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The Difference Between Trait Disinhibition and Impulsivity—and Why It Matters for Clinical Psychological Science

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In the psychological science field, there is substantial interest in quantifying individual differences in self-regulatory capacity because of its transdiagnostic relevance to various forms of psychopathology. Trait disinhibition and impulsiveness are popular conceptualizations of dispositions reflecting self-regulation of behavioral and emotional responding. In the literature, these constructs are often treated interchangeably because of their shared focus on general disconstraint and a lack of direct comparisons between measures of each. The current work used structural modeling to examine conceptual and empirical differences between 2 popular operationalizations of these traits in 2 samples (*N*s = 400, 308), and employed regression and dominance analyses to compare their predictive relations with criterion measures of externalizing problems and negative affectivity (NA). Impulsigenic traits were related both to externalizing problems and NA, whereas trait disinhibition was selectively associated with externalizing. In a dominance analysis, trait disinhibition exhibited complete dominance over all impulsigenic traits in predicting externalizing problems. Conversely, multiple impulsigenic traits evidenced complete dominance over trait disinhibition in prediction of NA. The current work provides evidence that (a) disinhibition and impulsigenic traits are not interchangeable, (b) disinhibition specifically indexes propensity for externalizing problems, and (c) impulsigenic traits reflect a blend of externalizing and NA that appears relevant to diverse forms of psychopathology.

Public Significance Statement
This study compared the traits of disinhibition and UPPS-P impulsivity in prediction of externalizing problems and negative affectivity (NA). Disinhibition predicted externalizing problems more strongly than UPPS-P traits, and certain UPPS-P traits predicted NA more strongly. Future work should prioritize disinhibition for study of the externalizing spectrum and UPPS-P for study of impulsivity-relevant features of NA.

Keywords: disinhibition, dominance analysis, externalizing, impulsivity, negative affectivity

Supplemental materials: http://dx.doi.org/10.1037/pas0000964.supp

Psychological scientists have long been interested in self-regulatory capacity because of its broad relevance to a host of psychological and behavioral outcomes. This construct is particularly important for *clinical* psychological science, because it is thought to operate as a transdiagnostic liability for psychopathological outcomes involving weak impulse control, poor emotional

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control, and dysregulated behavior. Several conceptualizations of trait dispositions relevant to self-regulatory ability are popular in the literature, including the construct of disinhibition reflected in the Externalizing Spectrum Inventory (ESI; Krueger, Markon, Patrick, Benning, & Kramer, 2007) and the Triarchic Psychopathy Measure (TriPM; Patrick, 2010), and the set of impulsivity-promoting ("impulsigenic") traits measured by the UPPS-P scale (Negative Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency; Lynam, Hoyle, & Newman, 2006; Whiteside & Lynam, 2001). However, to date, it has not yet been clearly explicated what distinguishes disinhibition and impulsigenic traits—or whether they are functionally interchangeable while being named differently (e.g., a case of the "jangle fallacy"; Kelley, 1927; Pedhazur & Pedhazur Schmelkin, 1991; Thorndike, 1904). Further complicating this matter, the UPPS-P model is argued to represent five separate, *divergent* pathways to impulsive behavior (Lynam, Smith, Whiteside, & Cyders, 2006), whereas disinhibition is conceptualized as a higher-order construct encompassing *converging* subfactors within the context of the externalizing spectrum model (Krueger et al., 2007). Thus, the current work sought to (a) illustrate areas of convergence and divergence between disinhibition and impulsigenic traits and (b) compare the two models in predicting psychopathology-relevant criterion measures (i.e., externalizing problems and negative affective proclivities/problems).

Construct Definitions and Nomological Networks

Disinhibition

Trait disinhibition is a dispositional construct encompassing recklessness, lack of planning and forethought, and deficient emotional and behavioral control (Patrick, Fowles, & Krueger, 2009). Although several models of personality and psychopathology include variations on the term *disinhibition*, the specific construct examined in this study is the common trait liability promoting risk for a range of disorders characterized by poor behavioral control (Krueger et al., 2002). One well-validated operationalization of trait disinhibition in the self-report domain comes from the ESI (Krueger et al., 2007; Patrick, Kramer, Krueger, & Markon, 2013). Conceptually, ESI disinhibition is related to constructs from other models related to externalizing behavior, including Barratt, Monahan, and Steadman's (1994) impulsiveness as well as the low pole of the constraint dimension (i.e., hypothesized latent continuum of capacity for self-restraint) indexed by the Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982). However, it differs from constructs tapped by these impulsivity measures in that it was deduced from twin-study research demonstrating a highly heritable factor accounting for systematic covariance among externalizing problems of various types and disinhibitory personality traits (e.g., Krueger et al., 2002; Young et al., 2009).

Prior research has demonstrated the utility of the latent construct indexed by the ESI's general factor, showing that self-report scale measures of this disinhibition factor concurrently and prospectively predict multiple externalizing outcomes, including substance dependence (Iacono, Malone, & McGue, 2008; Joyner et al., 2019; Krueger et al., 2002; Tarter, Kirisci, Habeych, Reynolds, & Vanyukov, 2004) along with conduct and attentional problems (Brislin et al., 2019). Furthermore, scale-assessed disinhibition is highly heritable (Yancey, Venables, Hicks, & Patrick, 2013), and twin modeling work has shown that genetic influences on disinhibition explain a substantial amount of variance in the heritability of substance use disorders (Hicks, Schalet, Malone, Iacono, & McGue, 2011; Joyner et al., 2020; Vrieze, McGue, Miller, Hicks, & Iacono, 2013) and other externalizing problems (Yancey et al., 2013). Given these and other lines of evidence (see Nelson & Foell, 2018, for a review), trait disinhibition has been conceptualized as a liability factor for externalizing psychopathology (Perkins, Joyner, et al., 2020; see also Iacono, Carlson, Taylor, Elkins, & McGue, 1999; Patrick, Venables, et al., 2013; Young et al., 2009). Importantly, disinhibition can be operationalized in other modalities of measurement besides self-report, including poor behavioral performance on executive function tasks (Venables et al., 2018; Young et al., 2009) and impaired brain responding in cognitive-attentional tasks (Brennan & Baskin-Sommers, 2018; Iacono, Carlson, Malone, & McGue, 2002; Nelson, Patrick, & Bernat, 2011; Patrick et al., 2006; Patrick, Venables, et al., 2013; Yancey et al., 2013). Critically, the brain response measures found to covary with self-reported disinhibition *prospectively* predict the later emergence of substance use problems in individuals assessed prior to the onset of such problems (Iacono et al., 1999, 2002; Hill, Steinhauer, Locke-Wellman, & Ulrich, 2009; Habeych, Charles, Sclabassi, Kirisci, & Tarter, 2005). Although indexed in the current study using a self-report scale measure, the latent construct of ESI disinhibition thus reflects a broader neurobehavioral trait dimension anchored in behavioral performance and neural response in addition to experiential report (Patrick et al., 2019; Patrick, Venables, et al., 2013; Venables et al., 2018).

Impulsivity and Impulsigenic Traits

As with disinhibition, the term *impulsivity* has multiple meanings and connotations in the literature. The current study focused on the well-known model of impulsivity put forth by Lynam and colleagues (Lynam et al., 2006; Whiteside & Lynam, 2001) to consolidate these varied conceptualizations. In this model, impulsive behavior is viewed as an equifinal outcome that can result from various distinct impulsivity-promoting dispositions, or *impulsigenic traits*: heightened urgency for rash action driven by positive or negative mood states ("positive" and "negative urgency," respectively); suboptimal preplanning ("lack of premeditation"); poor sustained attention and prolonged goal pursuit ("lack of perseverance"); and propensity to engage in high-intensity or risky behaviors ("sensation seeking"). These five traits constitute the UPPS-P model[1] and eponymous self-report measure (Lynam et al., 2006). The UPPS-P model was conceptually derived from the five-factor model of personality (FFM; Costa & McCrae, 1992), based on the idea that differing impulsigenic tendencies reflect ostensibly similar behavioral manifestations of core FFM traits (Lynam et al., 2006). The original article on this model explained

[1] This model and measure differ from the original UPPS (Whiteside & Lynam, 2001) in that the latter did not differentiate between positive and negative urgency and thus included only four traits: urgency, lack of premeditation, lack of perseverance, and sensation seeking. In what follows, unless otherwise stated, the term "UPPS-P" is used to refer broadly to this model of impulsigenic traits without excluding papers using its original conceptualization as UPPS.

that (a) urgency is the manifestation of the impulsiveness facet of FFM neuroticism; (b) lack of premeditation derives from the 'lack of deliberation' facet of conscientiousness; (c) lack of perseverance stems from the 'self-discipline' facet of conscientiousness; and (d) sensation seeking arises from the 'excitement seeking' facet of extraversion (Lynam et al., 2006; Whiteside & Lynam, 2001).

