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An Initial Investigation of the Joint Classification of Hypomania- and Neurodevelopmental Disorder-Relevant Dimensions within the Hierarchical Taxonomy of Psychopathology

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Abstract

We examined hierarchical structural models of psychopathology in samples of (a) adults recruited online and screened based on psychopathology history ($N = 429$) and (b) undergraduates ($N = 529$) to inform classification of neurodevelopmental disorder (NDD)- and hypomania-relevant dimensions within the Hierarchical Taxonomy of Psychopathology (HiTOP). Results differed across samples in some ways, but converged to indicate that some NDD- and hypomania-relevant dimensions aligned closely with different HiTOP spectra. For example, some hypomania-relevant dimensions (e.g., lability) overlapped strongly with the internalizing spectrum, whereas others (e.g., self-perceived charisma) were reverse-indicators of detachment. Examination of cross-sectional and prospective correlates for emergent factors also was informative in some ways. This included NDD-relevant and disinhibited externalizing dimensions associating robustly with treatment seeking history and recent experiences of distress. These results provide initial insights into classifying NDD- and hypomania-relevant dimensions within the HiTOP and indicate a need for future research in this area.

KEYWORDS: Hierarchical Taxonomy of Psychopathology; dimensional models; bipolar spectrum disorders; neurodevelopmental disorders; exploratory factor analysis

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The Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017) is an empirically-driven, dimensional classification system with the potential to address limitations of the *Diagnostic and Statistical Manual of Mental Disorders* (currently fifth edition; *DSM-5*; American Psychiatric Association [APA], 2013). Although a substantial literature has guided the classification of many symptom dimensions within broad domains such as internalizing and externalizing from a HiTOP perspective, classification of other symptom dimensions, including those associated with *DSM* neurodevelopmental disorders (NDD) such as attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD), remains unclear (Kotov et al., 2017; Zimmerman et al., 2021). The classification of other dimensions related to widely studied disorders such as bipolar spectrum disorders/hypomania also remains uncertain, representing another critical gap that limits the HiTOP's applicability for informing measure development efforts and clinical assessment (Kotov et al., 2020; Watson et al., 2021).

Extant Dimensional Research on Neurodevelopmental Disorder Classification

Research examining the dimensional NDD classification, for autism-relevant dimensions in particular is limited in scope. Notably, recent calls for reforming ASD diagnosis argue *against* conceptualizing ASD and other NDDs dimensionally, based in part on concerns that use of dimensional frameworks complicates categorical determinations of the presence or absence of ASD in research and practice, among other reasons (e.g., hindering research on mechanisms; Mottron, 2021). Acknowledging these perspectives, several recent studies indicate that some NDD-relevant features such as communication difficulties may be distinct from well-established HiTOP spectra (e.g., internalizing, detachment; Michelini et al., 2019; Stanton et al., 2021).

However, other features described as characteristic of ASD (e.g., social withdrawal) overlap closely with existing HiTOP spectra such as detachment (Micheline et al., 2019; Zimmerman et al., 2021). Furthermore, some structural models classify ADHD dimensions, which have been studied somewhat more widely than ASD in dimensional classification research, within externalizing rather than within a separate NDD spectrum (Andrews et al., 2009).

In addition to recent studies formally examining placement of NDD features within dimensional models, accounting for findings from other overlapping literatures is useful for informing hypotheses regarding classification of NDD-relevant dimensions within the HiTOP. For example, measures such as the Broad Autism Phenotype Questionnaire (BAPQ; Hurley et al., 2007) increasingly are used to assess dimensions (e.g., rigidity) relevant to ASD, and measures such as the Child Behavior Checklist (Achenbach, 1991) have long been used to assess NDD-relevant dimensions such as attention and social difficulties. Growing research examining ADHD-ASD comorbidity across development also indicates that emotion dysregulation and social difficulties are shared ADHD and ASD features, with these transdiagnostic dimensions potentially being useful targets for improving upon traditional, disorder-specific diagnostic and treatment approaches (England-Mason, 2020; Gadow & Garman, 2020; Mikami et al., 2019).

Other related research examining personality-psychopathology associations has informed the classification of many other forms of psychopathology (e.g., internalizing disorders, personality pathology) and offers insights into NDD classification as well. Two recent meta-analyses indicate that autism is positively associated with traits such neuroticism/negative emotionality, but negatively associated with openness, extraversion/surgency, agreeableness, conscientiousness, and associated traits such as effortful control (Chetcuti et al., 2021; Lodi-Smith et al., 2019; Stanton & Watson, 2016). Regarding ADHD meta-analytic research, both

ADHD inattentive and hyperactive/impulsive symptoms associate positively with negative emotionality, with inattentiveness and hyperactivity/impulsivity also showing notable negative associations with conscientiousness and agreeableness, respectively (Gomez & Corr, 2014; Jacobsson et al., 2021).

Although these literatures are informative in many ways, they still are at a more nascent stage than literatures examining the personality and transdiagnostic correlates of other forms of psychopathology (Jacobsson et al., 2021), and most of this research has focused on child and adolescent samples (England-Mason, 2020; Michelini et al., 2019). For example, Lodi-Smith et al. (2019) identified only 14 relevant studies examining autism-personality associations in their meta-analysis, and Chetcuti et al. (2021) identified 64 such studies. By comparison, meta-analytic research on internalizing-personality associations from over a decade ago was based on nearly 200 studies from adult samples alone (Kotov et al., 2010). Additionally, though there have been exceptions (e.g., studies examining distinct personality profiles for ADHD inattentiveness versus hyperactivity), much of this research reviewed focused primarily on composite global, NDD ratings in analyses. An exclusive focus on composite ratings may obscure distinct associations for different components of broader NDD domains (e.g., behavioral rigidity versus social difficulties associated with ASD) with personality and related constructs that would inform dimensional classification in more precise ways. Compounding this issue, although identifying shared associations with transdiagnostic dimensions such as negative emotionality is helpful to account for diagnostic comorbidity, elevated experiences of negative emotions and difficulties regulating them are linked to nearly every form of psychopathology to varying degrees (Clark & Watson, 2019; Stanton et al., 2020). As a result, direct examinations

of the placement of specific NDD dimensions within large scale structural psychopathology models would build significantly upon prior research informing classification.

Extant Research on Hypomania Classification from Dimensional Perspectives

Similar issues regarding classification continue to persist for hypomanic/manic symptom dimensions, which compared to disorders such as ASD, have been incorporated more extensively into psychopathology structure research (Kotov et al., 2017; 2020). Based on the evidence to date, hypomania is classified provisionally within the thought disorder spectrum (Kotov et al., 2020). However, a focus on general composite ratings of hypomania in prior research greatly limits understanding of classification (Forbes et al., 2021). The *DSM-5* hypomania criteria are particularly heterogeneous, as they include description of dimensions that may align most closely with several different HiTOP spectra (e.g., irritability with internalizing; distractibility and risk taking with disinhibited externalizing; grandiose delusions with thought disorder; APA, 2013).

Similar to research on NDD classification, research examining the personality correlates of hypomania-relevant dimensions provides insights into classifying distinct aspects of hypomania. First, some hypomania symptom and trait-relevant dimensions (e.g., tendencies toward experiencing mood swings and irritability assessed with measures such as the Hypomanic Personality Scale [HPS]; Eckblad & Chapman, 1986) appear to reflect specific aspects of negative emotionality. Other hypomania dimensions such as grandiosity and increased energy show distinctive positive associations with extraversion and reward seeking that are shared by only a few other forms of psychopathology (e.g., grandiose narcissistic traits; Kotov et al., 2020; Stanton et al., 2019; Watson et al., 2021). Even though hypomania is provisionally classified within thought disorder, these specific associations with extraversion and related constructs are not shared by other thought disorder dimensions (e.g., unusual beliefs, unusual experiences;

Kotov et al. 2020). Consequently, some specific hypomania dimensions such as increased energy may be differentiable from the thought disorder spectrum in some ways.

Current Study Goals and Contributions

Informing Classification of Neurodevelopmental Disorder- and Mania-Relevant Dimensions

Our primary aim was to address gaps in the HiTOP framework by informing classification of trait dimensions relevant to *DSM* diagnoses such as ASD, ADHD, and bipolar spectrum disorders. Our study included data from both samples of (a) adults recruited online who self-identified as having a current or past history of mental health issues and (b) undergraduates not screened based on any criteria. We refer to the sample of community adults as the “online community sample” going forward, and data from this sample were collected at two timepoints approximately 2 weeks apart. Given issues with examinations of psychopathology structures using composite disorder ratings (Forbes et al., 2021), we focused on assessing distinct trait dimensions using an array of self-report scales to assess NDDs, hypomania, and other psychopathology. With use of this self-report assessment approach, we refer to measures used here as indicators of traits relevant to hypomania and NDDs (e.g., “NDD-relevant”) rather than indicators of current symptoms exceeding traditionally-defined *DSM* disorder cutoffs. We are aware of little research jointly examining the factor structure of dimensions relevant to hypomania, ASD, ADHD, and other forms of psychopathology, such that this research represents an initial step toward informing classification of these dimensions in adulthood.

We sought to inform classification of NDD- and hypomania-relevant dimensions within the HiTOP at both broad (e.g., two-factor structures) and narrower levels of abstraction (e.g., specific factors reflecting different aspects of externalizing). Therefore, we examined hierarchical structural models, beginning by examining single factor models and proceeding to

examine models with an increasing number of factors. Timestamped, preregistered predictions for select aspects of these analyses are provided on the Open Science Framework page (<https://osf.io/hz7au/>). These predictions were made after completing data collection but before beginning analyses. Furthermore, timestamped predictions were made only for models ranging from five to seven factors, though we also provide predictions for models with fewer factors subsequently. The latter set of predictions were not preregistered because our initial manuscript submission focused on reviewing the results of models with the largest number of psychologically-meaningful factors (see Online Figure S1). However, upon considering reviewer feedback, we deemed this revised, more comprehensive approach of presenting the full results of hierarchical models more useful for informing hierarchical classification. Predictions described next apply to both samples, though these predictions were tentative given the lack of research examining the joint classification of NDD- and hypomania-relevant dimensions.

Structural Model Predictions. First, we predicted that most measures would load moderately to strongly onto a common factor when examining single-factor models. Second, we predicted that some hypomania-relevant dimensions such as affective lability would align with an internalizing factor in multifactor models. In contrast, other hypomania dimensions (e.g., excessive energy, confidence) were expected to load weakly onto internalizing given their positive associations with extraversion. Instead, we predicted that these dimensions would load strongly along with entitlement/grandiosity measures onto a broad externalizing factor that would be identified in models with two or more factors (see Online Figure S1 for predictions regarding the nature of externalizing trait dimensions in more nuanced models).

Progressing through predictions across hierarchy levels, an additional thought disorder factor was predicted to emerge in models with three or more factors based on existing research

(Kotov et al., 2017; 2020). Hypomania-relevant dimensions such as self-perceived creativity (e.g., “intense periods of insight”) were hypothesized to overlap meaningfully with both thought disorder and externalizing. Next, we predicted that a fourth detachment factor would emerge when extracting an additional factor. Measures of some ASD dimensions include content (e.g., “do not enjoy being around others”) very similar to that of detachment measures, leading to the prediction that these autism-relevant measures would load strongly onto detachment across models with four or more factors. Other NDD-relevant, ADHD dimensions were expected to align closely with externalizing indicators across levels of analysis (Andrews et al., 2009). We also anticipated that some NDD dimensions (e.g., inattentiveness, rigidity) would overlap with internalizing given strong NDD-negative emotionality associations (e.g., Gomez & Corr, 2014).

Finally, Online Figure S1 provides detailed predictions for all primary measure factor loadings across five- to seven-factor structures as noted. As shown in this figure, we predicted being able to identify at least five well-defined factors reflecting internalizing, thought disorder, detachment, disinhibited externalizing, and antagonistic externalizing. When extracting six factors, we tentatively predicted that some NDD-relevant indicators (e.g., communication difficulties, hyperactivity) would load strongly onto a distinct, NDD-relevant factor based on prior research (e.g., Michelini et al., 2019). Finally, should a seven-factor model be tenable, hypomania-relevant dimensions reflecting tendencies toward being energetic and charismatic were predicted to emerge as indicators of a distinct seventh-factor due to showing distinctive extraversion associations in prior research.

Examining the Clinical and Symptom Associations for Different Spectra Dimensions

A second study aim was to explicate patterns of associations for emergent dimensions with self-report measures of (a) clinical ratings relevant to treatment planning (e.g., past

hospitalizations for mental health concerns) and (b) internalizing and hypomanic symptoms. We could not examine associations for factors from all levels of our hierarchies and therefore focused on examining associations for factors from models with the largest number of interpretable dimensions (anticipated to be a model with up to seven factors). This approach enabled us to determine the extent to which more specific, homogeneous dimensions (versus broader dimensions from models with fewer factors) showed distinctive patterns of correlates.

Predictions for Factor Associations. Acknowledging that resulting factor structures may not align with our predictions, Online Table S1 (cross-sectional correlates) and Online Table S2 (online community sample prospective correlates) provide full sets of expected associations for dimensions from the seven-factor model. Although we cannot review every predicted association in detail here, we review general patterns of predictions and provide illustrative examples of anticipated associations. First, all factors were expected to show robust clinical correlates in many cases; thus, we were most interested in determining the extent to which some factors showed stronger overall patterns of associations than others. For example, we predicted that factors reflecting thought disorder and internalizing would display stronger associations than other factors with current functional impairment, quality of life, and treatment seeking history. In contrast, antagonistic externalizing was expected to show relatively weak associations with these variables. However, antagonistic and disinhibited externalizing were expected to show stronger associations than other factors with (a) histories of externalizing behaviors (e.g., lifetime arrests) and (b) ratings corresponding with these domains from the online community sample follow-up assessment (e.g., past week substance use; missed appointments).

