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Updated 1/15/2015

PURDUE UNIVERSITY
GRADUATE SCHOOL
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By Sarah Ann Griffin

Entitled

Understanding Representations of Impulsivity in Dimensional Models of Personality Pathology

For the degree of Master of Science

Is approved by the final examining committee:

Douglas B. Samuel
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Head of the Departmental Graduate Program Date

UNDERSTANDING REPRESENTATIONS OF IMPULSIVITY IN DIMENSIONAL MODELS OF PERSONALITY PATHOLOGY

A Thesis

Submitted to the Faculty

of

Purdue University

by

Sarah Ann Griffin

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Science

May 2015

Purdue University

West Lafayette, Indiana

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ABSTRACT

Griffin, Sarah Ann. M.S., Purdue University, May 2015. Understanding Representations of Impulsivity in Dimensional Models of Personality Pathology. Major Professor: Douglas B. Samuel.

Impulsivity is an individual difference that impacts many aspects of an individual's functioning; however, there as of yet has been no consensus on a single definition of impulsivity across the various fields that study it and its related outcomes. In fact, research at this point predominantly supports the idea that "impulsivity" is actually a multi-faceted construct comprised of multiple lower-order traits, but there is little agreement on what those lower-order facets should be. The purpose of the present study was to investigate the conceptualization of complex trait impulsivity within two new omnibus measures of maladaptive personality in terms of both their reproduction of the nomological network of impulsivity and their ability to predict behavioral outcomes related to impulsive personality traits. This study obtained self-report questionnaire ratings and behavioral lab task data from a community sample, recruited online and oversampled for high impulsivity. The results showed that while these new measures of personality pathology generally include the overall components of the nomological net of impulsivity, the lower-order facets seem to lack specificity in their relationships with impulsive trait constructs and in their ability to predict maladaptive behavioral outcomes. These results are discussed in terms of theoretical

conceptualizations of impulsivity and practical implications for usage of these measures.

INTRODUCTION

What exactly does it mean to say that someone is “impulsive”? For decades, researchers have endeavored to capture the complexities and nuances of this trait within a single conceptualization or definition. Adequately and accurately capturing the delicate intricacies of this construct is vital because of impulsivity’s social importance as an individual difference. Trait impulsivity has been included in nearly all major personality models (e.g., the Five Factor Model, Eysenck’s P-E-N). Further, behavioral impulsivity is central to a variety of diagnostic constructs in both internationally utilized diagnostic and classification systems of mental disorder: the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013) and the International Classification of Diseases (ICD-10; WHO, 1994). Impulsivity, in its broadest and most heterogeneous state, is an elementary component of the diagnostic criteria of at least 18 disorders included in the *Diagnostic and Statistical Manual of Mental Disorders, Edition IV* (DSM-IV; American Psychiatric Association, 1994; Whiteside et al., 2005).

The real-life, practical manifestations and implications of impulsivity are critically germane in both clinical and non-clinical populations. Impulsivity has a meaningful bearing on multiple life domains including negative associations with educational achievement (Paunonen, 2003; Spinella & Miley, 2003), occupational and

career success (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001), social adjustment (Bagge et al., 2004), and physical and mental health (Bogg & Roberts, 2004). Furthermore, impulsivity and impulsivity-related constructs have been shown to increase engagement in problematic behaviors such as antisocial and criminal behaviors (Miller & Lynam, 2001; Shiner, Masten, & Tellegen, 2002), risky sexual behaviors (Hoyle, Fejfar, & Miller, 2000; Lejuez et al., 2004), drug and alcohol use/abuse (Verdejo-García, Larence, & Clark, 2008; Whiteside & Lynam, 2009), gambling (Blaszczynski, Steel, & McConaghy, 1997; Chambers & Potenza, 2003), binge eating (De Zwaan et al., 1994; Fischer, Smith & Anderson, 2003), bulimic symptoms (Anestis , Selby & Joiner, 2007; Claes et al., 2005; Fischer, Smith, & Anderson, 2003), interpersonal aggression and violence (Barratt, 1994; Miller, Zeichner, & Wilson, 2012), and self-harm (Lynam et al., 2011; Nixon, Cloutier, & Jansson, 2008; Madge et al., 2011). Furthermore, problematic behaviors linked to impulsivity are frequently found to similarly relate to each other (Smith et al., 2007).

Over the last three decades, researchers have produced a large body of literature on various theories and differing operationalizations of the construct of impulsivity that have important differences. Some of the terms used to conceptualize impulsivity over the past few decades include control, deliberation, risk taking, novelty seeking, excitement seeking, inattention, non-planning, and venturesomeness (Evenden, 1999). Despite the significant overlap between some of these terms and their associated constructs, distinctions between them may prove both important and necessary.