Myriad studies have demonstrated a concurrent and prospective link between impulsigenic traits and externalizing behavior (Carlson, Pritchard, & Dominelli, 2013; Settles et al., 2012; Whiteside & Lynam, 2003), including several meta-analyses (Berg, Latzman, Bliwise, & Lilienfeld, 2015; Coskunpinar & Cyders, 2013). However, self-report measures of these traits do not typically relate robustly to behavioral performance on executive function tasks (Derefinko et al., 2014; Friedman et al., 2020; MacKillop et al., 2016) nor to the blunted brain reactivity observed for disinhibition (Petit, Kornreich, Noël, Verbanck, & Campanella, 2012). Furthermore, while early models of impulsivity conceptualized it as orthogonal to fear and anxiety (Barratt, 1965; Gray, 1987), the UPPS-P model includes explicit, substantial representation of negative affectivity (NA; Settles et al., 2012), the dispositional propensity to experience greater levels of negative emotion (Clark, Watson, & Mineka, 1994).

Although it is unsurprising that dysregulated behavior would be associated with negative emotional experiences, it should be noted that the observed covariation that impulsivity shows (when defined in terms of proneness to unplanned, emotion-driven action) with NA and internalizing problems is attributable substantially to common genetic influences (Gustavson et al., 2017; Racine et al., 2013). This suggests that the impulsigenic traits indexed by the UPPS-P may share etiological influences with both internalizing *and* externalizing psychopathology, reducing the specificity of their prediction to externalizing forms of psychopathology. Indeed, Whiteside and Lynam (2003) demonstrated that individuals with alcohol dependence showed elevations on all impulsigenic traits compared to controls, but these differences were eliminated when controlling for other types of psychopathology symptoms. Taken together, these empirical findings suggest that UPPS-P traits are saturated with negative affect related variance, including variance *not* associated with externalizing psychopathology,[2] in contrast to the specific neurobehavioral predisposition to externalizing represented by trait disinhibition.

Commonalities and Divergence Between Disinhibition and Impulsigenic Traits

As one might expect, there are several commonalities between disinhibition and impulsigenic traits due to their shared focus on disconstraint and dysregulation and their demonstrated links with psychopathology. For example, meta-analyses suggest that all five UPPS-P facets relate to substance use and aggression, with particularly strong associations for positive and negative urgency (Berg et al., 2015). Similarly, although a meta-analysis has yet to be conducted, numerous studies have reported links between trait disinhibition and various forms of externalizing psychopathology, including conduct problems, aggressive-antisocial behavior, and substance abuse (Iacono et al., 2008; Joyner et al., 2019, 2020; Krueger et al., 2002; Tarter et al., 2004).

However, there are also salient points of divergence. Most broadly, the two models differ substantially in their approach to explaining behavioral dysregulation: Impulsigenic traits are conceptualized as separable, etiologically distinct phenomena, whereas disinhibition is characterized as a single, coherent liability factor for externalizing problems specifically. As a result, the UPPS-P self-report scale aims to provide a measure of various pathways to impulsive behavior thought to contribute to psychopathology, whereas the ESI Disinhibition scale was designed to capture the latent liability factor for externalizing reflected in the systematic covariance among different externalizing disorders that has been further characterized through twin (e.g., Patrick, Venables, et al., 2013; Yancey et al., 2013) and multimethod research studies (e.g., Venables et al., 2018). Authors of the UPPS-P measure articulate the importance of the UPPS-P model of impulsivity being treated as multidimensional instead of unidimensional (Sperry, Lynam, Walsh, Horton, & Kwapil, 2016; Whiteside & Lynam, 2001), whereas the authors of the ESI explicitly articulate the need for conceptualizing and measuring disinhibition as coherent dimension reflecting dispositional liability toward externalizing problems (Krueger et al., 2007; Patrick et al., in press; Patrick, Kramer, et al., 2013).

Relatedly, the two models differ in the depth and breadth of psychopathology they seek to explain. All five UPPS-P traits relate quite robustly to both internalizing (e.g., depression, suicidality) and externalizing symptoms (e.g., substance use) across studies (Berg et al., 2015). Given the importance of demarcating individual differences underlying broad, hierarchical psychopathology dimensions more clearly (Lynam & Miller, 2019), systematic research is needed to characterize trait dispositions conducive to internalizing and externalizing problems more distinctly from one another. Compared to the associations with both internalizing and externalizing problems exhibited by the UPPS-P traits, trait disinhibition is markedly more strongly related to externalizing than internalizing pathology (Nelson, Strickland, Krueger, Arbisi, & Patrick, 2016). Whereas UPPS-P traits appear to capture behavioral dysregulation and emotional instability that relates broadly to psychopathology, these traits do not show systematic associations with behavioral measures of inhibitory control (see, e.g., Cyders & Coskunpinar, 2011; MacKillop et al., 2016; Whiteside & Lynam, 2001). Trait disinhibition, on the other hand, relates more specifically to externalizing problems and demonstrates associations with neurophysiological as well as behavioral indicators of inhibitory control (Brislin et al., 2019; Ribes-Guardiola, Poy, Patrick, & Moltó, 2020; Venables et al., 2018; Yancey et al., 2013; see also Young et al., 2009). These lines of evidence indicate that trait disinhibition may provide a more robust and specific index of latent externalizing liability.

[2] It should be noted that there is evidence relating externalizing problems to NA—in particular, facets of NA pertaining to hostility/aggressiveness and suspiciousness/mistrust (e.g., Krueger, 1999), which reflect elements of NA shared between externalizing and internalizing. In the current work, we were interested in comparing UPPS-P traits and disinhibition for representation of internalizing specific elements of NA (i.e., anxious-fearful proclivities) as opposed to elements common to externalizing and internalizing.

Dominance Analysis

Given evidence supporting the value of both trait disinhibition and impulsigenic traits to clinical psychological research, it is useful to consider what types of questions might best be addressed using one versus the other. The current work was undertaken to provide empirical guidance on this topic through use of an underutilized statistical approach, dominance analysis—along with the well-known approach of structural modeling. Although tools for comparing the magnitude of bivariate correlations exist (e.g., Steiger-*Z* test; Steiger, 1980), these tools cannot be extended to multivariate regression models due to multiple predictor collinearity. The technique of dominance analysis (Azen & Budescu, 2003; Budescu, 1993) was developed to overcome the pitfalls of high collinearity between predictors, by defining predictor importance in terms of total unique variance accounted for in an outcome variable. Additionally, by allowing individual predictors to fall into differing tiers of dominance, the approach overcomes concerns that have been raised regarding the use of variance partitioning (partialing) to evaluate predictive associations of correlated variables (e.g., Lynam et al., 2006).

Specifically, a given predictor can demonstrate "complete," "conditional," or "general dominance" in relation to other variables included in a prediction model (Nimon & Oswald, 2013). Complete dominance over a second predictor of interest, the strongest form of dominance, is achieved when the main predictor of interest accounts for more unique variance in the outcome variable than the second predictor (a) at the zero-order level (i.e., a larger-magnitude correlation coefficient), (b) in a regression model including only those two predictors (i.e., a larger semipartial correlation coefficient), and, if other predictors exist besides the main and second predictors, (c) in a regression model including all possible combinations of predictors (i.e., a larger semipartial correlation coefficient when 1 through *n* other predictors are included in the model; Azen & Budescu, 2003).

If a predictor exhibits complete dominance over another predictor, it also possesses conditional and general dominance. One predictor has conditional dominance over another if it accounts for more variance than the other predictor in only some regression submodels (e.g., only at the zero-order level but not in the multiple regression models, or vice versa). The weakest form of dominance, general dominance, signifies that the predictor in question accounts for more unique variance than another predictor, *on average,* across all models (i.e., averaging variance accounted for in zero-order, two-predictor regression, and *n*-predictor regression models). Employing the technique of dominance analysis, then, the comparative strength of the predictors can be judged without reference to the psychological meaning of a residualized versus "full-variance" representation of a construct. Given its unique advantages as a method for comparing the predictive utility of different variables, we used dominance analysis to characterize the relative importance of ESI disinhibition and UPPS-P traits in predicting a range of psychopathological outcomes.