Method

Study Samples and Procedure

The first sample of participants ($N = 429$) were adults (age 18+) recruited through the Prolific crowdsourcing platform. Prolific includes screening filters, and only participants from the US who endorsed being currently or previously diagnosed with a mental health disorder were eligible to participate. Past and/or current diagnoses were based on participants' self-identification in the Prolific system rather than through verification from a professional, but we still anticipated that participants would report relatively extensive histories of psychopathology and treatment seeking. Consistent with this, over half of the sample reported currently taking psychiatric medication, with roughly 1/3 of the sample receiving current psychotherapy. Most participants ($N = 377$; 87.8%) also completed the second assessment (M completion interval = 13.7 days, $SD = 1.3$). Second, undergraduate participants ($N = 529$) were recruited through the Psychology Department subject pool at a large Southern university. Undergraduates were not screened by mental health history or any other criteria. See Table 1 for demographic information for both samples. From here on, we refer to the initial assessment from both samples as "Time 1" and the follow-up assessment in the online community sample as "Time 2."

Measures

Measures of Psychopathology Dimensions Included in Study Factor Analyses

All measures described in this subsection were administered across samples and timepoints. Our assessment strategy did not provide comprehensive coverage of all specific trait dimensions previously identified as indicators of well-established HiTOP spectra, which prevented us from comprehensively delineating hierarchical trait structures. However, we used scales from a range of measures to assess dimensions representative of core HiTOP domains as well dimensions related to NDDs and hypomania.

First, we administered select scales from the Comprehensive Assessment of Traits Relevant to Personality Disorder (CAT-PD; Wright & Simms, 2014). Participants responded to the CAT-PD items using a 5-point scale ranging from 0 (*very untrue of me*) to 4 (*very true of me*), and we administered scales providing coverage of the HiTOP internalizing, detachment, thought disorder, disinhibited externalizing, and antagonistic externalizing spectra. Kotov et al. (2017) describe these five dimensions as reflecting broad spectra that account for the covariation of more specific symptom dimensions based on extant research, though other spectra have been recognized as provisional and requiring further study (e.g., a somatoform spectrum; see Figure 3 of Kotov et al., 2017; Kotov et al., 2020). We included at least several CAT-PD measures to model each of these spectra, with a focus on assessing specific dimensions consistently identified as facets of each spectrum (Kotov et al., 2017; Stanton et al., 2020). Specifically, CAT-PD Anxiousness (7 items), Depressiveness (6 items), and Affective Lability were included as internalizing indicators; Emotional Detachment (7 items), Social Withdrawal (6 items), and Romantic Disinterest (6 items) were selected for coverage of detachment; Unusual Beliefs (7 items), Unusual Experiences (7 items), and Fantasy Proneness (6 items) were included to assess thought disorder; Irresponsibility (7 items), Non-Perseverance (6 items), and Non-Planfulness (6 items) as disinhibited externalizing indicators; and finally, CAT-PD Grandiosity (7 items), Callousness (7 items), Manipulativeness (6 items), and Exhibitionism (6 items; which also may be a reverse detachment indicator; Kotov et al., 2017) to assess antagonistic externalizing.

Next, hypomania-relevant dimensions were assessed using the HPS (Eckblad & Chapman, 1986), a widely used measure assessing traits related to mania proneness. Participants responded to the HPS items using a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Guided by factor analytic research administering the HPS in this format (Stanton et al., 2019),

we scored HPS Activation (9 items; e.g., “get so excited I cannot stop talking”), Charisma (8 items; e.g., “life of the party”), Intellectual Confidence (7 items; e.g., “have periods of insight”), and Mood Lability (7 items; e.g., “moods change frequently”) scales.

Measures administered to assess NDD-relevant dimensions included the 18-item Adult ADHD Self-Report Scale (ASRS; Stanton et al., 2018; Matza et al., 2011), and we used ASRS Inattentiveness (9 items), Motor Hyperactivity/Impulsivity (5 items; e.g., “often feel fidgety”), and Verbal Hyperactivity/Impulsivity (4 items; e.g., “talk excessively”) scale scores for analyses. Rather than participants responding to whether or not they had experienced symptoms using a checklist format (i.e., yes/no responses), participants rated the extent to which they had been experiencing ADHD symptoms over the past year on a 0 (*never*) to 4 (*very often*) scale, consistent with the ASRS administration instructions. Although the ASRS assesses symptoms, scores appear as stable as those for measures of many other trait dimensions (e.g., test-retest coefficients near .90 over 2-week intervals; Gomez & Corr, 2014; Matza et al., 2011). Trait dimensions relevant to autism were assessed with the BAPQ (Hurley et al., 2007), which has been cited over 500 times as of August 2021 and is used to assess phenotypic dimensions relevant to autism, including Aloofness (12 items; “prefer to be alone”), Pragmatic Language Difficulties (e.g., “talk too much about certain topics”), and Rigidity (12 items; “strong need for sameness in my routines”).

Finally, participants were administered the 10-item Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993) and an 8-item version of the Drug Use Survey (Clark & Watson, 1999) to assess substance use. The AUDIT assesses alcohol use and potential consequences of alcohol use over the past 12 months. The DUS provides an assessment of the

lifetime history of use for a range of substances (e.g., cannabis, amphetamines) on a 7-point scale ranging from 0 (*Never*) to 6 (*40+*), with ratings for each item summed to create a total score.

Measures of Symptoms and Other Clinically-Relevant Variables

Clinically-Relevant Items Administered to Both Samples at Time 1. Participants completed items assessing different aspects of their mental health histories (see Online Table S3), including lifetime number of hospitalizations due to mental health issues, average physical pain (on a 0-10 scale; higher scores indicate more pain), and the number of times previously having sought substance use treatment. Participants also indicated their lifetime number of arrests, speeding tickets, being fired from a job, and having stolen something. Furthermore, participants completed items from the Single-Item Global Measures of Severity (Zimmerman et al., 2006) assessing mental health impacts on quality of life (rated on a 0 [*very good*] to 4 [*very bad*] scale) and functional impairment (rated on a 0 [*not at all*] to 4 [*extremely*] scale).

Additional Clinically-Relevant Items Administered to the Online Community Sample Participants at Time 2. At Time 2, online community participants also completed items assessing past week behaviors including number of times getting drunk (0-7 scale, with a score of 7 equaling all 7 days), using substances to get high (0-7 scale), number of arguments with others, and how many times they were late for an appointment or work (see Online Table S3). Participants also provided information regarding the occurrence of other past week events including how many times they were so upset that they cried, number of nights experiencing sleep difficulties (0-7 scale), and how many times they experienced a panic attack (described to participants as sudden experiences of physiological symptoms related to anxiety). We recognize that participant responses to these items may be influenced by their subjective interpretations (e.g., variation in what constitutes a “panic attack”). Still, these past week events commonly are

assessed in treatment settings and may provide insights into participants' subjective experiences (e.g., reporting many past week arguments would reflect self-perceived social difficulties).

Symptom Measures Administered Across Samples and Timepoints. Lastly, participants completed select scales from the Expanded Version of the Inventory of Depression and Anxiety Symptoms (IDAS-II; Watson et al., 2012), with participants in the online community sample also completing these measures at Time 2. This included the IDAS-II Dysphoria (10 items; e.g., “felt depressed”), Social Anxiety (6 items), Mania (5 items; “thoughts jumped rapidly”), and Euphoria scales (5 items; e.g., “so much energy it was hard to sit still”). Participants indicated how much they experienced symptoms over the past 2 weeks using a 5-point scale ranging from 1 (*not at all*) to 5 (*extremely*). Scores from the IDAS-II scales were not included in our factor analyses due to these scales assessing recent symptom experiences, whereas measures included assessed trait tendencies or more extended symptom experiences.

Results

Descriptive Statistics

Online Table S3 provides measure descriptive statistics. Mean score differences across online community sample timepoints were trivial (i.e., effect size differences $< .20$). Internalizing, detachment, and disinhibited externalizing scores generally were higher in the online community sample than the undergraduate sample, as anticipated. However, undergraduates reported higher average scores for measures assessing exhibitionism and some hypomania-relevant measures (e.g., $d = -.67$ for HPS Activation for Time 1 comparisons).

Overview of Primary Study Analyses

As reviewed previously and described in Online Appendix S1, there were several deviations from our preregistered analyses (again, see <https://osf.io/hz7au/>). Deviations relevant

to primary analyses included (a) using exploratory structural equation modeling (ESEM) rather than a purely exploratory factor analytic approach to examine factor models at different levels of hierarchies and (b) removing a series of multiple regression analyses examining associations for emergent factors. Online Tables S4 and S5 provide correlation matrices for variables included in the ESEMs that were conducted to delineate hierarchical psychopathology structures. A maximum likelihood robust (MLR) estimator was used for ESEMs, with factors rotated using an oblique geomin rotation. Across models, indicators were allowed to load onto all factors, though constraints were added for select analyses evaluating Time 1 to Time 2 model similarity. Although we considered a confirmatory factor analytic (CFA) approach given our tentative predictions regarding the nature of factor structures, we opted for using ESEM because use of CFA would have required adjudicating amongst many different models varying in their loading specifications (e.g., many different combinations for specifying loadings for four hypomania-relevant ratings in tandem with specifying loadings for six NDD-relevant measures).

We followed a hierarchical (“bass-ackwards”) approach by beginning with single-factor ESEM models and continuing to examine models with an increasing number of factors. We ceased extracting additional factors once models included one or more poorly defined or difficult to interpret factors. We considered factors well-defined if they had three or more indicators with primary loadings $\geq .40$ and cross-loadings of $\leq .30$ (Clark & Watson, 2019). We recognize that other criteria could be used for evaluating loadings in addition to these general benchmarks, and we also consider other information (e.g., various model fit indices), as described subsequently. However, an overreliance on model fit indices with ESEM approaches can lead to overfactoring (i.e., fit improving with more factors even when more complex models include poorly defined

factors; Montoya & Edwards, 2021), and the presentation of our results provides information for models varying in complexity rather than focusing on identifying a single “best” model.

Keeping these issues in mind, recent simulation research indicates that the following model indices may be useful for informing the maximum number of ESEM/EFA factors to extract (Finch, 2020): The confirmatory fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean squared residual (SRMR). Values $\leq .08$ often are interpreted as indicating acceptable fit for RMSEA and SRMR, as are CFI and TLI values $\geq .95$ (Finch, 2020; Montoya & Edwards, 2021), though cutoffs often are relaxed (i.e., CFI and TLI values $\geq .90$; RMSEA $\leq .10$; Hopwood & Donnellan, 2010). Change in CFI (i.e., $\geq .01$) often is used for comparing models differing in factor number, and we also consider changes in RMSEA of $\geq .015$, which may be more informative than other methods of comparison when using ESEM (e.g., chi-square difference testing; Bayesian Information Criterion comparisons; Finch, 2020). To provide a comprehensive understanding of variable interrelations, we did not make analytic modifications that could be used to improve model fit (e.g., removing specific variables from analyses). Related to this, even when using a flexible ESEM approach, we anticipated that fit would be poor for models with few factors, as these models would fail to account for psychopathology heterogeneity. Additionally, we took into account results of parallel analyses using principal components, which also can be used to inform the maximum number of ESEM factors to extract (Finch, 2020). Finally, we examined emergent factors’ correlates with external variables (e.g., hospitalization history) after evaluating ESEMs.

Results of Hierarchical Structural Analyses

Solutions with Three or Fewer Factors Across Samples at Time 1

Due to the detailed descriptions presented for different models, Table 2 provides general summaries for how all subsequently described results inform psychopathology classification. Parallel analyses suggested that up to four and five factors could be extracted in the Time 1 online community and undergraduate data, respectively. Additionally, Table 3 provides model fit indices. Values for CFI increased substantially (i.e., increases $\geq .10$) across all one- to three-factor models comparisons (e.g., when comparing single- to two-factor models), with RMSEA values decreasing by $> .015$ in all cases. Still, overall fit was very poor for 1-3 factor models according to most indices. As described next, results also varied across samples in some ways regarding factor loading patterns and the maximum number of well-defined dimensions that could be identified, precluding stringent evaluations of multigroup invariance. However, to provide an efficient, basic examination of cross-sample factor correspondence, congruence coefficients are presented. Coefficients $\geq .95$ indicate strong similarity, and coefficients between .85 and .94 indicate fair similarity (Lorenzo-Seva & ten Berge, 2006).

Acknowledging these issues, Figure 1 depicts hierarchical factor structures from each sample. Figure 1 pathway coefficients represent correlations between factors across hierarchy levels (e.g., from one- to two-factor models), with regression-based factor scores used to model factors. Beginning with single-factor solutions, most scales loaded moderately to strongly (e.g., CAT-PD Lability, ASRS Inattentiveness loaded $> .70$ across samples) onto a common factor that was similar across datasets (congruence coefficient = .96).

Second, Online Table S6 provides two-factor model loadings and interfactor correlations. Many scales loaded strongly onto an *Instability* factor, including ADHD indicators, BAPQ Pragmatic Language Difficulties, and HPS Mood Lability (loadings $\geq .50$). Scales such as HPS Charisma and BAPQ Aloofness loaded strongly (i.e., loadings $> |.60|$, though in the opposite

direction) onto a second *Detachment* factor. Congruence coefficients indicated fair similarity in cross-sample loadings (coefficients = .88 and .90 for Instability and Detachment, respectively). Note that for the undergraduate sample in this case, and in some other models examined subsequently, the direction of loadings for indicators such as HPS Charisma was positive rather than negative on factors reflecting detachment. However, we use the label Detachment when describing factors for consistency and clarity (rather than using two labels interchangeably to refer to the same basic factor representing Detachment/social engagement).

