical work would suggest is perhaps illusory (Krueger, 2005).

However, there are complexities to the proposed restructuring and the hierarchy of DSM-5 traits that must be recognized. The results at hand suggest that Internalizing features might differentiate in to Negative Affect and Withdrawal, and Externalizing might be further differentiated in to Disinhibition and Antagonism. Taking into account studies which have modeled a broader sampling of disorders (Kessler et al., 2005; Kotov et al., 2011; Markon, 2010; Roysamb et al., 2011), the dimensions underlying psychopathology go beyond just Internalizing, Externalizing, and Psychoticism, and include dimensions which are related to Introversion (Markon, 2010) or Antagonism (Kotov et al., 2011). Thus, the distinctions observed here might be the result of a more comprehensive examination of variability in functioning; variability that has been under represented in studies that have focused primarily on syndromal disorders. At this time, these additional putative spectra are novel, and have not been subjected to replication, and therefore should be given cautious consideration.

Using the proposed trait structure as the foundation for an organizing meta-structure in DSM-5 raises the additional question of how to classify the PDs within a larger

metastructure. One approach would be to place the recognized PD types in their respective clusters. Although this follows the principle of using these broad trait dimensions as an organizing guide for classification, it ignores the shared core features linking PDs together—self and interpersonal dysfunction. An alternative approach would be to create a metacluster for PD revolving around the core self and interpersonal deficits, and use the traits to describe individual patients. Undoubtedly these issues are complex, and require more consideration before implementation. Nevertheless, this study offers promising initial evidence for the potential of the pathological personality traits to scaffold the larger structure of the DSM.

Limitations and Future Directions

The generalizability of these results is potentially limited by the use of self-report survey methodology. However, questionnaire and, more broadly, self-report based research is by far the most common method used in the study of personality pathology (Bornstein, 2003). It will be important to understand the ways these traits and this measure operate under informant-report condition, particularly with clinicians as the informants. Relatedly, to better understand how the PID-5 operates in clinical settings, it would be useful to sample individuals with known severe personality pathology. The use of a primarily non-clinical sample, as we have done here, may matter less when the focus of the analysis is on the covariation and structure of dimensional constructs (see O'Connor, 2002). Additionally, admission to college does not confer immunity to psychopathology and early adulthood is the developmental period in which psychopathology peaks (Kessler et al., 2005). However, it is possible that some of the most severely affected individuals may be censored in a non-clinical sample such as this. Ultimately, the DSM-5 is intended to be a clinical tool and it would be important to conduct studies examining the issue of trait structure in samples selected for severe personality pathology.

We interpret the patterns of factor loadings at each level of the hierarchy to demonstrate close conceptual similarity to many well-established models of personality, psychopathology, and temperament, but did not test these relationships directly. This association will be important to examine in future samples. In such work, it will be important to remember that the DSM-5 traits are unipolar and maladaptive in nature, which has important implications for resulting correlations with other models. The relation between adaptive and maladaptive variants of what are presumed to be the same content domain remains an understudied question. Patterns of associations among scales intended to measure the same domain but that differ in maladaptivity are often complex (Haigler & Widiger, 2001). Indeed, the lack of a strong empirical base and a clear understanding of what links adaptive and maladaptive trait models was instrumental in the decision to focus on maladaptive variants over normative ones in DSM-5 (Krueger et al., 2011), and the distinctions between normal and abnormal expressions of personality remains an important area for novel empirical explorations (Wright, 2011).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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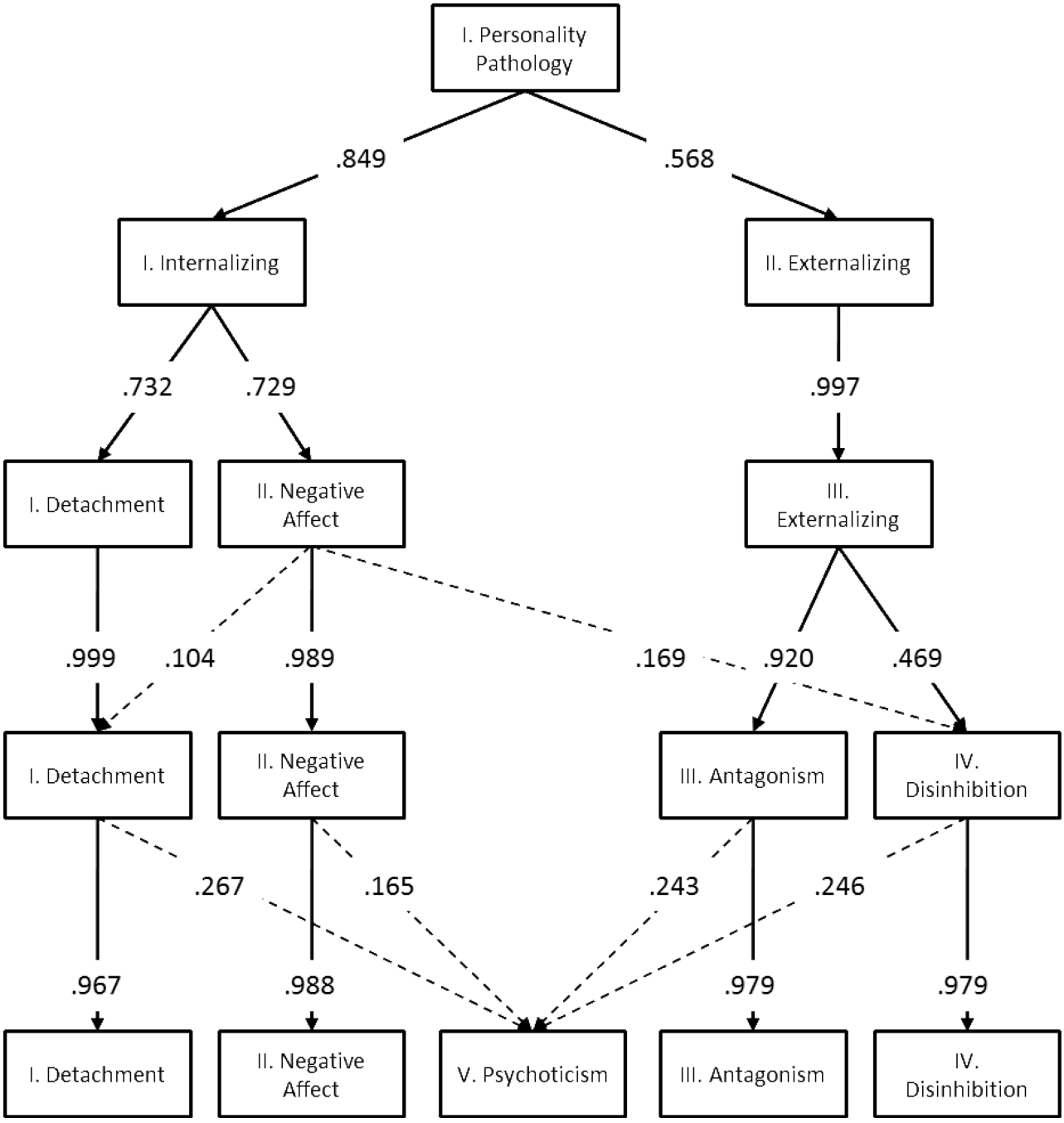