The Current Study

Although it is not feasible to fully compare the extensive nomological networks of these two constructs in a single study, the current work was undertaken to examine two highly popular scale-based operationalizations of each to begin to understand their similarities and differences. Our overarching hypothesis was that impulsigenic traits represent a mix of two distinct dispositional characteristics—externalizing and NA—and, compared with disinhibition, would relate more to NA and NA-related problems and less to impulsive-irresponsible (externalizing) psychopathology. We tested this hypothesis in two relatively large samples with self-report data for ESI Disinhibition, UPPS-P impulsigenic traits, and various measures of externalizing and NA. First, we utilized structural equation modeling (SEM) in Sample 1 and exploratory SEM (ESEM) in Sample 2 to define latent externalizing and NA dimensions and explored the degree of cross-loading of disinhibition and impulsigenic traits on these dimensions. Our specific hypothesis was that (a) disinhibition would load robustly onto the latent externalizing dimension and not on the NA dimension, whereas impulsigenic traits would load more weakly onto the latent externalizing dimension and significantly on the internalizing dimension as well. Next, we performed multiple regression and dominance analysis in the two samples separately to investigate the relative importance of each scale in predicting externalizing and NA factor scores derived from structural models in each sample. We hypothesized that (b) disinhibition would exhibit greater variable importance than all impulsigenic traits in prediction of externalizing problems and (c) impulsigenic traits—especially positive and negative urgency—would exhibit greater variable importance than disinhibition in prediction of criterion variables more closely related to NA.

Method

Participants

Participants in Sample 1 were 400 college students (74% female; 40.5% Black, 24.0% White, 21.3% Asian, 5.5% Latino, 5.0% Multiracial, <1% each American Pacific Islander, Middle Eastern, Indian, or Indigenous American, M_{age} = 21.6 years, *SD* = 6.2 years) from a large university in the southern United States. Sample 2 consisted of 308 college students (74% female; 31.8% White, 29.5% Black, 22% Latino; 31.8% freshmen, 29.5% sophomores, 22.4% juniors, 16.2% senior or above) from the same university. All participants provided informed consent prior to data collection, and all activities were approved by the university's Institutional Review Board.[3]

Trait Measures

Disinhibition. Trait disinhibition was assessed in both samples using the Externalizing Spectrum Inventory's 20-item Disinhibition scale (ESI-Dis; Patrick, Kramer, et al., 2013), which corresponds to the Disinhibition scale of the Triarchic Psychopathy Measure (TriPM; Patrick, 2010). The 20-item ESI-Dis scale

[3] Other variables available in the current samples that were *not* utilized in the current work related to: Sample 1, cognitive-behavioral tasks and psychopathic personality; Sample 2, body modification, relationships, and sexual interests and experiences that were beyond the scope/unrelated to the goals of the current paper. Other articles published using subsets of these data concerning the constructs the above-mentioned measures seek to assess are: Watts, Bowes, Latzman, and Lilienfeld (2017); Watts, Donahue, Lilienfeld, and Latzman (2017); Willis, Birthrong, King, Nelson-Gray, and Latzman (2017).

was developed to provide a concise self-report index of the latent construct of biobehavioral liability for externalizing problems (Iacono et al., 1999; Patrick et al., 2019). This measure of disinhibition has good psychometric properties (Patrick, 2010; Patrick, Kramer, et al., 2013) and demonstrates high convergent validity with other measures of dispositional liability to externalizing problems (Drislane, Patrick, & Arsal, 2014; Stanley, Wygant, & Sellbom, 2013). It displayed good internal consistency reliability within the two samples of the current study (Sample 1/Sample 2: α = .80/.87, ω = .80/.87).

Impulsigenic traits. The UPPS-P scale (Lynam et al., 2006) was used to operationalize impulsigenic traits in both samples. The UPPS-P contains 59 items organized into five correlated subscales posited to quantify different routes to impulsive behavior (Lynam et al., 2006). These scales have been shown to exhibit good psychometric properties and measurement invariance across sex (Cyders, 2013). These scales displayed good internal consistency reliability in the current study (Sample 1/Sample 2: 14-item Positive Urgency α = .88/.90, ω = .89/.92; 12-item Negative Urgency α = .74/.83, ω = .81/.87; 11-item Lack of Premeditation α = .76/.82, ω = .78/.85; 10-item Lack of Perseverance α = .81/.82, ω = .81/.85; 12-item Sensation Seeking α = .82/.87, ω = .83/.87).

Externalizing Problem Measures

Sample 1. Available measures in this sample assessed alcohol use problems and various forms of aggression. The 24-item Young Adult Alcohol Consequences Questionnaire—Brief Form (YAACQ-B; Read, Merrill, Kahler, & Strong, 2007) and the 23-item Rutgers Alcohol Problems Index (RAPI; White & Labouvie, 1989) were used to operationalize alcohol problems. Both scales have been demonstrated to have good psychometric properties (Read, Beattie, Chamberlain, & Merrill, 2008; White & Labouvie, 1989) as well as evidence of convergent validity with diagnostic criteria of alcohol use disorder and other alcohol use and problems inventories (Kahler, Hustad, Barnett, Strong, & Borsari, 2008). These scales displayed good psychometric properties in this sample (YAACQ-B α = .95, ω = .95; RAPI α = .92, ω = .92).

The Reactive scale of Raine et al.'s (2006) Reactive-Proactive Aggression Questionnaire (RPQ-R) was used to operationalize reactive aggression. Because the RPQ's Proactive scale (RPQ-P) operates more as an indicator of callous behavior than externalizing psychopathology (Fanti, Frick, & Georgiou, 2009; Fite, Stoppelbein, & Greening, 2009), it was not used in the current work. The RPQ-R displayed good psychometric properties in the current sample (α = .92, ω = .92). Other measures of aggression were provided by the Indirect Aggression Scale (IAS; Forrest, Eatough, & Shevlin, 2005), which is composed of 25 items grouped into three subscales: Social Exclusion (IAS-S; 10 items), Malicious Humor (IAS-M; 9 items), and Guilt Induction (IAS-G; 6 items). Consistent with the exclusion of RPQ-P, IAS-G was excluded from analyses because of its strong and specific relations to callous behavior as opposed to externalizing psychopathology (Fanti et al., 2009). The two IAS subscales used displayed good psychometric properties in this sample (IAS-M α = .80, ω = .80; IAS-S α = .80, ω = .81).

Sample 2. Measures of externalizing problems for Sample 2 were derived from the Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (*DSM–IV*) Axis II Personality Disorders (SCID-II) screening questionnaire, which contains 119 items covering the diagnostic criteria for the 10 personality disorders (PDs) included in the *DSM–IV* and in Section II of the current 5th edition (*DSM–5*), along with criteria for the provisional diagnosis of depressive PD included in *DSM–IV*. Four of these PDs—narcissistic, histrionic, conduct/antisocial (only conduct disorder-related symptoms are covered in the SCID-II screening questionnaire), and borderline PDs—are characterized by erratic behavior and poor emotional control and are typically considered part of the externalizing spectrum (e.g., James & Taylor, 2008; Kotov et al., 2017; Krueger, Caspi, Moffitt, & Silva, 1998), making them appropriate criterion variables for the current work. Although borderline personality disorder (BPD) is considered part of Cluster B of the DSM PDs, it loads on to both internalizing and externalizing problem dimensions in theoretical and data-driven structural models (Kotov et al., 2017). Accordingly, in the ESEM for Sample 2, BPD was specified as a complex indicator with a priori loadings on both externalizing and NA factors.[4]

Negative Affectivity Measures

Sample 1. Measures of NA in this sample were derived from questionnaires assessing facets of emotional reactivity and mood experience. Two subscales from the 21-item Emotion Reactivity Scale (ERS; Nock, Wedig, Holmberg, & Hooley, 2008) were used to operationalize emotional reactivity—its Emotional Sensitivity (ERS-S) scale, which indexes susceptibility to strong negative emotions, and its seven-item Emotional Arousal (ERS-A) scale, which assesses the intensity of negative experienced emotions. The ERS's third scale, Emotional Persistence (ERS-P; four items), was not used, because its questions pertain to success or failure of emotion regulation rather than to emotional experience per se (Gross & Jazaieri, 2014). In the current sample, the ERS-S and ERS-A scales demonstrated very high internal consistency reliabilities (αs = .91 and .88, respectively, ωs = .91 and .88). In addition, the 10-item NA scale of the Positive and Negative Affect Schedule (PANAS; Watson & Clark, 1994) was used to assess the extent of negative emotions experienced over the past week. Its internal consistency reliability in the current sample was acceptably high (α = .85, ω = .85).

Sample 2. Symptoms most aligned with NA were derived from the SCID-II items assessing avoidant, dependent, and depressive PDs. These PDs entail mood disturbance and emotion dysregulation and are closely associated with internalizing pathology and chronic negative emotionality; factor analytic work suggests they load heavily onto the internalizing spectrum alongside depressive and anxiety disorders (Kotov et al., 2011, 2017; Krueger et al., 2018). Further, they exhibit discriminant validity with respect to externalizing problems (e.g., negligible relations with problem drinking; Coid, Yang, Tyrer, Roberts, & Ullrich, 2006).