Next, Online Table S7 provides factor loadings and interfactor correlations for three-factor models. The first two factors in both samples again were labeled *Instability* and *Detachment* (pathway coefficients for these factors were $> |.75|$ with factors with the same labels from the two-factor solution). The Instability (congruence coefficient = .96) and Detachment (congruence coefficient = .91) factors from these three-factor structures showed strong and fair cross-sample congruence. Lastly, measures such as CAT-PD Unusual Beliefs and CAT-PD Manipulativeness and Grandiosity all loaded strongly (loadings $> .60$) on the third factor labeled *Antagonism/Thought Disorder* in the undergraduate dataset. The third factor from the online community dataset was labeled *Antagonistic Externalizing* (CAT-PD Manipulativeness, Callousness, and Grandiosity loadings $> .60$), as measures such as CAT-PD Unusual Beliefs did not load strongly onto the online community sample Antagonistic Externalizing factor. As a result, loadings for these factors showed weak congruence (congruence coefficient = .70).

Solutions with Four or More Factors Across Samples

Fit improved when extracting a fourth factor across samples (e.g., CFI improvement $> .03$ across samples), though some indices (i.e., CFI, TLI) still indicated poor overall fit. Values for SRMR indicated good fit (.050 in the undergraduate data and .045 in the online community data

at Time 1; see Table 3), and RMSEA values met relaxed fit cutoffs (i.e., $\leq .10$; however, RMSEA change was $< .01$ from three-factor models across samples).

Factor loadings and interfactor correlations for the four-factor structure from the undergraduate data are provided in Table 4. As shown in Figure 1, *Detachment* and *Antagonism/Thought Disorder* factors essentially carried over from the three-factor model (both pathway coefficients = .99). Scales previously loading strongly onto Instability split to load strongly onto *Internalizing* (pathway coefficient = .93 with Instability from the three-factor model) and *Disinhibition/Communication* (pathway coefficient = .89) factors. This latter factor was given this label because disinhibition trait measures (e.g., CAT-PD Non-Perseverance), (b) BAPQ Pragmatic Language Difficulties (e.g., “voice is monotone”), and (c) all ADHD measures loaded strongly onto this factor (e.g., ASRS Verbal Hyperactivity/ Impulsivity; all loadings $\geq .57$). Notably then, most, but not all, NDD-relevant indicators loaded strongly onto this factor. Regarding other NDD- and hypomania-relevant measures, BAPQ Aloofness and HPS Charisma continued to load strongly onto Detachment as in prior models. However, HPS Intellectual Confidence and BAPQ Rigidity did not have overly strong loadings on any single emergent dimension as the Table 4 results indicate.

Online Table S8 provides factor loadings and interfactor correlations for the Time 1 online community sample four-factor structure. *Detachment*, *Internalizing*, and *Antagonism/Thought Disorder* (CAT-PD Unusual Beliefs now loaded .57 on this factor) factors emerged in this model. Congruence coefficients indicated strong loading similarity for the Detachment and Antagonism/Thought Disorder factors with their respective undergraduate factors (coefficients = .97 and .95, respectively), with fair similarity for Internalizing (coefficient = .89). We labeled the remaining factor *Disinhibited Externalizing*, which represented a counterpart to the

Disinhibition/Communication factor from the undergraduate data to some extent (congruence coefficient = .91). However, ASRS Motor and Verbal Hyperactivity/Impulsivity had comparatively weaker loadings on this factor in the online community data (loadings = .44 and .34, respectively) than in the Table 4 undergraduate results, where both loadings > .60.

Next, although parallel analysis suggested that five factors could be extracted in the undergraduate data and model fit improved meaningfully in some ways (CFI > .93 when comparing four- to five-factor models; Table 3), only one measure (CAT-PD Irresponsibility) had its strongest loading on the fifth factor. This model was thus deemed untenable and not considered further, and these issues persisted for models with more than five factors.

Parallel analysis indicated that only up to four factors could be extracted in the online community dataset, but models with five or more factors were examined to determine their viability. For the five-factor model shown in Table 5, both RMSEA (.078; improvement of .016 from the four-factor model) and SRMR (.037) indicated at least acceptable fit. The CFI value (.891) improved by .061 from the four-factor model but was still slightly below cutoffs indicating acceptable fit, and TFI (.834) still indicated poor fit. When considering factor interpretability, several or more scale indicators were clear markers (i.e., primary loadings $\geq |.40|$ and cross-loadings $\leq |.30|$) of all five factors. Therefore, given RMSEA and CFI improvements and all factors appearing psychologically-meaningful and well-defined, we considered this to be sufficient evidence overall to consider this five-factor model further.

As shown in Figure 1, *Detachment*, *Disinhibited Externalizing*, and *Internalizing* again were identified when examining this five-factor model (all pathway coefficients $\geq .97$ with corresponding four-factor model factors). Many of the same scales loaded strongly onto factors essentially carrying over from the four-factor model (e.g., HPS Liability on Internalizing; BAPQ

Aloofness on Detachment; ASRS Inattentiveness on Disinhibited Externalizing). The factor labeled *Antagonistic Externalizing* also was closely connected with Antagonism/Thought Disorder from the four-factor model (pathway coefficient = .98). We altered the label for this factor slightly because scales such as CAT-PD Unusual Beliefs that were clear indicators of Antagonism/Thought Disorder in the four-factor model had notable cross-loadings (i.e., loading = .34) on an emergent *Hypomanic Activation* factor from the five-factor model. Relatedly, CAT-PD Unusual Experiences loaded most strongly (although weakly, loading = .35) on Hypomanic Activation. The factor label Hypomanic Activation was chosen because HPS scales (i.e., HPS Activation and Intellectual Confidence) assessing high energy and goal directed activity linked to extraversion were clear factor markers. Additionally, CAT-PD Fantasy Proneness (e.g., “imagination can run wild”) loaded strongly onto this factor (loading = .62). Lastly, regarding NDD measures, BAPQ Rigidity and BAPQ Pragmatic Language Difficulties were relatively clear indicators of Detachment and Disinhibited Externalizing, respectively (both primary loadings $\geq .40$; no cross-loadings $\geq |.30|$). However, ASRS Motor Hyperactivity/Impulsivity and ASRS Verbal Hyperactivity/Impulsivity did not load overly strongly on any factor (highest loadings = .36 and .32, respectively on Disinhibited Externalizing).

Finally, examination of a six-factor structure in the online community data yielded some modest overall model fit improvement (e.g., RMSEA decrease of only .005). Furthermore, only two scales, ASRS Motor Hyperactivity/Impulsivity and ASRS Verbal Hyperactivity/Impulsivity, were clear indicators (i.e., both primary loadings $\geq .40$; no cross-loadings $\geq |.30|$) of the second factor. This provides some evidence of the distinctiveness of these symptom dimensions, but other factors in this model also were narrowly defined (e.g., only two clear markers for

Antagonistic Externalizing). These issues with poor factor definition were exacerbated when extracting seven or more factors, and we do not consider models with six or more factors further.

Factor Similarity Across the Time 1 and Time 2 Online Community Assessments

Initial Time 2 ESEM analyses used only Time 2 data to obtain a general sense of the extent to which the overall patterns of results mirrored those from Time 1. Parallel analysis indicated that up to four factors could be extracted in the Time 2 data. Values for RMSEA were lower than relaxed cutoffs of $\leq .10$ in models with four or more factors, and SRMR indicated good fit for models with three or more factors as shown in Table 3. Values for CFI and TLI indicated poor fit for Time 2 models ranging from one to five factors.

Online Tables S6-S9 provide unconstrained factor loadings (i.e., not constrained to equality with Time 1) for Time 2 models with two- to five-factors (most scales had moderate to strong loadings when examining a single-factor model). Examination of Time 2 models ranging in complexity indicated that the nature of factors and factor loadings closely paralleled those from the Time 1 online community data. For example, a maximum of five interpretable factors could be identified in the Time 2 data, with factors appearing to align with those from Time 1 (i.e., Hypomanic Activation, Detachment, Disinhibited Externalizing, Internalizing, and Antagonistic Externalizing factors). Similar to the Time 1 results, models with six or more factors were untenable due to some factors lacking a sufficient number of scale markers and being difficult to interpret. Also paralleling the Time 1 data, improvements in fit when extracting a sixth factor were modest (e.g., RMSEA decrease of only .004).

Due to the apparent similarities across time points regarding the number and nature of factors, we proceeded to conduct formal examinations of temporal invariance. Specifically, we compared (a) models where the only model restriction involved holding the number of factors

constant across timepoints with (b) models where both factor loadings and indicator thresholds were constrained to equality. These comparisons required accounting for the participants being readministered the same measures by correlating residuals for factor indicators across timepoints (Nixon et al., 2020). Table 3 provides fit indices for initial comparison models where only the number of factors were held constant. Model fit was acceptable to good according to most indices (e.g., RMSEA < .06) for these baseline models with three or more factors leveraging data from both timepoints. Even though model fit was poor for models with only one or two factors, we still conducted examinations of invariance for all models ranging from one to five factors to determine invariance across factor hierarchy levels. For all levels, models where both factor loadings and thresholds were constrained to equality across timepoints met very stringent criteria for invariance (i.e., CFI decreases $\leq .002$; RMSEA increases $\leq .007$; Meade et al., 2008) when compared to models where only the number of factors were held constant.

Factor Associations with Other Study Variables

Overview and Undergraduate Sample Associations

Finally, we examined correlations for dimensions from the four-factor undergraduate model and the five-factor online community model. Dimensions were modeled using regression-based factor scores. As shown in Table 6, some associations in the undergraduate data were not surprising; for example, Internalizing and IDAS-II Dysphoria both reflect distress levels and correlated strongly. Internalizing also had noteworthy associations with functional impairment and other clinical variables (e.g., perceived quality of life impact). Notably, some factors showed stronger overall patterns of associations. Disinhibition/Communication had the strongest average correlation with the four IDAS-II symptom ratings of any factor (overall average $r = .55$) and correlated moderately with some clinical ratings (e.g., functional impairment, $r = .43$). In

contrast, Detachment showed only two correlates $> .30$ (i.e., IDAS-II Social Anxiety and quality of life), and Antagonism/Thought Disorder had one correlate $> .30$ (i.e., IDAS-II Euphoria).

Online Community Sample Associations Across Timepoints

Table 7 provides cross-sectional correlates from the online community sample across timepoints. Factors again generally showed patterns of correlates that would be anticipated based on the content of scales that loaded strongly onto them (e.g., Hypomanic Activation associating robustly with IDAS-II Euphoria and Mania scores; all r s $> .55$ across timepoints). Disinhibited Externalizing correlated robustly with various symptom ratings, even correlating slightly more strongly with measures such as IDAS-II Dysphoria (r s = $.65$ and $.67$, respectively at Times 1 and 2) than did the Internalizing factor. Consistent with the undergraduate sample results, factors such as Detachment showed few notable correlates.

Table 8 presents correlations for Time 1 factors with Time 2 past week ratings, with factors generally showing theoretically consistent associations (e.g., a significant association at $p < .001$ for Disinhibited Externalizing with number of late appointments over the past week). Furthermore, these results again indicated that some factors showed stronger patterns of correlates overall than others. For example, Disinhibited Externalizing and Internalizing had five and four respective correlates that were significant at a $p < .001$ level, whereas Hypomanic Activation, Detachment, and Antagonistic Externalizing had only two such correlates.

Discussion

Our hierarchical structural results across samples converged to indicate clear aspects of overlap for some NDD- and hypomania-relevant trait dimensions with existing HiTOP spectra (e.g., BAPQ Aloofness with detachment indicators; HPS Mood Lability with internalizing). However, implications for the classification of other specific dimensions are less clear (e.g.,

some hypomania-relevant traits) due to structures differing in the nature and number of psychologically meaningful factors that could be identified across samples, contrary to our predictions. Regarding our secondary analyses, factors on which internalizing, disinhibited externalizing, and some NDD-relevant measures tended to load strongly showed the most robust patterns of correlates with various clinical and symptom ratings. We predicted that a distinct thought disorder factor would emerge and would show robust external correlates; however, different thought disorder indicators failed to load strongly onto the same common factor in models with the largest number of interpretable dimensions across samples.

We proceed to review the implications of our results for classifying each specific NDD- and hypomania-relevant dimension assessed, but highlight several issues warranting further consideration when designing studies aimed at informing HiTOP classification before doing so. First, our results underscore the need to carefully consider the cross-sample consistency of results in future dimensional classification research, as our conclusions may have differed in some ways had we focused results on only a single sample. For example, the distinct Hypomanic Activation factor identified in the online community data failed to emerge in the undergraduate data. Additionally, some aspects of our results that were consistent across the two samples used here were inconsistent with HiTOP framework as currently articulated (Kotov et al., 2020). Unexpected findings in our study included some indicators of antagonistic externalizing and thought disorder loading jointly onto a common factor in select models (e.g., four-factor models across samples). Although some other research indicates strong overlap between antagonistic externalizing and thought disorder (Røysamb et al., 2011), this may have been due to inadequate assessment of thought disorder psychopathology as well other characteristics of our samples (e.g., relatively few participants having extensive histories of

thought disorder psychopathology). Some antagonistic externalizing scales (i.e., grandiosity scales) assess inflated self-views that conceivably could overlap with some aspects of thought disorder. However, the CAT-PD Grandiosity scale administered here primarily assesses entitlement (e.g., “should get special privileges”), which seems less connected to thought disorder. Regarding other discrepancies from the broader HiTOP framework, disinhibited and antagonistic externalizing both traditionally are classified within the broader externalizing domain (Kotov et al., 2017); however, our results and those of other recent studies (Forbes et al., 2021) focusing on homogeneous dimensional ratings indicate that disinhibition overlaps strongly with the internalizing spectrum. Given our reliance on a limited measure set and convenience samples, we are not advocating for drastic reorganization of the HiTOP model based on these results. Rather, we are simply drawing attention to these issues to highlight potential challenges and important opportunities ahead for resolving discrepancies across sample types, assessment methods, and study designs in future dimensional classification research.