Because impulsivity is such a pervasively significant personality construct that is so broad and heterogeneous, its role in models of both normal and pathological

personality is both critical and often tenuous. In response to criticisms of the categorical diagnostic system (e.g., Clark, 2007), trait-based dimensional diagnostic systems for personality disorders have recently been introduced including the *Personality Inventory for DSM-5* (PID-5; Krueger et al., 2012) and the *Computerized Adaptive Test of Personality Disorder* (CAT-PD; Simms et al., 2011), in response to criticisms of the categorical diagnostic system. The PID-5 has been included in DSM-5 Section III ("Emerging Measures and Models") requiring further research on the validity and utility of a dimensional trait model. Because both the PID-5 and the CAT-PD base diagnostic decisions in the measurement of trait levels, understanding those individual traits is critical to the appropriate and consistent use of these diagnostic systems; therefore, it is essential to determine how well these models capture impulsivity (compared to existing models) and how they reproduce the nomological network.

Conceptualizations of Impulsivity

Buss and Plomin's (1975) four-factor model of temperament (EASI) included impulsivity as a factor alongside emotionality, activity, and sociability. Their model conceptualizes impulsivity as an inheritable, multi-dimensional personality trait centered in a lack of inhibitory control of behavior. It is also defined by tendencies to (not) consider alternatives or consequences of behavior prior to acting, (not) maintain focus in the face of competing temptations, and to become bored and seek out novel stimuli. These facets are measured by the impulsivity scale of the EASI-III, a self-report questionnaire developed by Buss and Plomin (1975) to measure their four-temperament model of personality.

Eysenck and Eysenck (1977) subdivided impulsivity into 4 dimensions: narrow impulsiveness, risk-taking, non-planning, and liveliness. Narrow impulsiveness (Imp_N) essentially comprises multiple lower-order characteristics of broad impulsivity that were not strong enough to form independent factors in their analyses. Specifically, items addressing impatience, and lack of premeditation or behavioral inhibition define ImpN. These domains were found to correlate divergently with extraversion, neuroticism, and psychoticism; narrow impulsiveness correlated strongly with neuroticism and psychoticism, but the three remaining factors correlated best with extraversion. Subsequently Eysenck and Eysenck (1985) reexamined their association of impulsivity with extraversion (1975) and proposed that impulsivity represents 2 different components: venturesomeness, which relates to extraversion, and impulsiveness, which relates to psychoticism.

Playing off the discrepancies between conceptualizations of impulsivity as a potential for additional information, some researchers have derived factor structures of impulsivity using measures tapping different approaches to the construct. Impulsivity is a pertinent trait of interest for many researchers within many fields of study, which has resulted in a lack of consensus on a single operationalization of the construct within and across areas of study. For example, Barratt and colleagues combined medical, psychological, behavioral, and social models of impulsivity along with self-report inventories, cognitive and behavioral tasks, and brain-behavioral measures (Barratt, 1993; Gerbing, Ahadi & Patton, 1987; Stanford & Barratt, 1992). This research resulted in a three-factor model of impulsivity: attentional impulsiveness, motor impulsiveness, and non-planning. These factors address the cognitive inattention,

spontaneous behavior, and lack of self-control included in the colloquial definition of "impulsivity". The factor structure of attentional and motor impulsivity have been replicated by other researchers, but non-planning has not been found consistently (Luengo, Carrillo-De-La-Pena & Otero, 1991).

Given the wide range of measures and definitions of impulsivity, it was apparent that potentially distinct constructs were being lumped together under the single umbrella term of "impulsivity". Whiteside and Lynam (2001) proposed a new conceptualization of the impulsivity construct based in the FFM, utilizing factor analyses of the NEO-PI-R and other established measures of impulsivity. Nine measures of impulsivity and the neuroticism, extraversion, and conscientiousness scales of the NEO-PI-R were administered to an undergraduate sample and analyzed for underlying factor structure. Their original results support the existence of a four-factor model of impulsivity, the UPPS Impulsive Behavior Scale, composed of the following domains: urgency, (lack of) premeditation, (lack of) perseverance, and sensation seeking. Urgency refers to a tendency to give in to strong impulses that are accompanied by strong emotion. Lack of premeditation measures an individual's ability to consider potential consequences of behaviors before acting. Lack of perseverance assesses an individual's ability to continue in and complete tasks despite boredom or fatigue. Sensation seeking measures a preference for excitement and stimulation. Recent work done by Smith and colleagues (e.g., Cyders & Smith, 2007; Cyders, Smith, Spillane, Fischer, & Annus, 2007) prompted the distinction between positive and negative urgency in the UPPS-P measure. Whereas negative urgency refers to the tendency to indulge strong impulses that are accompanied by strong

negative emotion, positive urgency refers to the indulging of impulses accompanied by strong positive emotion. While these five domains are conceptually similar, the authors argue that these traits are actually distinct characteristics and unique pathways to impulsive behaviors.