Data Analytic Plan

Correlational analyses were run in each sample to characterize the covariance among disinhibition and UPPS-P traits. Next, using data for Sample 1, a confirmatory factor analysis (CFA) model specifying

[4] We encourage interested readers to test their preferred alternative theoretical structural models using data and code available on the Open Science Framework for this article: https://osf.io/tc9qf/.

correlated externalizing and NA factors was run with maximum likelihood estimation using the *lavaan* package (Rosseel, 2012) of the R statistical environment (v.3.5.1; R Core Team, 2018). Specifically, the YAACQ-B, RAPI, RPQ-R, and IAS-S and IAS-M scales were specified as indicators of a latent externalizing factor, and the ERS-S, ERS-A, and PANAS-NA were specified as indicators of a latent NA factor. Because the two IAS and two ERS subscales came from the same parent instrument and the RAPI and B-YAACQ specifically assess alcohol use problems, residual covariances between these pairs were specified a priori. The goal of this specification strategy was to prevent the paired indicators from dominating their respective latent factors as a result of shared method variance, rather than because of shared construct-related variance. Using data for Sample 2, an ESEM with target rotation specifying correlated externalizing and NA factors from personality disorder indicators was run with maximum likelihood using the *MplusAutomation* package in (*R* Hallquist & Wiley, 2018) implemented via Mplus v.8.3. ESEM allows all indicators to load onto all latent factors in the specified model, while still permitting confirmatory evaluation of hypothesized model structure (see Marsh, Morin, Parker, & Kaur, 2014). BPD was treated as a complex indicator in the model for Sample 2, being specified as belonging to both externalizing and NA factors. Histrionic, narcissistic, and antisocial PDs were specified as belonging to externalizing, whereas avoidant, dependent, and depressive PDs were specified as belonging to NA.

Absolute fit of these models was assessed using the chi-square (χ^2), root mean square error of approximation (RMSEA), and standardized root-mean-square residual (SRMR) statistics, and incremental fit was assessed using the comparative fit index (CFI) and Tucker-Lewis index (TLI). The observed loadings from these models were then applied as fixed loadings in a second set of models, in which either disinhibition or one of the UPPS-P traits was added as an observed variable and allowed to cross-load onto both latent factors. Six models were run in each dataset, one for disinhibition and one for each UPPS-P scale. All parameter estimates reported in the results are standardized parameter estimates.

The next set of analyses utilized Bartlett's (1937; see also Grice, 2001) method to quantify scores on the externalizing and NA factors modeled in each of Samples 1 and 2. First, to establish directionality of unique effects for disinhibition and UPPS-P traits, all six traits were entered into linear regression models predicting each factor in turn (four models total). In each sample, the regression analyses were then supplemented by dominance analyses using the *dominanceanalysis R* package to quantify the relative degrees to which disinhibition and the five UPPS-P traits contributed to each outcome variable. General Dominance Weights were generated by these dominance analyses, representing the average unique R^2 contribution of a given variable across all models. The GDW ratio is simply the GDW divided by the total R^2 of a model including all predictors. Last, bootstrapped models (n = 1,000) were implemented to ascertain the robustness of the dominance analysis results.

Results

Structural Models in Sample 1

The correlated two-factor model of externalizing problems and NA specified in Sample 1 is depicted in Figure 1. The model

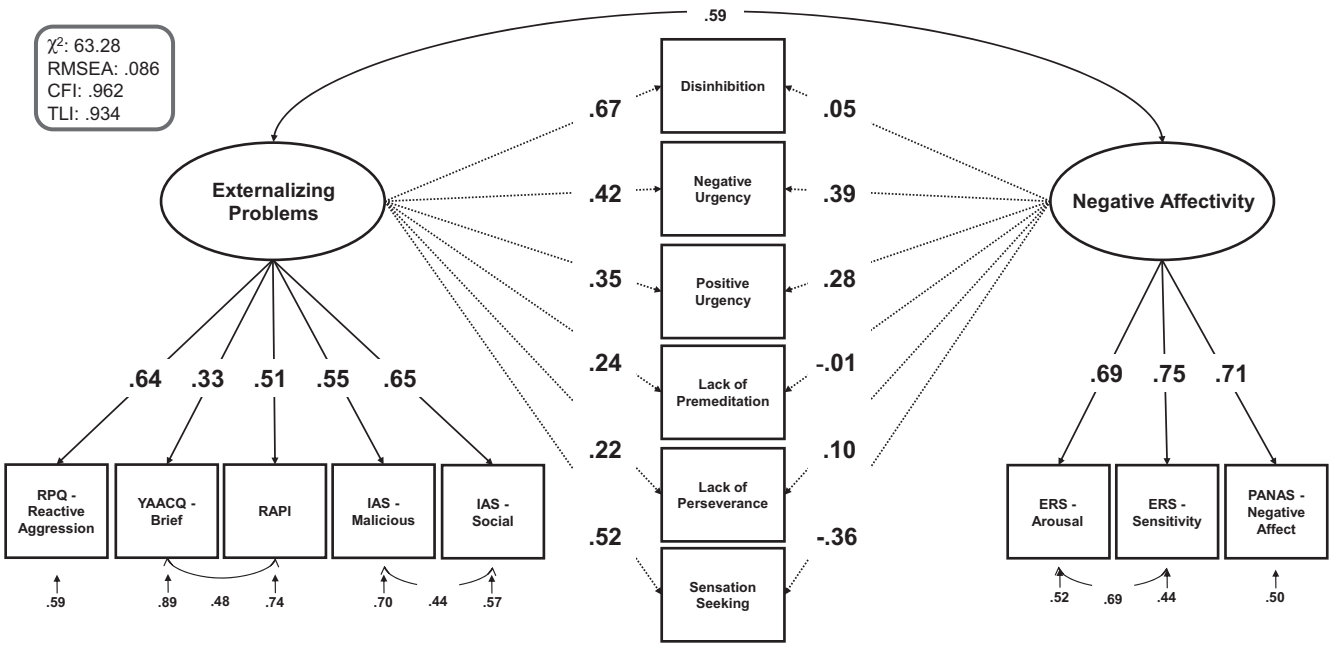

Figure 1. Correlated two-factor structural model of externalizing and negative affectivity. Nontrait loadings were fixed from the first iteration of the model that did not include traits, and only one trait was added at a time. Standardized parameter estimates are shown. CFI = comparative fit index; ERS = Emotional Reactivity Scale; IAS = Indirect Aggression Scale; PANAS = Positive and Negative Affect Schedule; RAPI = Rutgers Alcohol Problems Index; RMSEA = root mean square error of approximation; RPQ = Reactive-Proactive Aggression Questionnaire; TLI = Tucker-Lewis index; YAACQ = Young Adult Alcohol Consequences Questionnaire.

evidenced acceptable fit: CFI = .962, TLI = .934, $\chi^2(28) = 63.28$ ($p < .001$), RMSEA = .086, and SRMR = .048. Both factors exhibited strong and generally balanced loadings for their respective indicators (see Figure 1), and externalizing problems and NA were moderately correlated ($\psi = .59$, $p < .001$). The loadings from this first model were fixed in subsequent models. When ESI-Dis was added to the model and allowed to load onto both factors, it exhibited a strong and selective loading on the externalizing factor ($\lambda = .67$, $p < .001$) and a near-zero loading on the NA factor ($\lambda = .05$, $p = .55$). The UPPS-P's lack of premeditation and lack of perseverance scales loaded weakly but significantly onto the externalizing factor (λs = .24 and .22, respectively, ps = .006 and .01) and negligibly onto the NA factor (λs = −.01 and .10, respectively, ps = .95 and .24). The UPPS's negative and positive urgency scales loaded slightly more strongly onto the externalizing factor of the model, but at lower levels than for ESI-Dis (λs = .42 and .35, respectively, ps < .001), and they loaded nearly as strongly onto the NA factor (λs = .39 and .28, respectively, ps < .001). The UPPS's fifth scale, sensation seeking, loaded more highly onto the externalizing factor (externalizing: $\lambda = .52$, $p < .001$), but also loaded to a prominent degree on the NA factor—in the opposing direction ($\lambda = -.36$, $p < .001$).[5]

Prediction Models in Sample 1

Correlations among ESI-Dis and UPPS-P trait scales can be found in Table 1 (above the diagonal). Disinhibition was positively associated with all impulsigenic trait scales, and with the extracted externalizing and NA factor scores (all ps < .001). In a linear regression model using all trait scales to predict the externalizing factor ($R^2 = .37$, $F(6, 392) = 39.15$, $p < .001$), ESI-Dis ($\beta = .39$, $p < .001$), UPPS-P negative urgency ($\beta = .24$, $p < .001$), and UPPS-P sensation seeking ($\beta = .10$, $p = .02$) emerged as significant unique predictors, whereas the other three UPPS-P trait scales did not (βs = −.03 to .03, ps = .56 to .88). In contrast, in the counterpart regression model for the extracted NA factor score ($R^2 = .34$, $F(6, 392) = 33.87$, $p < .001$), ESI-Dis evidenced a notably smaller contribution ($\beta = .11$, $p = .05$), whereas UPPS-P negative urgency ($\beta = .50$, $p < .001$), sensation seeking ($\beta = -.20$, $p < .001$), and lack of premeditation ($\beta = -.13$, $p = .01$) emerged as significant predictors, with the other two UPPS-P traits predicting negligibly (positive urgency: $\beta = .10$, $p = .09$; lack of perseverance: $\beta = -.01$, $p = .77$).