Next, some measures failed to load strongly onto any factor in some models (e.g., HPS Intellectual Confidence in the four-factor undergraduate model), including indicators of dimensions for which HiTOP classification remains unclear. Relatedly, some widely reported fit indices (e.g., CFI, TLI) indicated poor fit for cross-sectional models with the largest number of viable factors even when using a flexible ESEM approach, recognizing again that model fit was not prioritized in making data analytic decisions. Well-fitting models with clearer patterns of indicator loadings have been identified in many examinations of psychopathology structure of course (Kotov et al., 2017). However, some other recent work also indicates that model fit (a) may be relatively poor according to indices such as CFI and TLI when examining ESEM structures of broad sets of trait ratings spanning multiple HITOP spectra (e.g., Latzman et al.,

2019), and (b) can worsen as a function of the number of indicators in analyses increasing (Watts et al., 2021). These issues are important given that more comprehensive examinations of psychopathology structure would involve using sizeable indicator sets (e.g., over 30 dimensions are identified as facets of the internalizing domain alone; Watson et al., 2021). As a result, further investigation into how information yielded by fit indices can be used to adjudicate amongst structural psychopathology models would be useful, as would dialogue regarding the optimal manner for classifying dimensions potentially not aligning neatly with a single existing HiTOP spectrum (e.g., is this evidence that new spectra dimensions should be added to the HiTOP model, issues with validly measuring a construct, and so on).

Implications for the Classification of Specific Psychopathology Dimensions

Taking into account cross-sample discrepancies and related issues, aspects of agreement across sample results still are informative, as summarized in Table 2. For example, HPS Charisma was consistently identified as a reverse-indicator of detachment. Next, BAPQ Aloofness and HPS Mood Lability were clear detachment and internalizing indicators across samples and models, respectively. These results were anticipated based on these measures' content, for BAPQ Aloofness especially (e.g., "prefer to be alone"). Still, convincingly demonstrating this pattern of results across samples underscores that dimensions traditionally classified as part of the same broader domain align more closely with other forms psychopathology than with one another in some cases (e.g., HPS Mood Lability overlapped more closely with CAT-PD Internalizing measures than other HPS scales). Instances where scales from the same broader measure functioned similarly in analyses included BAPQ Rigidity aligning most closely with detachment, similar to BAPQ Aloofness. Loadings for BAPQ

Rigidity on detachment factors were weaker than for BAPQ Aloofness, and this was contrary to predictions that BAPQ Rigidity would be an internalizing indicator (see Online Figure S1).

Next, unlike BAPQ Aloofness and Rigidity, BAPQ Pragmatic Language loaded most strongly onto common factors with ADHD rather than other BAPQ indicators across hierarchical levels. This strong degree of overlap with ADHD symptoms was hypothesized, acknowledging that fewer interpretable factors emerged in each dataset than anticipated. These findings for BAPQ Pragmatic Language also suggest that widely used measures such as the BAPQ assess heterogeneous sets of traits aligning with different spectra, even though terms such as “autism” have been used synonymously with social withdrawal in some prior HiTOP research (Zimmerman et al., 2021).

Across samples, all three ADHD indicators and BAPQ Pragmatic Language Difficulties loaded most strongly onto joint factors with indicators of disinhibited externalizing in models with the greatest number of factors. Specifically, the emergence of a Disinhibition/Communication factor marked by inattention, hyperactivity, communication difficulties, and non-perseverance parallels a distinct NDD factor identified in other recent studies (e.g., Michelini et al., 2019; Stanton et al., 2021). However, with the exception of ASRS Inattentiveness, loadings for other ADHD indicators and BAPQ Pragmatic Language Difficulties were substantially weaker in magnitude on the closest parallel factor in four and five-factor models from the online community data, which we instead labeled Disinhibited Externalizing due to specific patterns of loadings (e.g., CAT-PD Irresponsibility loading very strongly on this factor in the online community data). Therefore, these findings are less conclusive in some ways regarding the extent to which some NDD features reflect a broader spectrum distinct from other HiTOP spectra. Regardless, overlap for these NDD indicators with disinhibited externalizing

indicators was substantial in models with three or fewer factors, with these indicators overlapping meaningfully in these more basic models (e.g., ADHD and internalizing measures loading strongly onto Instability factors in three-factor models). Furthermore, both (a) the online community Disinhibited Externalizing factor and (b) the undergraduate Disinhibition/Communication factor showed notable correlates with internalizing symptoms and related past week ratings reflecting emotion dysregulation, distress, and fear (e.g., perceived panic attacks), underscoring previously identified links between internalizing, disinhibited externalizing, and some NDD features (Forbes et al., 2021; Stanton et al., 2021).

Implications for hypomania-relevant dimensions assessed by HPS Intellectual Confidence and Activation also are uncertain in some ways. These scales had discrepant loading patterns across samples in some cases (e.g., having primary loadings on different factors in the two-factor models across samples), and HPS Intellectual Confidence failed to load strongly onto any factor in the four-factor undergraduate model. Both measures loaded strongly onto a distinct Hypomanic Activation factor in the online community data, as did CAT-PD Fantasy Proneness. Other thought disorder indicators (e.g., CAT-PD Unusual Beliefs) also loaded moderately on this factor, indicating some degree of overlap for these specific hypomania-relevant dimensions with thought disorder. Still, given cross-sample discrepancies in the loading patterns for these measures, future investigation into the classification of these and other hypomania dimensions is needed. Finally, NDD- and hypomania-relevant indicators rarely shared strong loadings onto common factors with antagonistic externalizing indicators in models with three or more factors. This is contrary to some research negatively linking autism-relevant traits with empathy and also was unexpected in some ways given research linking specific hypomania-relevant traits (e.g., charisma) assessed via self-report with antagonistic externalizing (e.g., Stanton et al., 2019).

Future Directions, Limitations, and Conclusion

In addition to the critical need to consider cross-sample differences in structural models, several other study limitations should be acknowledged. First, although assessing homogeneous dimensions was a study strength, it would have been interesting to examine patterns of results using methods other than self-report. At the same time, it may be mistaken to dismiss self-report entirely, even for assessing some aspects of social behavior relevant to NDDs and hypomania. For example, although self-report has limitations, it may provide useful information regarding individuals' motivations and preferences for social interaction and routine (e.g., even if others describe a person as aloof, self-report may be useful for assessing that person's internal motivations and level of desire to connect with others; Hurley et al., 2007). Other limitations include limited assessment of some HiTOP spectra and lack of assessment of other symptom dimensions (e.g., checking and counting related to obsessive-compulsive disorders). As a result, we may have reached different conclusions had we assessed a broader range of traits as has been done in other research on NDD classification (e.g., assessing learning and academic difficulties; Michelini et al., 2019).

Next, although the content and structure of symptom and trait measures may parallel one another in many ways (Gomez & Corr, 2014; Jacobsson et al., 2021), our study design precluded comprehensive examinations of the degree of consistency in results when using symptom instead of trait ratings. Relatedly, our approach of administering several trait-based measures of thought disorder (e.g., unusual beliefs, fantasy proneness) may not have adequately captured more severe manifestations of thought disorder psychopathology (e.g., current experiences or extensive histories of positive psychotic symptoms). Furthermore, although online community sample participants were recruited based on psychopathology history, most participants still may not

have had extensive histories of thought disorder and other pathology. Consequently, extending our findings in other samples and using other study designs is necessary (e.g., examining fluctuations in manic and thought disorder symptoms), particularly for informing classification of hypomania-relevant dimensions. Examining these issues in samples of participants ranging in demographic factors such as age also will be important given that NDDs traditionally are conceptualized as having their origins in early childhood.

Regarding downstream implications of research of this nature, there is ongoing debate concerning the research and clinical utility of dimensional models as reviewed (Motttron, 2021), including for dimensions described as features of traditional NDD categories that were a focus here. Growing research indicates potential benefits of using transdiagnostic dimensions for NDD diagnosis and treatment planning (e.g., Astle et al., 2021; Gadow & Garman, 2020; Mikami et al., 2019), and improving understanding of the dimensional classification of NDD and hypomania features in future studies would be useful for informing transdiagnostic treatment approaches (e.g., the composition and scoring of clinical assessment measures used for diagnosis and treatment planning may vary depending on which specific traits are viewed as reflecting a potentially distinct NDD spectrum). Acknowledging these issues, our results (a) indicate clear alignment for some NDD- and hypomania-relevant dimensions with existing spectra, (b) indicate the distinctive nature of other dimensions, and (c) draw attention to key future directions for dimensional classification research.

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Figure 1*Hierarchical Factor Structures from the Undergraduate and Online Community Samples***Panel A** **Panel B**

Note. Panels A and B depict the undergraduate and online community hierarchical structures, respectively. Antag/Thought = Antagonism/Thought Disorder; Disinh/Comm = Disinhibition/Communication; Antag Extern = Antagonistic Externalizing; Disinh Ext = Disinhibited Externalizing; Hypomanic Act = Hypomanic Activation. Only the strongest pathway coefficients for each factor are shown, with the exception of the Hypomanic Activation factor in Panel B due to pathway coefficients for this factor being very similar in magnitude. The number before each factor label indicates the order in which it emerged at that specific level of analysis.

Table 1*Demographic Characteristics of Both Samples*

	<u>Online Community Sample</u>		<u>Undergraduate Sample</u>
	<u>Time 1</u>	<u>Time 2</u>	
Age (<i>M</i> & <i>SD</i>)	32.8 (11.7)	32.8 (11.8)	19.5 (1.7)
Gender**			
Women	64.6	63.1	74.3
Men	33.8	35.5	25.5
Nonbinary	3.5	3.4	0.2
Racial Identity			
White or European American	82.8	83.6	69.9
Black or African American	9.8	9.3	7.0
Asian American	7.2	7.2	14.6
Native American	2.3	2.4	1.5
Ethnicity			
Hispanic or Latino/a	6.5	6.4	6.2
Education			
Some high school	1.4	1.6	-
High school/GED equivalent	14.0	13.3	-
Some college/associates degree	39.9	40.8	-
Bachelor's degree	29.8	30.2	-
Advanced degree	14.5	13.5	-
Psychiatric Treatment Status			
Current Psychotherapy	32.4	31.0	19.8
Current Medication	52.9	52.0	18.3

Note. $N = 429$ for the online community sample at Time 1 and 377 at Time 2; $N = 529$ for the undergraduate sample. Age values are mean and standard deviation values, respectively, and all other values shown are percentages. In some cases, percentages may slightly exceed 100% because participants could select multiple response options, and in other cases, totals may not sum to exactly 100% due to rounding or participants not providing relevant information. ** = At Times 1 and 2 in the online community sample, 1.9% and 2.1% of participants were transgender, respectively; 0.2% of undergraduate participants were transgender. Very small percentages of participants also endorsed other racial identities in each sample, including being of Middle Eastern or North African Descent, Native Hawaiian or Pacific Islander, or a write-in response not included as a response option on our demographic questionnaire.

Table 2

Summary of Findings from Hierarchical Structural Analyses Across Models Varying in Their Number of Factors

Scale	Example Item	Implications of Results for Classification
BAPQ Aloofness	Talk to others only to get information	Clear Detachment indicator across samples as predicted
HPS Charisma	Uncommon ability to inspire others	Reverse-indicator of Detachment across samples
BAPQ Rigidity	Do not like unexpected changes in plans	Closest alignment with Detachment, though factor loadings were relatively weak in some cases
HPS Intellectual Confidence	Have periods of insight and inspiration	Indicator of Hypomanic Activation in online community sample; some overlap with measures of Thought Disorder
HPS Activation	Often very excited for no reason	Hypomanic Activation indicator in online community sample; Detachment overlap in the undergraduate data
HPS Mood Lability	Frequently feel speeded up and irritable	Internalizing indicator across samples as predicted
ASRS Inattentiveness	Easily distracted, trouble concentrating	Overlap with other ADHD indicators, BAPQ Pragmatic Language, and Disinhibited Externalizing
ASRS Motor Hyp/Imp	Often feel fidgety or restless	Overlap with other ADHD and Disinhibited Externalizing indicators; weak patterns of loadings in some cases
ASRS Verbal Hyp/Imp	Talk too much in social situations	Overlap with other ADHD and Disinhibited Externalizing indicators; weak patterns of loadings in some cases
BAPQ Pragmatic Language	Leave long pauses in conversations	Closest overlap with ADHD and Disinhibited Externalizing, though some relatively weak loadings

Note. The summaries above focus on models with two or more factors because most scales loaded moderately to strongly onto a common factor when examining models with one-factor. These summaries give more weight to more complex models with larger numbers of factors that more directly inform more nuanced classification levels (e.g., reviewing the implications for the emergence of a Hypomanic Activation factor when extracting five factors versus less differentiated two- or three-factor structures).