Figure 1.
Correlations between subordinate and superordinate factors. Numerical factor labels correspond to Tables 2–4 in the online supplement.

Table 1

Five-Factor Oblique Model Loadings and Factor Correlations

Facet	Negative Affect	Detachment	Antagonism	Disinhibition	Psychoticism	*Residual*
Emotional Lability	**0.696**	0.018	0.061	0.096	0.195	*0.347*
Anxiousness	**0.652**	0.294	0.039	0.018	0.138	*0.319*
Separation Insecurity	**0.599**	0.038	0.141	0.174	−0.007	*0.545*
Perseveration	**0.409**	0.177	0.097	0.124	**0.442**	*0.313*
Restricted Affectivity	**−0.420**	**0.488**	0.129	0.109	0.256	*0.468*
Submissiveness	0.358	0.130	0.092	0.076	0.006	*0.805*
Withdrawal	−0.068	**0.740**	0.026	0.078	0.229	*0.273*
Anhedonia	0.216	**0.700**	−0.113	0.394	−0.027	*0.198*
Depressivity	0.334	**0.535**	−0.107	**0.466**	0.057	*0.193*
Intimacy Avoidance	−0.201	**0.453**	0.009	0.122	0.232	*0.637*
Suspiciousness	0.212	0.358	0.192	0.155	0.189	*0.535*
Manipulativeness	−0.032	−0.052	**0.772**	0.109	0.072	*0.310*
Deceitfulness	0.046	0.113	**0.674**	0.320	0.037	*0.246*
Grandiosity	−0.106	0.041	**0.648**	−0.116	0.194	*0.493*
Attention Seeking	0.230	−0.363	**0.554**	0.141	0.100	*0.471*
Callousness	−0.176	0.356	**0.495**	0.265	0.083	*0.358*
Hostility	0.281	0.212	**0.420**	0.161	0.104	*0.484*
Impulsivity	0.030	−0.284	0.082	**0.621**	0.286	*0.353*
Irresponsibility	0.048	0.190	0.176	**0.528**	0.151	*0.421*
Risk Taking	−0.219	**−0.404**	0.166	**0.450**	0.215	*0.502*
Distractibility	0.282	0.060	−0.042	**0.448**	0.327	*0.406*
Rigid Perfectionism	0.345	0.173	0.295	**−0.396**	0.306	*0.539*
Eccentricity	0.099	0.078	0.013	0.160	**0.612**	*0.424*
Perceptual Dysregulation	0.107	0.160	0.047	0.162	**0.690**	*0.214*
Unusual Beliefs	−0.059	0.077	0.125	−0.039	**0.752**	*0.360*
Factor Correlations						
Detachment	0.173					
Antagonism	0.043	0.113				

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Facet	Negative Affect	Detachment	Antagonism	Disinhibition	Psychoticism	*Residual*
Disinhibition	0.085	0.171	0.263			
Psychoticism	0.249	0.287	0.353	0.437		

Note. N = 2461. Factor loadings of .40 and above are bolded.