Dominance analyses of externalizing. In total, ESI-Dis and the five impulsigenic trait scales accounted for 37.5% of the variance in the externalizing factor score. Results indicated that ESI-Dis was by far the strongest predictor, with a general dominance weight (GDW) of .17 and "GDW to total model R^2" ratio (hereafter called "ratio") of 44.80%. This was followed by negative urgency (GDW = .11, ratio = 28.27%), positive urgency (GDW = .05, ratio = 13.87%), sensation seeking (GDW = .03, ratio = 7.20%), lack of perseverance (GDW = .01, ratio = 3.46%), and lack of premeditation (GDW = .01, ratio = 2.4%). ESI-Dis exhibited *complete dominance* over each of the five impulsigenic trait scales, yielding (a) larger average contributions than all other measures and (b) larger unique contributions in all model subsets, regardless of how many other predictors were included in the models. Dominance analysis results are depicted in Figure 2. Next, bootstrapped resampling (n = 1,000) was utilized to quantify the reproducibility and generalizability of observed dominance patterns. As shown in Table 1 in the online supplemental materials, ESI-Dis exhibited complete dominance over negative urgency, positive urgency, lack of premeditation, lack of perseverance, and sensation seeking in 84.3%, 100%, 99.9%, 100%, and 99.9% of bootstrap resamples, respectively.

Dominance analyses of negative affectivity. In total, ESI-Dis and the five UPPS-P trait scales accounted for 34.1% of the variance in the NA factor. Results showed negative urgency to be by far the strongest predictor, with a GDW of .18 (ratio = 53.67%), followed by positive urgency (GDW = .07, ratio 20.23%), ESI-Dis (GDW = .05, ratio = 15.25%), sensation seeking (GDW = .02, ratio = 6.45%), lack of premeditation (GDW = .01, ratio = 2.35%), and lack of perseverance (GDW = .01, ratio = 2.05%). Negative urgency exhibited complete dominance over ESI-Dis and each of the other four impulsigenic trait scales, exhibiting (a) larger average contributions than all other measures and (b) larger unique contributions in all model subsets, regardless of how many other predictors were included in the models. Dominance analysis results are illustrated in Figure 2. Additionally, as shown in Table 2 in the online supplemental materials, when using bootstrapped resampling, negative urgency exhibited complete dominance over ESI-Dis in 99.9% of bootstrap resamples and complete dominance over positive urgency, lack of premeditation, lack of perseverance, and sensation seeking in 99.8%, 99.7%, 100%, and 97.0% of bootstrap resamples, respectively.

Structural Models in Sample 2

The ESEM for externalizing problems and negative affectivity specified in Sample 2 is depicted in Figure 3. The model evidenced acceptable fit: CFI = .972, TLI = .926, $\chi^2(8) = 27.53$ ($p < .001$), RMSEA = .089, and SRMR = .026. The model parameters supported the relative division between externalizing and internalizing factors, with the candidate externalizing-PD symptom variables loading strongly onto the externalizing factor (histrionic λ = .75, narcissistic λ = .67, antisocial λ = .53), and the NA PD variables loading weakly or negligibly onto this factor (avoidant $\lambda = -.22$, depressive λ = .03, dependent λ = .32). Conversely, the candidate NA PD symptom variables all loaded strongly onto the NA factor (avoidant λ = .75, depressive λ = .85, dependent λ = .49), whereas the externalizing PD variables loaded weakly onto this factor (histrionic $\lambda = -.16$, narcissistic λ = .19, antisocial λ = .09). As expected, BPD loaded appreciably onto both factors (externalizing λ = .42, NA λ = .51), supporting its placement as a complex indicator of personality pathology. The externalizing problems and NA factors of the model were moderately correlated ($\psi = .35$, $p < .001$). The loadings from this first

[5] Although fixing model parameters from the measurement model for the EXT and NA factors ensures their factor compositions do not change as a function of introducing the traits into the model, readers may be interested in whether the results would change as function of leaving all parameters free. The fit of the freed versus fixed models was very close to the same across the six models introducing each of the six traits to the latent model (freed CFIs = .95–.97, RMSEAs = .07–.09; fixed CFIs = .96–.97, RMSEA = .05–.06), and the loadings of the traits onto their respective factors are also highly similar (average absolute deviation from constrained to freed models across traits for unstandardized loadings = .02).

Table 1
Correlations Among Disinhibition, Impulsigenic Traits, and Externalizing Problems and Negative Affectivity

Variable	1	2	3	4	5	6	7	8
1. Disinhibition	—	.61** [.54, .66]	.50** [.42, .57]	.33** [.24, .42]	.39** [.30, .47]	.26** [.16, .35]	.57** [.49, .63]	.36** [.28, .45]
2. Negative urgency	.63** [.55, .69]	—	.71** [.66, .76]	.36** [.27, .44]	.32** [.23, .41]	.24** [.15, .33]	.51** [.43, .58]	.54** [.47, .61]
3. Positive urgency	.59** [.52, .66]	.75** [.70, .79]	—	.34** [.25, .42]	.35** [.26, .43]	.31** [.22, .39]	.42** [.33, .49]	.40** [.32, .48]
4. Lack of premeditation	.23** [.12, .33]	.08 [−.03, .19]	−.02 [−.13, .09]	—	.55** [.47, .61]	.08 [−.02, .18]	.21** [.11, .30]	.10* [.00, .20]
5. Lack of perseverance	.43** [.34, .52]	.29** [.19, .39]	.24** [.13, .34]	.58** [.51, .65]	—	−.05 [−.14, .05]	.23** [.13, .32]	.16** [.07, .26]
6. Sensation seeking	.37** [.27, .47]	.48** [.39, .56]	.56** [.48, .63]	.06 [−.05, .17]	−.01 [−.12, .11]	—	.26** [.17, .35]	−.03 [−.13, .07]
7. Manifest externalizing factor	.41** [.31, .50]	.30** [.20, .40]	.33** [.23, .43]	.21** [.10, .31]	.25** [.14, .35]	.26** [.16, .36]	—	.37** [.29, .45]
8. Manifest negative affectivity factor	.26** [.15, .36]	.28** [.17, .38]	.13* [.02, .24]	.03 [−.08, .14]	.30** [.20, .40]	−.14* [−.24, −.02]	.24** [.13, .34]	—

Note. Values above the diagonal represent correlations from Sample 1 ($N = 400$); values below the diagonal represent correlations from Sample 2 ($N = 308$). Values in square brackets indicate the 95% confidence interval of the correlation coefficient. In Sample 1, the Externalizing Factor was derived from a structural equation model with the Young Adult Alcohol Consequences Questionnaire–Brief form, Rutgers Alcohol Problems Index, Reactive-Proactive Aggression Questionnaire–Reactive scale, and Indirect Aggression Scale–Social and –Malicious Humor scales, and the Negative Affectivity Factor was derived from the Positive and Negative Affect Schedule–Negative Affect scale, Emotional Reactivity Scale–Sensitivity and –Arousal scales. In Sample 2, the Externalizing Factor was derived from an exploratory structural equation model of the Structured Clinical Interview for *DSM–IV* Axis II Personality Disorder Questionnaire and was most prominently influenced by symptoms of Narcissistic, Conduct/Antisocial, and Histrionic Personality Disorder, and the Negative Affectivity Factor was most prominently influenced by symptoms of Depressive, Avoidant, and Dependent Personality Disorder.
* $p < .05$. ** $p < .01$.

model were fixed in subsequent models that examined associations of the externalizing and NA factors with the ESI-Dis and UPPS trait scales.