Table 3
Model Fit Indices for Factor Structures Across Samples

Factor Model	χ^2 (df)	RMSEA	CFI	TLI	SRMR
<u>Undergraduate</u>					
Single-Factor	4503.6 (350)	.150	.397	.348	.150
Two-Factor	2849.7 (323)	<i>.122</i>	.633	.570	.089
Three-Factor	1870.9 (297)	<i>.100</i>	.771	.709	.058
Four-Factor	1474.6 (272)	.091	.825	.757	.050
Five-Factor	1213.8 (248)	.086	.860	.786	.041
<u>Online Community Time 1</u>					
Single-Factor	3926.1 (350)	.154	.406	.358	.157
Two-Factor	2198.0 (323)	<i>.116</i>	.688	.635	.076
Three-Factor	1512.5 (297)	<i>.098</i>	.798	.743	.050
Four-Factor	1294.7 (272)	.094	.830	.764	.045
Five-Factor	902.0 (248)	.078	.891	.834	.037
Six-Factor	735.9 (225)	.073	.915	.857	.033
<u>Online Community Time 2</u>					
Single-Factor	3579.1 (350)	.156	.396	.348	.156
Two-Factor	2112.7 (323)	<i>.121</i>	.665	.608	.081
Three-Factor	1450.0 (297)	<i>.101</i>	.784	.726	.054
Four-Factor	1162.4 (272)	.093	.834	.769	.044
Five-Factor	887.5 (248)	.083	.880	.818	.038
Six-Factor	748.5 (225)	.079	.902	.836	.033
<u>Joint Online Community</u>					
Single-Factor	6338.2 (1455)	.088	.771	.758	.158
Two-Factor	4285.8 (1398)	.069	.865	.851	.081
Three-Factor	3296.3 (1341)	.058	.908	.895	.057
Four-Factor	2836.5 (1284)	.053	.927	.913	.050
Five-Factor	2387.8 (1227)	.047	.946	.932	.044

Note. $N = 529$ in the undergraduate sample; 429 in the online community sample at Time 1, and 377 in the online community sample at Time 2. The Joint Online Community models are initial models using data from both Time 1 and Time 2 with no constraints for testing invariance other than the number of factors being the same across timepoints. *Italicized* RMSEA values indicate changes $\geq .015$ from models in the same sample and time point with one fewer factor; CFI change $\geq .01$ for all comparisons. Results of Satorra-Bentler chi-square comparison tests are not reported because these difference tests consistently favored models with a greater number of factors, even in cases where models with more factors included factors without clear measure indicators. Models in **bold** are those with the largest number of interpretable factors in each dataset.

Table 4*Geomin Rotated Factor Loadings from the Four-Factor Model in the Undergraduate Data*

Scale	Disinh/Comm	Detachment	Internalizing	Ant/Thought
ASRS Inattentiveness	.94	.06	.01	-.24
ASRS Motor Hyper/Impulsivity	.73	-.02	.13	-.23
ASRS Verbal Hyper/Impulsivity	.61	-.22	.07	-.03
CAT-PD Non-Perseverance	.59	.01	.18	.05
BAPQ Pragmatic Language	.57	.33	.02	.08
CAT-PD Fantasy Proneness	.47	-.01	.14	.20
CAT-PD Non-Planfulness	.41	-.19	.00	.24
HPS Intellectual Confidence	.37	-.29	-.13	.24
CAT-PD Irresponsibility	.34	.07	.11	.30
CAT-PD Social Withdrawal	.20	.82	.07	.02
BAPQ Aloofness	.19	.81	.01	.08
HPS Charisma	.04	-.70	-.04	.42
CAT-PD Exhibitionism	.01	-.58	.03	.56
HPS Activation	.38	-.51	-.03	.19
BAPQ Rigidity	-.03	.40	.31	.03
CAT-PD Emotional Detachment	.33	.40	-.13	.02
CAT-PD Romantic Disinterest	-.01	.39	-.15	.03
CAT-PD Affective Lability	-.05	.00	.89	.10
CAT-PD Anxiousness	.05	.17	.77	-.11
HPS Mood Lability	.12	-.13	.73	-.02
CAT-PD Depressiveness	.05	.31	.65	.04
CAT-PD Grandiosity	-.02	.00	.04	.79
CAT-PD Unusual Beliefs	-.12	-.03	.07	.67
CAT-PD Manipulativeness	.12	.06	.05	.67
CAT-PD Callousness	.01	.38	-.15	.66
CAT-PD Unusual Experiences	.04	.11	.24	.50
AUDIT Alcohol Use	.05	-.28	.19	.16
Drug Use Survey	.12	-.13	.18	.09

Note. $N = 529$. All loadings $\geq |.40|$ are **bolded**. Ant/Thought = Antagonism/Thought Disorder; Disinh/Comm = Disinhibition/Communication. The Disinhibition/Communication and Internalizing factors correlated .61, and Disinhibition/Communication and Antagonism/Thought Disorder correlated .42. All other interfactor correlates were $< .25$. AUDIT = Alcohol Use Disorders Identification Test; ASRS = Adult ADHD Self-Report Scale; BAPQ = Broad Autism Phenotype Questionnaire; CAT-PD = Comprehensive Assessment of Traits Relevant to Personality Disorder; HPS = Hypomanic Personality Scale; Hyper/Impulsivity = Hyperactivity/Impulsivity.

Table 5*Five-Factor Model Geomin Rotated Factor Loadings from the Online Community Data (Time 1)*

Scale	Hyp Act	Detach	Disinh	Internal	Antag
HPS Intellectual Confidence	.93	-.02	-.07	-.09	.03
CAT-PD Fantasy Proneness	.62	.18	.26	.05	-.04
HPS Activation	.56	-.21	.01	.11	.24
CAT-PD Unusual Experiences	.35	.09	.16	.08	.25
CAT-PD Social Withdrawal	.11	.94	.09	-.01	.01
BAPQ Aloofness	.03	.89	.10	-.03	.05
CAT-PD Emotional Detachment	.05	.59	.16	-.02	.13
HPS Charisma	.29	-.51	.10	-.18	.32
BAPQ Rigidity	-.07	.48	.01	.29	.05
CAT-PD Romantic Disinterest	-.07	.31	.08	.03	.04
ASRS Inattentiveness	.12	-.04	.81	.03	-.07
CAT-PD Non-Perseverance	.01	.03	.81	.01	.01
CAT-PD Irresponsibility	-.11	.07	.73	-.06	.20
BAPQ Pragmatic Language	.18	.29	.40	.16	.03
CAT-PD Non-Planfulness	.00	-.21	.39	.12	.28
ASRS Motor Hyper/Impulsivity	.30	-.09	.36	.19	-.02
ASRS Verbal Hyper/Impulsivity	.24	-.28	.32	.14	.17
CAT-PD Affective Lability	.01	-.01	.02	.90	.16
HPS Mood Lability	.32	-.01	-.01	.71	-.01
CAT-PD Anxiousness	.07	.20	.16	.56	-.14
CAT-PD Depressiveness	-.09	.28	.26	.44	.02
CAT-PD Grandiosity	.06	.03	-.14	.04	.84
CAT-PD Callousness	-.09	.29	-.03	.02	.75
CAT-PD Manipulativeness	.00	.01	.13	.02	.71
CAT-PD Exhibitionism	.17	-.55	.09	-.04	.45
CAT-PD Unusual Beliefs	.34	.01	-.07	-.04	.43
AUDIT Alcohol Use	.00	-.06	.10	-.05	.28
Drug Use Survey	.09	-.09	.05	-.02	.18

Note. $N = 429$. All loadings $> |.40|$ are **bolded**. Hyp Act = Hypomanic Activation; Detach = Detachment; Disinh = Disinhibited Externalizing; Internal = Internalizing; Antag = Antagonistic Externalizing. Disinhibited Externalizing correlated .53 and .43 with Internalizing and Hypomanic Activation, respectively. Disinhibited and Antagonistic Externalizing correlated .38. Hypomanic Activation and Antagonistic Externalizing correlated .37. All other interfactor correlations $< .30$. ASRS = Adult ADHD Self-Report Scale; BAPQ = Broad Autism Phenotype Questionnaire; CAT-PD = Comprehensive Assessment of Traits Relevant to Personality Disorder; HPS = Hypomanic Personality Scale; Hyper/Impulsivity = Hyperactivity/Impulsivity.

Table 6*Correlations for Emergent Factors with Other Study Ratings in the Undergraduate Sample*

Study Measure	Disinhib/Commun	Detachment	Internalizing	Antagonism/Thought Disorder
<i>Symptom Ratings</i>				
IDAS-II Dysphoria	.65	.26	.73	.10
IDAS-II Mania	.61	.05	.54	.18
IDAS-II Social Anxiety	.48	.43	.57	.07
IDAS-II Euphoria	.45	-.16	.26	.32
<i>Other Clinical & Externalizing Ratings</i>				
Functional Impairment	.43	.21	.65	.02
Quality of Life Impact	.30	.31	.43	.09
Current Psychotropic Medication	.31	.06	.41	.07
Lifetime Stealing Number	.28	.00	.19	.22
Average Level of Physical Pain	.27	.01	.24	.09
Current Psychotherapy	.24	.09	.32	.03
Hospitalization Number	.15	.01	.21	.07
Lifetime Speeding Tickets	.08	-.07	.05	.12

Note. $N = 529$ with the exceptions for correlations with current psychotherapy, current psychotropic medication, number of lifetime speeding tickets, and having stolen something, for which $N = 528$ due to missing data. Correlations greater than $|.30|$ are **bolded**. All correlations are Pearson correlations other than those with current psychotherapy and medication, which are polyserial correlations. All correlations $>|.15|$ are significant at $p < .001$. Disinhib/Commun = Disinhibition/Communication. IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms.

Table 7*Cross-Sectional Correlations for Emergent Dimensions with Other Study Ratings in the Online Community Sample*

Study Measure	Hypomanic Act	Detachment	Disinhibited Ext	Internalizing	Ant Externalizing
<i>Symptom Ratings (Both Timepoints)</i>					
IDAS-II Mania	.63/.68	.02/.11	.56/.57	.51/.49	.36/.27
IDAS-II Euphoria	.56/.60	-.10/-.04	.35/.37	.25/.18	.52/.40
IDAS-II Dysphoria	.39/.39	.22/.30	.65/.67	.63/.65	.21/.15
IDAS-II Social Anxiety	.21/.21	.45/.49	.40/.41	.45/.52	.15/.06
<i>Other Clinical Ratings (Time 1)</i>					
Functional Impairment	.22	.20	.47	.48	.06
Quality of Life Impact	-.01	.36	.31	.37	.05
Average Level of Physical Pain	.25	-.10	.21	.19	.16
Hospitalization Number	.16	.03	.16	.21	.16
Substance Use Treatment Number	.16	.02	.09	.02	.20
Current Psychotherapy	.04	-.01	.17	.12	.03
Current Psychotropic Medication Use	.02	-.11	.12	.14	.03
<i>Other Externalizing Behaviors (Time 1)</i>					
Lifetime Stealing Number	.18	-.04	.17	.05	.28
Times Fired from a Job	.22	-.06	.23	.11	.21
Lifetime Speeding Tickets	.07	-.15	.08	-.01	.19
Lifetime Arrest Number	.14	.01	.06	.05	.18

Note. $N = 429$ for Time 1 correlations with the exception of those for externalizing behavior history ratings ($N = 426$); $N = 377$ at Time 2. Correlations before and after the slash with symptom ratings are those from Time 1 and Time 2, respectively. Correlations with other variables were not repeated at Time 2. Correlations greater than $|.25|$ are **bolded**. All correlations are Pearson correlations other than the correlations with current medication and psychotherapy, which are polyserial correlations. All correlations $\geq |.18|$ are significant at $p < .001$. Hypomanic Act = Hypomanic Activation; Disinhibited Ext = Disinhibited Externalizing; Internal = Internalizing; Ant Externalizing = Antagonistic Externalizing.

Table 8*Prospective Correlations for Time 1 Dimensions with Past Week Clinical Ratings at Time 2 in the Online Community Sample*

Study Measure	Hypomanic Act	Detachment	Disinhibited Ext	Internalizing	Ant Externalizing
<i>Past Week Externalizing Ratings</i>					
Number of arguments	.16	.02	.27	.29	.13
Number of late appointments	.15	.02	.26	.05	.19
Number of appointments missed	.15	-.01	.16	.07	.19
Number of times getting drunk	.05	-.06	.02	-.06	.12
Number of times getting high	.14	-.07	.13	.01	.11
<i>Other Past Week Ratings</i>					
Number of times so upset cried	.23	-.03	.24	.28	-.01
Number of perceived panic attacks	.17	.17	.21	.23	.11
Number of nights with sleep difficulties	.13	.17	.18	.25	-.06

Note. $N = 376$. All correlations $> |.17|$ are significant at $p < .001$ and are **bolded**. All correlations are Pearson correlations.

Hypomanic Act = Hypomanic Activation; Disinhibited Ext = Disinhibited Externalizing; Internal = Internalizing; Ant Externalizing = Antagonistic Externalizing.

Online Appendix S1

Incorporation of Exploratory Structural Equation Modeling

This section provides an overview of deviations from our preregistered analyses. A detailed description of this preregistration can be found at <https://osf.io/hz7au/>. Initially, we had described in our preregistration document that exploratory factor analyses (EFA) and examinations of factor comparability would be conducted using SAS Version 9.4; however, final study structural analyses were conducted using Mplus Version 8 software to provide access to exploratory structural modeling (ESEM) capabilities in place of an EFA approach. Use of Mplus also provided access to a much wider range of model fit indices. Model fit indices were not reported in our initial submission but were added to provide additional information for evaluating ESEM models. Importantly, incorporation of an ESEM framework also allowed us to account for the same participants being readministered the same measures across Time 1 and Time 2 in the online community sample, which were not able to do when using a purely EFA-based approach with SAS. Therefore, analyses evaluating factor similarity in our original manuscript submission (i.e., data from Time 1 and Time 2 were treated as being drawn from two groups) failed to account for this aspect of our study design.