When ESI-Dis was added to the model and specified as loading onto both factors, it exhibited a markedly stronger loading on the externalizing factor ($\lambda = .44$, $p < .001$) than the NA factor ($\lambda = .14$, $p = .02$). Compared with ESI-Dis, negative urgency loaded more weakly onto the externalizing factor of the model ($\lambda = .28$, $p < .001$) and more strongly onto the NA factor ($\lambda = .22$, $p = .001$). Positive urgency loaded selectively onto the externalizing factor of the model ($\lambda = .39$, $p < .001$), showing no loading on the NA factor ($\lambda = .02$, $p = .75$). Lack of premeditation loaded to a lesser significant degree on the externalizing factor ($\lambda = .25$, $p < .001$) and negligibly on the NA factor ($\lambda = -.05$, $p = .50$). Lack of perseverance loaded comparably on to the NA and externalizing factors of the model (λs = .27 and .20, respectively, ps < .005). The UPPS's fifth scale, sensation seeking, loaded to a moderate positive degree on the externalizing factor ($\lambda = .40$, $p < .001$), and *negatively* on the NA factor ($\lambda = -.28$, $p < .001$).

Prediction Models in Sample 2

Correlations among ESI-Dis and impulsigenic trait scales are shown in Table 1 (below the diagonal). ESI-Dis was positively associated with all impulsigenic trait scales as well as with the extracted externalizing and NA factor scores (ps < .001). In a linear regression model predicting scores on the externalizing-related PD factor ($R^2 = .21$, $F(6, 301) = 12.98$, $p < .001$), only ESI-Dis ($\beta = .26$, $p < .001$) emerged as a significant unique predictor (positive urgency: $\beta = .14$, $p = .10$; negative urgency: $\beta = -.04$, $p = .66$; lack of premeditation: $\beta = .13$, $p = .06$; lack of perseverance: $\beta = .04$, $p = .58$; sensation seeking: $\beta = .09$, $p = .15$). In contrast, in a linear regression model predicting the NA-related PD factor ($R^2 = .23$, $F(6, 301) = 15.27$, $p < .001$), only ESI-Dis ($\beta = .13$, $p = .07$) and positive urgency ($\beta = -.13$, $p = .13$) were *not* significant predictors, whereas all other impulsigenic traits evidenced significant unique predictive value (negative urgency: $\beta = .36$, $p < .001$; lack of perseverance: $\beta = .28$, $p < .001$; sensation seeking: $\beta = -.27$, $p < .001$; lack of premeditation: $\beta = -.18$, $p = .007$).

Dominance analyses of externalizing. In total, ESI-Dis and the five impulsigenic trait scales accounted for 20.5% of the variance in the externalizing-related PD factor. Results indicated that ESI-Dis was by far the strongest predictor, with a GDW of .08 (ratio = 36.59%), followed by positive urgency (GDW = .04, ratio = 18.53%), sensation seeking (GDW = .03, ratio = 12.20%), negative urgency (GDW = .03, ratio = 12.20%), lack of premeditation (GDW = .02, ratio = 10.73%), and lack of perseverance (GDW = .02, ratio = 10.24%). ESI-Dis again exhibited complete dominance over each of the five impulsigenic trait scales, exhibiting (a) larger average contributions than all other measures and (b) larger unique contributions in all model subsets, regardless of how many other predictors were included in the models. Dominance analysis results are illustrated in Figure 2. As shown in Table 3 in the online supplemental materials, bootstrapped resampling revealed that ESI-Dis exhibited complete dominance over negative urgency, positive urgency, lack of premeditation, lack of perseverance, and sensation seeking in 94.0%, 75.2%, 68.8%, 79.4%, and 83.1% of bootstrap resamples, respectively.

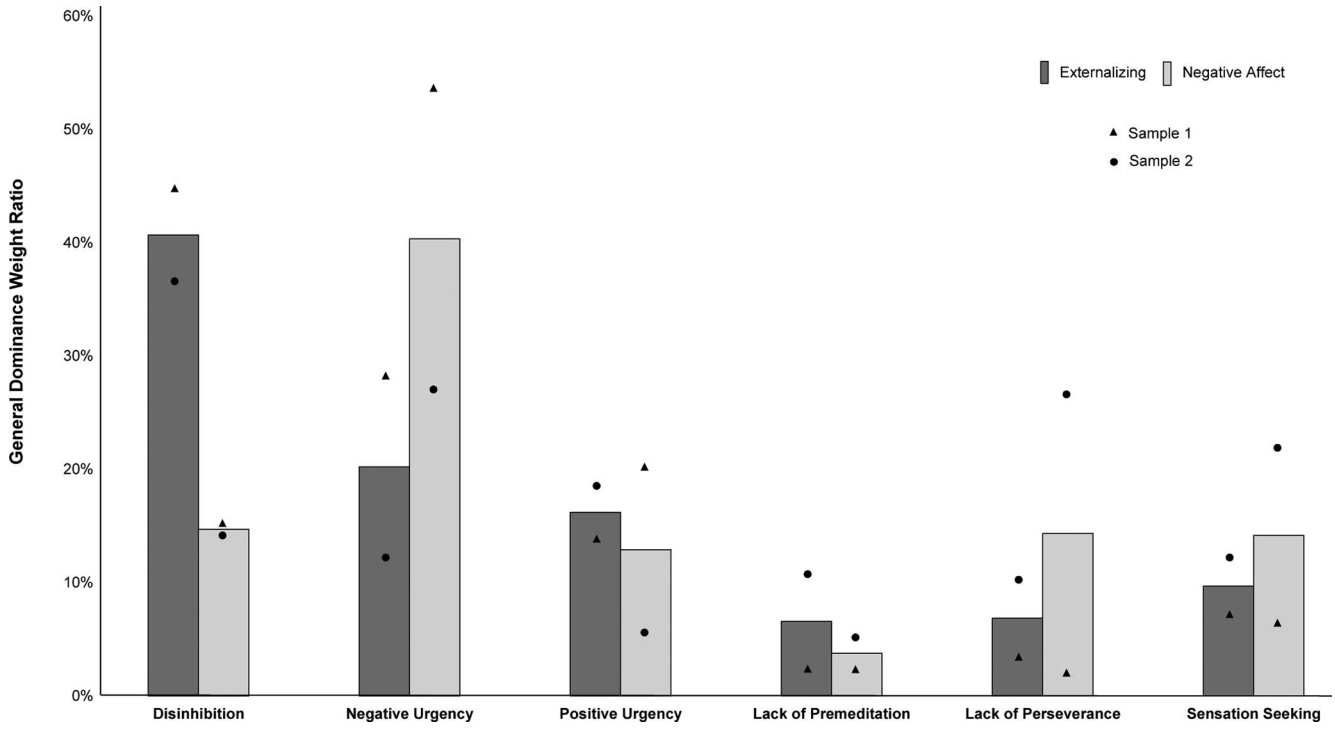

Figure 2. Results from dominance analyses. For each trait, the dark gray bar represents the average of the general dominance weight (GDW) ratios across both samples in prediction of the externalizing factors, and the light gray bar represents the average of the GDW ratios across both samples in prediction of the negative affectivity factors. The individual GDW ratios from each sample are shown by the black and gray dots for sample 1 ($N = 400$) and 2 ($N = 308$), respectively.

Dominance analyses of negative affectivity. In total, ESI-Dis and the five impulsigenic trait scales accounted for 23.3% of the variance in the NA-related PD factor. Dominance analyses revealed negative urgency to be the most important predictor, with a GDW of .06 (ratio = 27.04%), followed by lack of perseverance (GDW = .06, ratio = 26.61%), sensation seeking (GDW = .05, ratio = 21.89%), disinhibition (GDW = .03, ratio = 14.16%), positive urgency (GDW = .01, ratio = 5.58%), and lack of premeditation (GDW = .01, ratio = 5.15%). Complete dominance could not be established for any scale over all others; however, complete dominance was established for (a) negative urgency over positive urgency, (b) negative urgency over ESI-Dis, (c) lack of perseverance over positive urgency, (d) lack of perseverance over lack of premeditation, and (e) sensation seeking over positive urgency. Lack of perseverance exhibited conditional dominance over ESI-Dis, and broadly, lack of perseverance and negative urgency each exhibited conditional dominance over the other impulsigenic trait scales. Dominance analysis results are illustrated in Figure 2. Finally, Table 4 in the online supplemental materials details the pattern of dominance results using bootstrapped resampling, demonstrating that negative urgency exhibited complete dominance over ESI-Dis in 63.7% of bootstrap resamples, and over positive urgency in 75.6% of bootstrap resamples. Lack of perseverance exhibited conditional dominance over disinhibition in 72.3% of bootstrap resamples.

Discussion

Behavioral disconstraint, poor planning ability, and emotion dysregulation (i.e., poor self-regulatory abilities) play a key role in various forms of psychopathology. Therefore, it is of critical importance to identify risk factors that promote these behavioral and emotional features. Both disinhibition, as reflected in the externalizing spectrum model (Krueger et al., 2002), and impulsigenic traits, as represented in the UPPS-P conceptualization (Lynam et al., 2006), have been extensively studied as dispositional traits associated with increased rates of mental illness. The current study elucidated the unique and common predictive properties of these widely used measures of disinhibition and impulsigenic traits, providing direction for the field regarding the optimal inventories and conceptualizations to use for differing purposes. Disinhibition and all five impulsigenic traits showed similarly good psychometric properties in terms of internal consistency reliability. Across both samples, disinhibition was most highly correlated with UPPS-P negative urgency ($r \sim .60$), closely followed by positive urgency ($r \sim .50$). Conversely, disinhibition showed its smallest-magnitude association with UPPS-P sensation seeking ($r \sim .30$).

The Place of Disinhibition and Impulsigenic Traits in the Structure of Psychopathology

One of the major strengths of the current study is its ability to shed light on the dispositional traits of interest as part of the

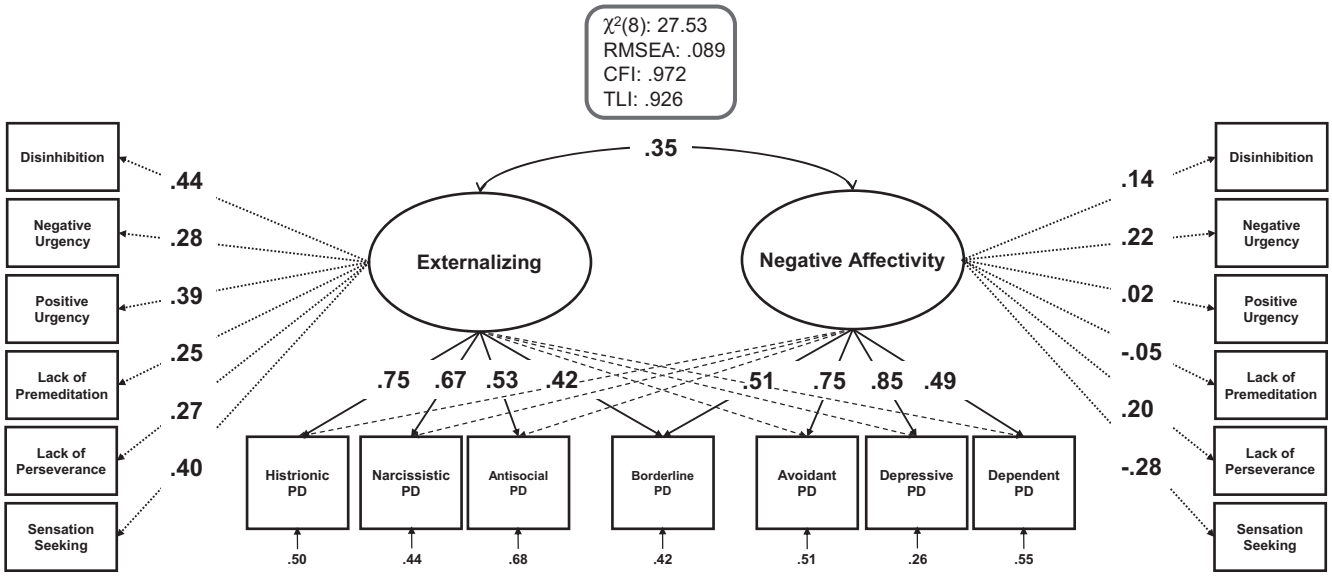

Figure 3. Two-factor exploratory structural equation model with target rotation of externalizing and negative affectivity among personality disorder variables. Nontrait loadings were fixed from the first iteration of the model that didn't include traits, and only one trait was added at a time. Standardized parameter estimates are shown. Loadings $\lambda < .35$ for the personality disorder variables are not depicted for ease of visual presentation. CFI = comparative fit index; PD = personality disorder; RMSEA = root mean square error of approximation; TLI = Tucker-Lewis index.

broader structure of psychopathology, building on prior work exploring the links between personality and clinical symptom dimensions (Clark, 2005; Clark et al., 1994; Krueger, McGue, & Iacono, 2001). We introduced each trait into a fixed structural model of externalizing and NA to explore their relative covariance with each dimension. Structural modeling demonstrated that whereas variance in disinhibition was strongly explained by a latent externalizing dimension ($\lambda = .67$), it did not load onto latent NA ($\lambda = .05$). The selective association between disinhibition and externalizing replicates past work on the Externalizing Spectrum Inventory operationalization of disinhibition (Joyner et al., 2019, 2020; Krueger et al., 2007; Nelson et al., 2016) and is consistent with the notion that disinhibition represents a specific liability factor for externalizing (Iacono et al., 1999; Patrick et al., 2019; Patrick, Venables, et al., 2013).

A more complex picture emerged when examining the placement of the various UPPS-P-assessed impulsigenic traits in relation to externalizing and NA. Specifically, lack of premeditation and lack of perseverance loaded selectively with externalizing, although these loadings were much smaller than that for disinhibition (λs = .24 and .22, respectively). Premeditation and perseverance are considered to be behavioral manifestations of cognitive processes, and low levels of these attributes are presumed to reflect executive dysfunction more so than aberrant affective processing (Whiteside & Lynam, 2001). This conceptualization is consistent with these traits' selective loading on the externalizing factor, which reflects proneness to unrestrained and irresponsible behavior, and with past work showing similar associations for these particular UPPS-P traits with externalizing problems (Latzman & Vaidya, 2013; Latzman, Vaidya, Malikina, Berg, & Lilienfeld, 2014). However, their markedly weaker loading relative to disinhibition suggests these two impulsigenic traits are less well aligned with externalizing problems than disinhibition; this strength of disinhibition is discussed in further detail below.

In contrast to the selective findings for lack of premeditation and lack of perseverance, negative and positive urgency each evidenced fairly balanced loadings on externalizing and NA. Negative and positive urgency are impulsigenic traits that involve a dysregulated response to the experience of strong emotions and, thus, appear to reflect a combination of cognitive and affective processes. The affective component of these traits is reflected in the wording of urgency-related items within the UPPS-P, which invoke a conditional process (e.g., "when you're feeling an intense emotion. . .") in assessing poor behavioral control. The structural-modeling results for negative and positive urgency, showing cross-loadings on both externalizing and NA factors, are consistent with this interpretation. Positive and negative urgency may represent predispositions to broad psychological distress, given their relations to psychopathology spanning the internalizing and externalizing spectra.

Finally, sensation seeking loaded onto both latent factors, but positively on externalizing and negatively on NA. Attributes of sensation seeking or risk-taking have obvious positive relations with externalizing, but these constructs also include a *fearlessness* component, which is associated to a strong negative degree with internalizing propensity (Nelson et al., 2016)—evidenced by the negative loading of UPPS-P sensation seeking on the NA factor in the current work. Complementary to this explanation of the negative association between sensation seeking and internalizing, there is also FFM work showing that low extraversion (i.e., low levels of the FFM trait that UPPS sensation seeking corresponds

most to) relates to heightened depressivity (Watson, Stanton, Khoo, Ellickson-Larew, & Stasik-O'Brien, 2019).

Comparing Disinhibition and Impulsigenic Traits as Predictors of Psychopathology

The second major focus of the current study was to directly compare these two popular models of weak self-restraint—disinhibition and impulsigenic traits—in terms of the magnitude of their predictive relations with differing forms of psychopathology, using popular scale-based operationalizations in multiple regression and dominance analysis in two samples.

Externalizing. Although all UPPS-P impulsigenic traits demonstrated significant relations with externalizing psychopathology at the zero-order level, regression models comparing disinhibition and each impulsigenic trait revealed that disinhibition was by far the strongest independent predictor of externalizing in both samples, overshadowing observed associations for impulsigenic traits. Dominance analyses yielded clear, consistent evidence for disinhibition as the most important predictor of externalizing symptomatology, achieving complete dominance over all impulsigenic traits. Across both samples, disinhibition was twice as important, in raw units of general dominance weight, for predicting externalizing than the strongest impulsigenic trait predictor. Importantly, the two samples used distinct variables in their externalizing factors—with Sample 1 comprising alcohol problems and aggression and Sample 2 including impulsive-erratic PD symptoms—thus highlighting the robustness of this result.

Overall, our analyses indicate that disinhibition, as conceptualized by the externalizing spectrum model (Krueger et al., 2002), is likely to be markedly more useful than impulsigenic traits for assessing propensity for externalizing problems in a between-subjects manner. The measure of disinhibition derived from the Externalizing Spectrum Inventory has already been validated as a self-report indicator of latent dispositional liability for externalizing psychopathology, but the current study represents the first formal demonstration that this operationalization of latent disinhibition operates as a *better* predictor of externalizing problems than impulsigenic traits. Disinhibition is both (a) more *specific* to externalizing as opposed to NA and (b) more *strongly predictive* of externalizing problems. This is a desirable quality for researchers seeking to better understand dispositional risk for externalizing problems as distinct from other forms psychopathology, while also connecting to the broader nomological network of a dispositional trait that crosses units of analysis (Patrick et al., 2019; Perkins, Latzman, & Patrick, 2020).