Greater Emphasis on a Hierarchical Factor Analytic Approach

Another deviation involved reporting the full results of hierarchical factor analyses. Although we previously considered the interpretation of a range of factor models when following our preregistration plan, in our revised manuscript, we give much attention to presenting detailed findings for each level of our factor hierarchies. Specifically, we now report loadings and item fit indices for all factor solutions that were deemed interpretable (i.e., models ranging from one to four factors in undergraduates; one to five factors in the online community sample). This

approach was adopted when making revisions to provide information regarding how hypomania- and neurodevelopmental disorder (NDD)- relevant traits should be classified within dimensional frameworks at various levels of abstraction (e.g., superspectrum level, narrower spectrum level). With this revised approach, we also report pathway coefficients to provide readers with a sense of how factor structures “unfolded” in each sample (e.g., examining how factor scores representing factors from a two-factor model associated with a factor score representing a general psychopathology factor).

Removal of Unnecessary Multiple Regression Analyses

Our preregistration document also described a series of hierarchical multiple regression analyses using data from the online community sample, which were collected at two timepoints roughly 2 weeks apart. These analyses involved examining associations for factors identified at Time 1 in this sample with symptom ratings from Time 2. Factor scores representing emergent factors from Time 1 were entered jointly into an initial regression block as independent variables to examine their associations with Time 2 symptoms ratings, which were treated as dependent variables. Following that, symptom ratings from Time 1 also were entered into a second regression block along with these factor scores. We had planned to use this approach to determine the extent to which these factor scores representing HiTOP spectrum dimensions still showed meaningful associations with Time 2 symptoms even when accounting for Time 1 initial symptom ratings. However, based on reviewer feedback, these analyses were removed due to making a limited incremental contribution to our manuscript.

Online Figure S1

Predictions for 5- to 7-Factor Solution for Study Factor Analyses Across Samples

Internalizing	Detachment	Thought Disorder	Disinhibited Externalizing	Antagonistic Externalizing
CAT-PD Anxiousness	BAPQ Aloofness	CAT-PD Unusual Beliefs	CAT-PD Irresponsibility	CAT-PD Manipulative
CAT-PD Depressiveness	CAT-PD Social Withdrawal	CAT-PD Unusual Experiences	ASRS Inattentiveness	CAT-PD Callousness
CAT-PD Affective Liability	CAT-PD Emotional Detachment	CAT-PD Fantasy Proneness	CAT-PD Non-Perseverance	CAT-PD Grandiosity
HPS Liability	CAT-PD Romantic Disinterest	HPS Intellectual Confidence	CAT-PD Non-Planfulness	CAT-PD Exhibitionism
BAPQ Rigidity	CAT-PD Exhibitionism	ASRS Verbal Impulsivity	AUDIT Alcohol Use	HPS Charisma
ASRS Inattentiveness		BAPQ Pragmatic Language	Drug Use Survey	
			HPS Activation	
			ASRS Motor Impulsivity	
			ASRS Inattentiveness	

Internalizing	Detachment	Thought Disorder	Neurodev Relevant	Disinhibited Externalizing	Antagonistic Externalizing
CAT-PD Anxiousness	BAPQ Aloofness	CAT-PD Unusual Beliefs	ASRS Verbal Impulsivity	CAT-PD Irresponsibility	CAT-PD Manipulative
CAT-PD Depressiveness	CAT-PD Social Withdrawal	CAT-PD Unusual Experiences	BAPQ Pragmatic Language	ASRS Inattentiveness	CAT-PD Callousness
CAT-PD Affective Liability	CAT-PD Emotional Detachment	CAT-PD Fantasy Proneness	ASRS Motor Impulsivity	CAT-PD Non-Perseverance	CAT-PD Grandiosity
HPS Liability	CAT-PD Romantic Disinterest	HPS Intellectual Confidence	ASRS Inattentiveness	CAT-PD Non-Planfulness	CAT-PD Exhibitionism
BAPQ Rigidity	CAT-PD Exhibitionism			AUDIT Alcohol Use	HPS Charisma
				Drug Use Survey	
				HPS Activation	

Internalizing	Detachment	Thought Disorder	Hypomania	Neurodev Relevant	Disinhibited Externalizing	Antagonistic Externalizing
CAT-PD Anxiousness	BAPQ Aloofness	CAT-PD Unusual Beliefs	HPS Activation	ASRS Verbal Impulsivity	CAT-PD Irresponsibility	CAT-PD Manipulative
CAT-PD Depressiveness	CAT-PD Social Withdrawal	CAT-PD Unusual Experiences	HPS Intellectual Confidence	BAPQ Pragmatic Language	ASRS Inattentiveness	CAT-PD Callousness
CAT-PD Affective Liability	CAT-PD Emotional Detachment	CAT-PD Fantasy Proneness	HPS Charisma	ASRS Motor Impulsivity	CAT-PD Non-Perseverance	CAT-PD Grandiosity
HPS Liability	CAT-PD Romantic Disinterest		CAT-PD Exhibitionism	ASRS Inattentiveness	CAT-PD Non-Planfulness	CAT-PD Exhibitionism
BAPQ Rigidity					AUDIT Alcohol Use	
					Drug Use Survey	

Note. A scale being listed under a column is used to indicate a predicted loading $> |.40|$. **Bolded and italicized** scales were expected to cross-load $> |.40|$ onto multiple factors.

Online Table S1*Predicted Cross-Sectional Correlations for Dimensions Representing HiTOP Spectra with Other Study Ratings*

Study Measure	Internal	Detachment	Thought	Hypomania	Neurodev	Disinhibition	Antagonism
<i>Symptoms</i>							
IDAS-II Dysphoria	.70	.60	.50		.50	.45	
IDAS-II Social Anxiety	.65	.65	.50		.45		
IDAS-II Mania	.60		.40	.50	.40	.40	
IDAS-II Euphoria				.50			
<i>Other Clinical Ratings</i>							
Hospitalization number	.25		.20	.20			
Substance treatment history	.20			.25		.30	
Average physical pain	.30						
Functional impairment	.30	.30	.40	.20	.30	.30	
Quality of life impact	.50	.40	.40	.20	.30	.30	
<i>Externalizing Behaviors</i>							
Lifetime arrest number				.20		.25	.20
Lifetime speeding tickets				.20		.25	
Lifetime fired from job	.20	.20	.20	.20	.20	.25	
Lifetime stealing number						.25	.20

Note. Correlations were predicted to replicate across the undergraduate and online community samples and across the Time 1 and Time 2 assessments in the online community sample. Only correlations with symptoms $\geq .40$ shown; for all other correlates, only predicted correlates $\geq .20$ shown. IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms; Internal = Internalizing; Thought = Thought Disorder; Hypomania = Hypomania-Relevant; Neurodev = Neurodevelopmental Disorder-Relevant; Disinhibition = Disinhibited Externalizing; Antagonism = Antagonistic Externalizing.

Online Table S2

Predicted Correlates for Time 1 Factor Scores in the Online Community Dataset with Time 2 Clinically-Relevant Ratings

Study Measure	Internal	Detachment	Thought	Hypomania	Neurodev	Disinhibition	Antagonism
<i>Externalizing Behaviors</i>							
Argument number	.25			.20	.20	.25	.25
Times got drunk	.20		.20	.20		.30	
Times got high	.20		.20	.20		.30	
Times late for appointment	.20			.20	.20	.30	.20
Times missed appointment	.20			.20	.20	.30	
<i>Other Ratings</i>							
Times so upset cried	.30		.20		.20		
Number of panic attacks	.30						
Nights with sleep diff	.30			.20	.20	.20	

Note. These ratings shown were rated by participants in reference to the past week (e.g., how many times participants perceived having an argument over the past 7 days). Only predicted correlates $\geq .20$ shown. All correlations were planned to be conducted as Pearson correlations. Internal = Internalizing; Thought = Thought Disorder; Hypomania = Hypomania-Relevant; Neurodev = Neurodevelopmental Disorder-Relevant; Disinhibition = Disinhibited Externalizing; Antagonism = Antagonistic Externalizing.

Online Table S3*Measure Descriptive Statistics Across Samples and Timepoints*

	<u>Online Community Sample</u>		T1-T2 <i>d</i>	<u>Undergraduate Sample</u>	T1 <i>d</i>
	<u>Time 1</u>	<u>Time 2</u>			
<i>Trait Ratings</i>					
CAT-PD Anxiousness	16.7 (6.7)	16.4 (6.7)	0.04	14.6 (6.4)	0.32
CAT-PD Depressiveness	13.3 (5.7)	13.2 (5.6)	0.02	9.6 (5.8)	0.64
CAT-PD Affective Lability	10.7 (5.8)	10.3 (5.7)	0.07	10.2 (4.9)	0.09
CAT-PD Emotional Detachment	13.7 (6.8)	13.8 (6.8)	-0.01	13.9 (6.7)	-0.03
CAT-PD Social Withdrawal	13.0 (5.8)	13.2 (5.7)	-0.03	8.6 (4.7)	0.83
CAT-PD Romantic Disinterest	8.7 (6.0)	8.9 (6.1)	-0.03	7.4 (4.9)	0.23
CAT-PD Unusual Beliefs	3.4 (4.6)	3.0 (4.5)	0.09	4.7 (4.4)	-0.29
CAT-PD Unusual Experiences	4.1 (5.3)	3.6 (5.2)	0.10	3.8 (4.5)	0.06
CAT-PD Fantasy Proneness	12.7 (6.3)	11.7 (6.4)	0.16	11.8 (5.9)	0.15
CAT-PD Irresponsibility	8.7 (5.8)	8.4 (5.7)	0.05	5.9 (4.4)	0.54
CAT-PD Non-Perseverance	11.2 (5.7)	10.9 (5.4)	0.05	9.5 (4.9)	0.32
CAT-PD Non-Planfulness	8.1 (5.4)	7.9 (5.1)	0.04	8.5 (4.9)	-0.08
CAT-PD Grandiosity	4.8 (5.1)	4.6 (5.1)	0.04	4.7 (4.7)	0.02
CAT-PD Manipulativeness	4.2 (4.5)	4.0 (4.4)	0.04	4.0 (3.8)	0.05
CAT-PD Callousness	5.1 (5.5)	5.2 (5.7)	-0.02	4.1 (4.1)	0.21
CAT-PD Exhibitionism	6.4 (5.1)	6.1 (5.0)	0.06	8.7 (5.3)	-0.44
HPS Activation	20.4 (7.9)	19.8 (8.0)	0.08	25.4 (6.9)	-0.67
HPS Charisma	17.5 (6.5)	17.0 (6.2)	0.08	20.3 (5.8)	-0.45
HPS Intellectual Confidence	20.6 (6.1)	19.9 (6.3)	0.11	21.9 (4.6)	-0.24
HPS Mood Lability	21.3 (5.5)	20.6 (5.5)	0.13	20.8 (4.6)	0.10
ASRS Inattentiveness	16.5 (7.7)	15.9 (8.0)	0.08	15.4 (6.9)	0.15
ASRS Motor H/I	7.7 (4.7)	7.4 (4.7)	0.06	8.0 (4.4)	-0.07
ASRS Verbal H/I	4.8 (3.7)	4.5 (3.6)	0.08	5.1 (3.7)	-0.08

(table continues)

Online Table S3 (cont.)

	<u>Online Community Sample</u>		T1-T2 <i>d</i>	<u>Undergraduate Sample</u>	T1 <i>d</i>
	<u>Time 1</u>	<u>Time 2</u>			
<i>Trait Ratings</i>					
BAPQ Aloofness	3.7 (1.0)	3.7 (1.0)	0.00	2.8 (0.8)	0.99
BAPQ Pragmatic Language	3.0 (0.8)	2.9 (0.8)	0.13	2.8 (0.6)	0.28
BAPQ Rigidity	3.5 (0.8)	3.5 (0.9)	0.00	3.3 (0.7)	0.27
<i>Substance Use</i>					
AUDIT Alcohol Use	5.2 (6.7)	4.7 (6.3)	0.08	5.5 (5.4)	-0.05
Drug Use Survey	7.9 (9.6)	7.5 (9.5)	0.04	2.3 (3.5)	0.78
<i>Symptoms</i>					
IDAS-II Dysphoria	28.3 (9.1)	27.6 (9.3)	0.08	26.1 (9.6)	0.24
IDAS-II Social Anxiety	15.2 (6.8)	14.8 (6.9)	0.06	14.3 (6.5)	0.14
IDAS-II Mania	10.4 (5.4)	10.2 (5.5)	0.04	11.3 (5.2)	-0.17
IDAS-II Euphoria	7.7 (3.8)	7.5 (3.8)	0.05	8.8 (4.0)	-0.28
<i>Time 1 Clinical Ratings</i>					
Number of Hospitalizations	0.6 (1.2)	0.6 (1.2)	0.00	0.1 (0.4)	0.56
Substance Use Treatment Number	0.2 (0.8)	0.2 (0.7)	0.00	-	-
Functional Impairment	2.1 (1.1)	2.1 (1.1)	0.00	1.4 (1.2)	0.61
Quality of Life Impact	1.9 (0.8)	1.9 (0.8)	0.00	1.3 (0.6)	0.85
Average Level of Physical Pain	3.0 (2.2)	2.9 (2.2)	0.05	1.7 (1.7)	0.66
Number of Lifetime Arrests	0.5 (1.4)	0.5 (1.4)	0.00	-	-
Number of Speeding Tickets	1.5 (2.0)	1.5 (2.0)	0.00	0.4 (0.8)	0.72
Number of Times Stealing	2.3 (3.1)	2.2 (3.1)	0.03	1.0 (2.3)	0.48
Times Fired from a Job	0.6 (1.2)	0.6 (1.2)	0.00	-	-

(table continues)

Online Table S3 (cont.)