Negative affectivity. Similar to the results for externalizing, at the zero-order (correlational) level, disinhibition and most impulsigenic traits were associated with the NA factor in each sample. This finding for disinhibition aligns with past work demonstrating its relations to certain NA-related constructs (e.g., Latzman, Palumbo, Krueger, Drislane, & Patrick, 2020, 2019; Nelson et al., 2016). However, in the current study—in both samples—the disinhibition coefficients were appreciably reduced in regression models that included impulsigenic traits as copredictors. In contrast, negative urgency, sensation seeking, and lack of premeditation retained significant independent prediction of NA in both samples; lack of perseverance was an additional independent predictor in Sample 2 only. Of note, in regressions for both samples, negative urgency showed the strongest relations of all impulsigenic traits to both externalizing and NA, consistent with meta-analytic findings that this trait exhibits the strongest associations of the UPPS-P facets with psychopathology-related outcomes (Berg et al., 2015).

Results from the dominance analyses provided further evidence of the weak association of disinhibition with NA, beyond impulsigenic traits. In Sample 1, negativity urgency was more than three times as important as disinhibition in predicting NA, demonstrating complete dominance over all other variables. In Sample 2, only conditional dominance (larger relations for the predictor of interest than the comparison predictor in some, but not all, regression submodels) was evident for some of the UPPS-P traits in predicting NA, but both lack of perseverance and negative urgency demonstrated complete dominance over disinhibition in about 50% of bootstrap resamples in predicting a PD symptom-based operationalization of NA.

Taken together, the dominance analyses consistently showed UPPS-P impulsigenic traits to be much more strongerly predictive of NA than disinhibition. Because NA is considered to be the common feature of the internalizing spectrum (Clark et al., 1994; Watson, 2005), this finding clearly establishes impulsigenic traits as important predictors of internalizing, consistent with a growing literature emphasizing the role of impulsigenic traits in depressive and anxious symptomatology (e.g., Berg et al., 2015). More broadly, the current study echoes a larger literature supporting the links of impulsigenic traits with internalizing, externalizing, and psychotic forms of psychopathology (see Carver & Johnson, 2018). Impulsigenic traits may thus provide an important index of a general risk for psychopathology (perhaps for the "*p* factor," but see Watts, Poore, & Waldman, 2019, for concerns about the *p* factor in its current operationalizations), and the common genetic liability for all mental disorders (Gustavson et al., 2017; Racine et al., 2013). However, if a *p* factor does not account for the substantial covariation between externalizing and internalizing forms of psychopathology, future HiTOP-aligned research should seek to determine which specific factors underlying these traits differentiate relevant psychopathology spectra and which do not. Given that negative and positive urgency appear to have particular transdiagnostic relevance, as evidenced by their comparable loadings on externalizing and NA factors in the current study, the urgency construct may be useful for generating hypotheses regarding the covariation among psychopathology spectra. This may be reflective of the theoretical model of equifinality (Cicchetti & Rogosch, 1996) on which the UPPS-P was based; originally, impulsigenic traits were conceptualized as alternative routes to impulsive behavior, but perhaps the equifinal outcome captured is more akin to psychological distress, dysregulation, and impairment. From this perspective, impulsigenic traits may be especially useful at higher-order levels of a hierarchical-dimensional framework for psychopathology (Kotov et al., 2017), whereas disinhibition may have greater utility for studying the narrower spectrum of impulsive-externalizing problems (Perkins, Joyner, et al., 2020). Furthermore, the relative division between trait-dispositions and psychopathology should continue to be investigated (e.g., Watson, Clark, & Chmielewski, 2008). The results from Sample 1 demonstrated disinhibition to be the best indicator of a latent externalizing factor, reiterating questions about the nature of the hierarchy of psycho-

pathology and the degree to which basic personality is represented within it (cf., Clark, 2005; Watson, Clark, & Harkness, 1994).

Limitations and Future Directions

Some limitations of the current work warrant mention. First, although the present analyses utilized two fairly large samples (*N*s = 400, 308) with adequate score variance for both independent and dependent measures, our results should be replicated and extended to other samples exhibiting a wider range of clinical symptomatology, spanning detachment, somatoform, and thought disorder dimensions along with internalizing and externalizing.[6] Second, measures used in this study were solely from the modality of self-report. Interview-based symptom assessments can provide an important complement to self-reported problems (Chmielewski, Clark, Bagby, & Watson, 2015), and future work should further evaluate predictive relations of impulsigenic traits and disinhibition with interview as well as self-report assessed symptomatology. Future work also should extend to within-subject investigations of these constructs. For example, ambulatory assessment work suggests that UPPS-P urgency functions as more of a unified process at the within-subjects level, with positive urgency not being responsive to positive mood states in the moment, only negative mood states (Sperry, Lynam, & Kwapil, 2018).

Although two samples offering a diverse set of externalizing- and NA-related criterion variables were available, another limitation of the current study is that single inventories were used to operationalize disinhibition and impulsigenic traits. It would be valuable to administer other measures of these dispositional constructs in future work to evaluate their interrelations and comparative predictive validity. In the case of trait disinhibition, various alternative measures of this construct have been developed using items from several popular personality inventories, including the Minnesota Multiphasic Personality Inventory (MMPI) – 2 (MMPI-2; Sellbom et al., 2016), the Multidimensional Personality Questionnaire (MPQ; Brislin, Drislane, Smith, Edens, & Patrick, 2015), the NEO Personality Inventory—Revised (NEO-PI-R; Drislane, Brislin, Jones, & Patrick, 2018), and the Personality Inventory for *DSM–5* (PID-5; Drislane et al., 2019). It would be valuable in future work to corroborate our findings using alternative—or ideally, multiple (e.g., Drislane & Patrick, 2017; Latzman et al., 2020)—operationalizations of trait disinhibition in order to refine our understanding of this construct. In addition, other models of impulsivity (e.g., the Barratt Impulsiveness Scale; Barratt, 1959; Patton, Stanford, & Barratt, 1995) should be examined alongside disinhibition and the UPPS-P traits as competitive predictors of important criterion variables, with the goal of identifying the most useful models and measures for prediction of a given outcome.

Beyond the use of alternative self-report measures of disinhibition and impulsigenic traits, it will be valuable in future research to explore the broader nomological networks of these traits using indicators from other measurement modalities (e.g., task performance, physiological response). For example, recent work has demonstrated that UPPS-P impulsigenic traits do not share the same genetic bases as behavioral measures of executive function, and relate differently to externalizing disorders (Friedman et al., 2020). Should indicators from other modalities of measurement be identified for UPPS-P traits, future work could similarly examine how such indicators compare in their relations with indicators of disinhibition from that measurement modality.

Conclusion

The current study provides a framework for conceptualizing disinhibition and impulsigenic traits as well as an empirical demonstration of their positions in the broader structure of psychopathology and their differential utility in predicting externalizing and NA. Our results indicate that disinhibition is selectively linked to the externalizing spectrum and is a more dominant predictor of externalizing psychopathology than impulsigenic traits, whereas impulsigenic traits are situated between externalizing and NA dimensions and demonstrate dominance over disinhibition in predicting NA. It is apparent from these findings that disinhibition and impulsigenic traits are not interchangeable. Specifically, disinhibition is a stronger and more specific predictor of externalizing psychopathology, whereas impulsigenic traits—especially negative urgency—are more potent predictors of NA and distress-related problems. Importantly, the current work does not suggest that impulsigenic traits are unrelated to externalizing problems, or that disinhibition is unrelated to NA. Instead, we sought to clearly demarcate which traits operate as better predictors of each outcome relative to one another, for purposes of guiding ongoing research efforts. As hierarchical structural models of psychopathology (e.g., Kotov et al., 2017; Krueger et al., 2018) gain prominence, the distinctions between disinhibition and impulsigenic traits warrant careful consideration. Disinhibition should be prioritized in studies of risk for externalizing psychopathology, and impulsigenic traits—particularly negative urgency—should be examined as risk factors for broad, nonspecific psychopathological outcomes.

[6] In response to a helpful comment from an anonymous reviewer, we compared the distribution of the ESI-Disinhibition scale across the two current study samples with that of a combined college and community sample (N = 821) exhibiting a much greater age range (18–47) and more balanced gender representation (54.0% female). In addition, we compared the distributions of SCID-II Questionnaire symptom scores in the current study Sample 2 with those for a separate community-only sample (N = 508) exhibiting different demographic characteristics (age range: 22-38, 50.6% female). The distributions of these variables for current study participants were highly similar to distributions for these comparison samples, somewhat mitigating these concerns. See the online supplemental materials for more details.

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