	<u>Online Community Sample</u>		T1-T2 <i>d</i>	<u>Undergraduate Sample</u>	T1 <i>d</i>
	<u>Time 1</u>	<u>Time 2</u>			
<i>Current Medications (% Frequency)</i>					
Antidepressants	42.0	41.4	-	13.0	-
Antianxiety	19.8	19.6	-	5.5	-
Stimulants	8.9	7.4	-	4.9	-
Sleep Aids	6.8	5.6	-	1.5	-
Mood Stabilizers	5.4	4.8	-	0.8	-
Antipsychotics	3.0	3.2	-	1.1	-
<i>Time 2 Past Week Clinical Ratings</i>					
Number of nights trouble sleeping	-	3.1 (2.3)	-	-	-
Number of times so upset cried	-	1.5 (2.1)	-	-	-
Number of perceived panic attacks	-	0.8 (1.7)	-	-	-
Number of times getting drunk	-	0.6 (1.2)	-	-	-
Number of times getting high	-	1.0 (2.2)	-	-	-
Number of arguments	-	1.1 (1.8)	-	-	-
Number of late appointments	-	0.4 (0.9)	-	-	-

Note. $N = 429$ for the online community sample at Time 1 and 377 at Time 2; $N = 529$ for the undergraduate sample. Sample sizes vary slightly in several cases for some clinical ratings due to missing data. Some variables assessing a history of externalizing behaviors (i.e., lifetime number of arrests, number of times seeking treatment for substance use, and number of times being fired from a job) were not examined in the undergraduate data as a result of there being little to no variability in responses to these items. T1-T2 d = Cohen's d difference for the online community sample values across timepoints. T1 d = Cohen's d difference for the online community and undergraduate sample values at Time 1. ASRS = Adult ADHD Self-Report Scale; AUDIT = Alcohol Use Disorders Identification Test; BAPQ = Broad Autism Phenotype Questionnaire; CAT-PD = Comprehensive Assessment of Traits Relevant to Personality Disorder; HPS = Hypomanic Personality Scale; IDAS-II = Expanded Version of the Inventory of Depression and Anxiety Symptoms. Symptom severity and quality of life impact were assessed using the Single-Item Global Measure of Severity.

Online Table S4*Correlation Matrix for Variables included in the Structural Analyses in the Online Community Sample*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1. HPS Charisma	-	.47	.53	.06	.11	.16	.39	-.47	-.10	-.26	-.04	-.20	-.18	-.16	-.52	-.26	.31	.23	.23	.17	.18	.33	.28	.10	.29	.75	.18	.25
2. HPS Activation	.51	-	.67	.50	.34	.48	.52	-.12	.35	.01	.35	.12	-.05	-.10	-.16	.00	.39	.41	.47	.27	.35	.39	.25	.18	.33	.42	.11	.13
3. HPS Intell Confidence	.50	.66	-	.38	.27	.33	.44	-.14	.25	-.10	.23	.08	-.05	-.14	-.14	-.01	.43	.42	.57	.21	.30	.31	.26	.13	.33	.51	.14	.19
4. HPS Mood Lability	.11	.46	.40	-	.44	.54	.38	.17	.49	.26	.77	.47	.44	.02	.24	.21	.21	.38	.56	.29	.40	.31	.14	.11	.14	.07	.04	.10
5. ASRS Inattentiveness	.15	.36	.33	.46	-	.65	.56	.13	.54	.20	.48	.39	.38	.07	.20	.20	.15	.32	.48	.60	.70	.41	.24	.12	.13	.14	.10	.04
6. ASRS Motor Hyp/Imp	.22	.46	.41	.46	.62	-	.60	.08	.52	.27	.49	.41	.29	.06	.14	.17	.22	.39	.47	.35	.47	.36	.19	.08	.14	.14	.15	.06
7. ASRS Verbal Hyp/Imp	.40	.52	.45	.38	.53	.57	-	-.11	.42	.11	.40	.19	.11	.01	-.09	-.09	.32	.37	.38	.38	.42	.36	.26	.17	.29	.37	.11	.13
8. BAPQ Aloofness	-.44	-.17	-.17	.15	.15	.00	-.13	-	.41	.50	.26	.31	.39	.27	.85	.54	-.02	.11	.15	.23	.19	-.06	.15	.37	.11	-.42	-.02	.01
9. BAPQ Prag Language	-.08	.30	.21	.44	.54	.46	.40	.39	-	.44	.54	.41	.37	.17	.42	.43	.20	.41	.50	.44	.47	.31	.25	.25	.23	.00	.02	-.04
10. BAPQ Rigidity	-.32	-.04	-.16	.24	.14	.19	.00	.54	.39	-	.38	.45	.36	.16	.49	.33	.03	.14	.16	.21	.21	-.08	.12	.21	.14	-.23	.00	-.05
11. CAT-PD Lability	-.04	.33	.21	.77	.49	.45	.39	.25	.50	.35	-	.60	.52	.11	.33	.25	.18	.37	.49	.36	.45	.33	.22	.20	.25	.03	.04	.02
12. CAT-PD Anxiousness	-.20	.06	.09	.52	.40	.36	.22	.29	.44	.44	.63	-	.60	.11	.42	.23	.07	.24	.39	.30	.37	.04	.16	.01	.11	-.11	-.02	-.05
13. CAT-PD Depress	-.13	-.03	-.01	.48	.38	.28	.15	.44	.40	.38	.58	.60	-	.14	.48	.36	-.02	.17	.27	.38	.39	.13	.20	.22	.14	-.12	.04	.06
14. CAP-PD Rom Disint	-.13	-.08	-.12	.07	.09	.01	-.03	.31	.19	.25	.13	.12	.16	-	.25	.23	.04	.16	-.03	.08	.06	-.03	.03	.09	-.01	-.25	-.16	-.01
15. CAT-PD Withdrawal	-.48	-.19	-.12	.18	.17	.05	-.12	.85	.39	.52	.29	.38	.49	.31	-	.60	.00	.14	.23	.27	.25	-.04	.14	.34	.12	-.42	.00	-.03
16. CAT-PD Emot Detach	-.25	-.03	-.04	.15	.24	.14	-.08	.55	.44	.35	.26	.24	.32	.28	.58	-	.02	.17	.27	.18	.23	.08	.19	.40	.16	-.19	.03	-.03
17. CAT-PD Unus Beliefs	.32	.39	.41	.16	.21	.24	.30	-.05	.16	.01	.17	.06	.04	.09	-.01	.05	-	.65	.36	.19	.18	.26	.41	.25	.49	.35	.15	.15
18. CAT-PD Unus Exper	.24	.38	.40	.37	.38	.35	.37	.10	.40	.06	.37	.29	.26	.11	.14	.19	.61	-	.55	.32	.32	.32	.36	.25	.38	.21	.12	.10
19. CAT-PD Fantasy	.23	.45	.58	.50	.51	.44	.38	.14	.47	.11	.43	.39	.32	.00	.19	.26	.31	.51	-	.42	.50	.32	.33	.19	.30	.24	.04	.10
20. CAT-PD Irrespons	.14	.25	.17	.34	.57	.27	.32	.27	.46	.19	.40	.31	.41	.14	.29	.24	.18	.37	.39	-	.68	.42	.46	.32	.29	.19	.07	.08
21. CAT-PD Non-Pers	.12	.31	.25	.45	.70	.42	.37	.23	.47	.20	.48	.39	.43	.11	.26	.27	.18	.38	.49	.68	-	.44	.30	.24	.25	.19	.07	.08
22. CAT-PD Nonplanful	.29	.42	.29	.37	.43	.28	.34	.00	.31	-.07	.39	.12	.18	-.01	-.02	.10	.23	.31	.33	.47	.45	-	.31	.21	.27	.34	.17	.15
23. CAT-PD Manipulative	.29	.35	.28	.21	.32	.30	.32	.13	.28	.11	.30	.16	.24	.02	.14	.21	.40	.38	.34	.44	.32	.38	-	.53	.63	.39	.24	.21
24. CAT-PD Callousness	.10	.24	.09	.16	.20	.11	.19	.40	.29	.20	.27	.03	.22	.18	.35	.39	.29	.30	.15	.34	.24	.28	.54	-	.60	.19	.15	.09
25. CAT-PD Grandiosity	.28	.36	.31	.15	.17	.21	.31	.07	.22	.11	.23	.05	.08	.04	.10	.17	.48	.35	.24	.28	.21	.28	.63	.61	-	.44	.20	.14
26. CAT-PD Exhibitionism	.73	.47	.48	.15	.22	.24	.43	-.43	.01	-.27	.09	-.10	-.10	-.25	-.44	-.21	.33	.24	.26	.17	.19	.32	.40	.12	.45	-	.21	.23
27. AUDIT Alcohol Use	.14	.16	.15	.03	.15	.15	.18	.00	.08	.02	.08	.04	.07	-.08	-.01	.09	.16	.11	.06	.14	.09	.25	.29	.17	.22	.21	-	.30
28. Drug Use Survey	.21	.17	.18	.10	.13	.10	.16	-.03	-.01	-.09	.09	-.03	.06	-.04	-.04	-.03	.14	.12	.14	.12	.07	.20	.19	.10	.13	.23	.33	-

Note. $N_s = 429$ and 377 at Time 1 and Time 2, respectively. All correlations are Pearson correlations, and all values $\geq |.50|$ are **bolded**. Correlations below the diagonal are those for Time 1, and correlations above the diagonal are those for Time 2. Please see the previous supplemental tables for full variable labels.

Online Table S5*Correlation Matrix for Variables included in the Structural Analyses in the Undergraduate Sample*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1. HPS Charisma	-																											
2. HPS Activation	.54	-																										
3. HPS Intell Confidence	.41	.53	-																									
4. HPS Mood Lability	.05	.29	.21	-																								
5. ASRS Inattentiveness	-.03	.19	.20	.44	-																							
6. ASRS Motor Hyp/Imp	.03	.28	.23	.49	.67	-																						
7. ASRS Verbal Hyp/Imp	.20	.38	.28	.35	.53	.57	-																					
8. BAPQ Aloofness	-.49	-.27	-.09	.19	.26	.19	.04	-																				
9. BAPQ Prag Language	-.13	.20	.17	.36	.51	.44	.41	.48	-																			
10. BAPQ Rigidity	-.33	-.16	-.14	.21	.20	.21	.18	.46	.36	-																		
11. CAT-PD Lability	-.07	.15	.05	.70	.46	.44	.35	.31	.42	.37	-																	
12. CAT-PD Anxiousness	-.23	.01	.02	.58	.46	.46	.30	.37	.42	.41	.71	-																
13. CAT-PD Depress	-.19	-.14	-.03	.56	.45	.39	.20	.47	.44	.37	.66	.67	-															
14. CAP-PD Rom Disint	-.17	-.08	-.06	-.07	-.06	-.06	-.13	.24	.16	.09	-.03	.04	.07	-														
15. CAT-PD Withdrawal	-.53	-.26	-.07	.21	.30	.23	-.02	.80	.46	.44	.34	.45	.55	.30	-													
16. CAT-PD Emot Detach	-.17	-.03	.02	.10	.24	.24	.04	.37	.35	.22	.15	.19	.31	.26	.42	-												
17. CAT-PD Unus Beliefs	.24	.20	.29	.10	.05	.08	.10	.09	.13	.03	.15	.08	.07	.05	.10	.02	-											
18. CAT-PD Unus Exper	.12	.17	.18	.28	.25	.25	.18	.25	.38	.15	.35	.31	.40	.09	.29	.17	.58	-										
19. CAT-PD Fantasy	.13	.29	.37	.43	.50	.42	.34	.23	.42	.12	.39	.38	.39	-.10	.25	.18	.30	.41	-									
20. CAT-PD Irrespons	.10	.16	.08	.29	.44	.23	.23	.24	.40	.11	.39	.27	.39	.02	.23	.11	.20	.36	.33	-								
21. CAT-PD Non-Pers	.02	.26	.15	.44	.66	.41	.36	.21	.45	.16	.51	.43	.45	-.07	.27	.18	.15	.28	.48	.61	-							
22. CAT-PD Nonplanful	.31	.35	.25	.27	.36	.21	.21	.02	.28	-.15	.26	.07	.23	-.10	.00	.14	.16	.27	.37	.46	.44	-						
23. CAT-PD Manipulative	.19	.15	.12	.20	.26	.15	.26	.22	.34	.16	.29	.14	.30	.00	.19	.16	.41	.45	.36	.53	.38	.36	-					
24. CAT-PD Callousness	.04	.01	.05	.02	.06	.05	.03	.42	.34	.21	.14	.03	.22	.20	.36	.29	.38	.33	.19	.33	.17	.20	.54	-				
25. CAT-PD Grandiosity	.24	.19	.30	.11	.14	.11	.26	.17	.25	.15	.23	.11	.14	-.03	.13	.07	.56	.44	.35	.34	.27	.22	.61	.52	-			
26. CAT-PD Exhibitionism	.65	.47	.40	.08	.04	.03	.25	-.34	-.01	-.14	.06	-.12	-.14	-.26	-.37	-.09	.30	.16	.22	.14	.15	.30	.33	.14	.46	-		
27. AUDIT Alcohol Use	.20	.11	.05	.17	.16	.11	.18	-.13	.03	.01	.17	.06	.05	-.30	-.13	.00	.06	.10	.18	.13	.14	.18	.22	.00	.16	.31	-	
28. Drug Use Survey	.11	.02	.07	.21	.22	.19	.18	.01	.10	-.01	.18	.16	.19	-.21	.05	.01	.09	.12	.16	.18	.20	.17	.16	.02	.16	.17	.52	-

Note. $N = 529$. All correlations are Pearson correlations, and all correlation values $|\geq .50|$ are **bolded**. Please see the previous supplemental tables for full variable labels.

Online Table S6*Geomin Rotated Loadings from the Two-Factor Models Across Samples and Timepoints*

Scale	<u>Community Time 1</u>		<u>Community Time 2</u>		<u>Undergraduate</u>	
	Instability	Detach	Instability	Detach	Instability	Detach
HPS Activation	.71	-.34	.73	-.32	.26	.60
ASRS Inattent	.70	.13	.66	.14	.70	-.02
ASRS Verb Hyp	.70	-.23	.70	-.22	.50	.25
CAT-PD Fantasy	.68	.08	.72	.07	.65	.12
ASRS Motor Hyp	.65	-.01	.66	.07	.61	.01
HPS Intellect Conf	.65	-.34	.68	-.37	.27	.44
CAT-PD Non-Persv	.64	.22	.66	.14	.70	.05
HPS Mood Lability	.63	.16	.62	.18	.64	.02
CAT-PD Unus Exper	.61	.04	.61	.01	.55	.04
CAT-PD Lability	.60	.31	.59	.31	.72	-.12
CAT-PD Non-Plan	.58	-.09	.57	-.17	.45	.32
CAT-PD Irrespon	.57	.24	.59	.16	.59	.06
CAT-PD Manipul	.57	.01	.50	-.02	.53	.16
BAPQ Prag Lang	.54	.40	.57	.39	.68	-.20
BAPQ Aloofness	-.02	.86	.00	.83	.49	-.67
CAT-PD Withdrawal	.01	.88	.04	.88	.52	-.71
CAT-PD Emot Detach	.15	.59	.15	.58	.34	-.29
HPS Charisma	.50	-.66	.52	-.73	.01	.81
CAT-PD Exhibit	.57	-.62	.54	-.65	.15	.72
BAPQ Rigidity	.08	.61	.16	.55	.38	-.42
CAT-PD Depressive	.34	.52	.29	.51	.71	-.36
CAT-PD Unus Belief	.49	-.15	.51	-.18	.32	.22
CAT-PD Grandiosity	.49	-.06	.50	-.06	.44	.24
CAT-PD Anxious	.37	.44	.36	.44	.66	-.31
CAT-PD Rom Disint	.00	.36	-.02	.31	.02	-.32
CAT-PD Callous	.36	.26	.33	.20	.37	-.10
AUDIT Alcohol	.25	-.07	.20	-.11	.19	.28
Drug Use Survey	.24	-.13	.21	-.14	.26	.13

Note. $N_s = 429$ and 377 at Times 1 and 2 in the online community sample; $N = 529$ in the Undergraduate sample. All loadings across samples and timepoints are unconstrained loadings. All loadings $\geq .50$ are **bolded**. Detach = Detachment. Some scale labels are abbreviated; see Online Supplemental Table S3 for full labels. Factors were intercorrelated $\leq .18$ in each dataset.

Online Table S7*Geomin Rotated Loadings from the Three-Factor Models Across Samples and Timepoints*

Scale	Community Time 1			Community Time 2			Undergraduate		
	Instab	Det	Antag	Instab	Det	Antag	Instab	Det	Ant/TD
HPS Lability	.82	.01	-.11	.79	-.09	-.10	.77	-.05	-.05
CAT-PD Lability	.78	-.12	.03	.74	-.19	.02	.76	.12	.01
CAT-PD Anxious	.72	-.33	-.09	.58	-.36	-.01	.75	.26	-.17
ASRS Inattent	.73	.08	.02	.79	-.03	-.08	.74	.02	.02
ASRS Motor Hyp	.69	.19	-.08	.82	.02	-.15	.70	-.03	-.03
CAT-PD Non-pers	.62	.00	.15	.63	.00	.13	.64	.00	.19
CAT-PD Fantasy	.61	.13	.10	.63	.07	.15	.52	-.03	.30
ASRS Verbal Hyp	.56	.42	-.04	.66	.33	-.07	.54	-.24	.14
BAPQ Language	.56	-.18	.24	.62	-.25	.18	.50	.29	.21
CAT-PD Depress	.53	-.37	.16	.40	-.40	.18	.66	.38	-.02
CAT-PD Irrespon	.41	.00	.33	.45	.00	.28	.39	.06	.38
CAT-PD Non-Plan	.37	.28	.16	.43	.28	.09	.33	-.22	.36
CAT-PD Unus Exp	.37	.19	.28	.42	.15	.27	.27	.12	.47
HPS Charisma	.08	.78	-.02	.17	.81	.01	-.03	-.73	.46
CAT-PD Exhibit	.12	.78	.05	.13	.77	.16	.01	-.60	.59
CAT-PD Withdraw	.03	-.75	.63	.03	-.78	.57	.28	.82	.02
BAPQ Aloof	-.04	-.73	.66	-.06	-.73	.60	.21	.80	.09
HPS Activation	.43	.54	.05	.58	.43	-.01	.27	-.54	.31
BAPQ Rigidity	.21	-.51	.30	.24	-.46	.24	.28	.44	-.03
HPS Intellect Conf	.41	.50	.01	.44	.48	.08	.18	-.34	.35
CAT-PD Unus Bel	.06	.36	.37	.17	.33	.36	-.02	-.03	.63
CAT-PD Rom Dis	.00	-.30	.26	.02	-.28	.14	-.13	.37	.03
CAT-PD Callous	-.21	.01	.86	-.16	.00	.81	-.11	.35	.67
CAT-PD Grand	-.15	.34	.71	-.03	.29	.71	.03	-.02	.77
CAT-PD Manip	.03	.28	.63	.03	.23	.66	.15	.04	.69
CAT-PD Emot Det	.05	-.43	.54	.06	-.46	.48	.17	.36	.10
AUDIT Alcohol	.00	.18	.23	.01	.17	.20	.20	-.27	.16
Drug Use Survey	.05	.21	.12	.01	.20	.18	.27	-.12	.10

Note. $N_s = 429$ and 377 at Times 1 and 2 in the online community sample; $N = 529$ in the Undergraduate sample. Instab = Instability; Detach = Detachment; Antag = Antagonistic Externalizing; Ant/TD = Antagonism/Thought Disorder. All loadings shown are unconstrained loadings. All loadings $\geq .50$ are **bolded**. Some scale labels are abbreviated; see Online Supplemental Table S3 for full labels. The strongest interfactor correlations in the online community sample were between Instability and Antagonistic Externalizing ($r_s = .52$ and $.47$ at Times 1 and 2, respectively). The strongest interfactor correlation in the undergraduate sample was between Instability and Antagonism/Thought Disorder ($r = .25$).

Online Table S8*Geomin Rotated Loadings from the Four-Factor Models in the Online Community Sample*

Scale	Community Time 1				Community Time 2			
	Intern	Detach	Disinh	Ant/TD	Intern	Detach	Disinh	Ant/TD
CAT-PD Lability	.88	.07	-.04	.08	.68	.25	.12	-.01
HPS Lability	.87	-.09	-.04	.04	.86	.14	-.02	-.05
CAT-PD Anxious	.65	.20	.13	-.18	.43	.37	.18	-.11
CAT-PD Depress	.47	.35	.20	-.07	.18	.44	.30	-.01
CAT-PD Withdraw	.05	.87	.23	.03	.06	.90	.03	.23
BAPQ Aloofness	.00	.87	.23	.04	.01	.87	-.03	.28
CAT-PD Emot Det	-.02	.59	.27	.13	.07	.58	.04	.27
HPS Charisma	-.11	-.59	.07	.45	.06	-.71	.16	.30
BAPQ Rigidity	.32	.52	.01	-.01	.21	.52	.05	.07
HPS Activation	.28	-.38	.08	.42	.59	-.33	.04	.22
HPS Int Confid	.19	-.37	.14	.34	.52	-.35	-.04	.32
ASRS Inattent	.03	-.04	.90	-.11	.08	-.02	.89	-.20
CAT-PD Non-pers	.03	.08	.80	-.04	.00	.02	.81	.02
CAT-PD Irrespon	-.07	.17	.69	.13	-.17	.06	.79	.15
BAPQ Language	.23	.26	.48	.04	.37	.32	.32	.08
ASRS Motor H/I	.29	-.18	.44	.02	.45	-.04	.45	-.13
CAT-PD Fantasy	.27	-.04	.39	.15	.53	.04	.17	.21
CAT-PD Non-plan	.10	-.14	.34	.25	.10	-.22	.43	.15
ASRS Verbal H/I	.20	-.33	.34	.21	.29	-.30	.46	.04
AUDIT Alcohol	-.07	-.03	.09	.28	-.03	-.09	.08	.23
Drug Use Survey	-.01	-.11	.06	.21	.04	-.11	.00	.24
CAT-PD Rom Dis	.01	.34	.11	.01	-.02	.30	.05	.02
CAT-PD Grandios	.04	.08	-.18	.88	.08	.00	-.03	.77
CAT-PD Callous	-.03	.40	-.03	.72	-.11	.27	.05	.72
CAT-PD Manip	.01	.09	.09	.70	-.08	.01	.22	.66
CAT-PD Unus Belf	.05	-.09	-.02	.57	.32	-.13	-.12	.52
CAT-PD Exhibit	-.02	-.57	.02	.53	.03	-.63	.17	.41
CAT-PD Unus Exp	.20	-.01	.21	.36	.44	.01	.02	.37

Note. $N_s = 429$ and 377 at Times 1 and 2, respectively. All loadings shown are unconstrained loadings. All loadings $\geq .40$ are **bolded**. Some scale labels are abbreviated; see Online Supplemental Table S3 for full labels. Intern = Internalizing; Detach = Detachment; Disinh = Disinhibited Externalizing; Ant/TD = Antagonism/Thought Disorder. The strongest interfactor correlations were between Internalizing and Disinhibited Externalizing ($r_s = .62$ and $.58$ at Times 1 and 2, respectively). Disinhibited Externalizing and Antagonism/Thought Disorder also were moderately correlated across time points ($r_s = .49$ and $.37$), with all other interfactor correlations being $< .30$.

Online Table S9*Five -Factor Model Geomin Rotated Factor Loadings from the Online Community Data (Time 2)*

Scale	Hyp Act	Detach	Disinh	Internal	Antag
HPS Intellectual Confidence	.83	-.03	-.02	-.17	.07
HPS Activation	.74	-.12	.05	.01	.04
CAT-PD Fantasy Proneness	.60	.19	.21	.05	.02
CAT-PD Unusual Experiences	.50	.14	.05	.05	.20
CAT-PD Unusual Beliefs	.45	.04	-.12	-.03	.37
ASRS Inattentiveness	.05	-.03	.90	.00	-.12
CAT-PD Non-Perseverance	.04	.04	.76	-.02	.08
CAT-PD Irresponsibility	-.11	.05	.72	-.04	.26
ASRS Motor Hyp/Impulsivity	.35	-.01	.49	.13	-.16
ASRS Verbal Hyp/Impulsivity	.30	-.24	.44	.07	.07
CAT-PD Non-Planfulness	.14	-.20	.37	.06	.21
BAPQ Aloofness	.05	.92	.04	-.07	.05
CAT-PD Social Withdrawal	.02	.91	.09	.01	.03
CAT-PD Emotional Detachment	.10	.63	.09	-.03	.10
HPS Charisma	.29	-.54	.09	-.14	.34
CAT-PD Exhibitionism	.19	-.53	.06	-.04	.50
BAPQ Rigidity	-.02	.39	.06	.28	.04
BAPQ Pragmatic Language	.32	.35	.36	.11	-.04
CAT-PD Romantic Disinterest	-.06	.27	.08	.00	-.03
CAT-PD Affective Lability	.21	-.05	.03	.83	.06
HPS Mood Lability	.53	.02	-.02	.61	-.14
CAT-PD Anxiousness	.03	.12	.16	.55	-.05
CAT-PD Depressiveness	-.22	.15	.25	.52	.13
CAT-PD Manipulativeness	-.05	.00	.11	.08	.75
CAT-PD Callousness	-.03	.29	-.04	.02	.69
CAT-PD Grandiosity	.09	.00	-.15	.17	.81
AUDIT Alcohol Use	.01	-.07	.05	-.01	.25
Drug Use Survey	.13	-.04	-.02	-.05	.21

Note. $N = 377$. All loadings $> |.40|$ are **bolded**. Loadings shown are unconstrained loadings. Detach = Detachment; Hyp Act = Hypomanic Activation; Disinh = Disinhibited Externalizing; Internal = Internalizing; Antag = Antagonistic Externalizing. Disinhibited Externalizing correlated .49 and .46 with Internalizing and Hypomanic Activation, respectively. Internalizing and Detachment also correlated .43. All other interfactor correlations $< .40$. ASRS = Adult ADHD Self-Report Scale; BAPQ = Broad Autism Phenotype Questionnaire; CAT-PD = Comprehensive Assessment of Traits Relevant to Personality Disorder; HPS = Hypomanic Personality Scale; Hyp/Impulsivity = Hyperactivity/Impulsivity.