The Inclusion of Impulsivity in Models of Personality Pathology

The PID-5 and CAT-PD represent recent efforts to construct measures of clinically maladaptive personality traits for the diagnosis of personality disorders. Both measures contain a multi-faceted impulsivity domain, titled "disinhibition" in the PID-5 and "(dis)constraint" in the CAT-PD. The PID-5's disinhibition scale consists of 5 lower-order facets: distractibility, impulsivity, irresponsibility, (lack of) rigid perfectionism, and risk taking. Structural analyses have shown that this factor generally relates to the low pole of the FFM conscientiousness domain (De Fruyt et al., 2103; Thomas et al., 2013); however, its relation to more specific measures of impulsivity is unknown. The authors of the PID-5 were contacted to ensure that all appropriate scales were included in this study's analyses (R.F. Krueger, personal communication, September 26, 2013); their recommendation for the inclusion of only the disinhibition scale was followed.

The CAT-PD was developed by Simms and colleagues as an attempt to develop a trait-based model of personality pathology implemented using a computerized adaptive format. Its disconstraint scale contains seven lower-order facets: non-planfulness, non-perseverance, risk taking, perfectionism, irresponsibility, workaholism, and rigidity. The CAT-PD model originally included facets of urgency and stress reactivity, which were condensed in the final version of the scale into the

facet of affective lability (in the negative emotionality domain). Because of the importance of urgency within a multi-faceted understanding of impulsivity, and at the recommendation of the CAT-PD's creators, we will include the facet of affective lability in our analyses (L. J. Simms, private communication, September 16, 2013). It is important to note that neither of the "impulsivity" domains of the CAT-PD nor the PID-5 perfectly map on to the structure provided by the UPPS model, or any other model of impulsivity; therefore, it is important to determine how these measures conceptualize and capture trait impulsivity and relate to its behavioral manifestations and outcomes.

The potential limitations of self-report measures of personality traits have been well documented (Trull & Durrett, 2005; Widiger & Clark, 2000), including issues such as lack of self-knowledge, image management, participant bias, and individual understanding and interpretation of questions. Consequently, a variety of behavioral measures or laboratory tasks have been developed that target individual components of impulsivity as an alternate method of assessing impulsive tendencies. Some tasks like the Balloon Analogue Risk Task (BART) (Lejuez et al., 2002), focus on measuring tendencies towards risk taking behavior. The BART models the real-world process of assessing situational risk and potential for gain versus loss; participants can take a chance to win small amounts of money by clicking a button, but stand to lose that money if they don't "cash out" before reaching a predetermined threshold, the exact value of which they are unaware. Higher scores on this task, therefore, equate to higher willingness to engage in risky behavior. Scores on the BART were found to predict

alcohol use and abuse among college students above and beyond other behavioral measures of impulsivity-related traits (Fernie, Cole, Goudie, & Field, 2010).

Anestis et al. (2007) point out that most likely each conceptualization of impulsivity relates uniquely to psychopathology and functioning. In other words, it is unlikely that a homogeneous construct would relate consistently to such a collection of superficially dissimilar behaviors and outcomes, and it is unlikely that all dimensions of impulsivity are equivalently related to psychopathology and functioning. For example, sensation seeking was most related to the likelihood of engaging in new and risky behaviors, while urgency related to problematic degrees of participation in risky behaviors (Smith et al., 2007). Fischer and Smith (2008) found that bulimic symptoms, pathological gambling, and alcohol abuse were significantly associated with urgency but not with sensation seeking, lack of planning, or lack of persistence. Also, suicidal behavior and non-suicidal self-injury showed strongest links with negative urgency and lack of premeditation (Lynam et al., 2011). Individual facets within the impulsivity construct obviously bear important differences among and between them that relate uniquely to behavioral and functional outcomes; therefore, it is critical to understand the relationships of impulsivity facets in new dimensional diagnostic models with both existing models and behavioral outcome measures.

METHOD

Participants and Procedure

Community participants were recruited through Amazon MTurk. In order to increase the potential variance in impulsivity and related outcomes, two different 3-question screening surveys were used to oversample individuals with a history of arrest or incarceration, or a history of mental health care utilization (e.g., psychotherapy, psychopharmaceutical use and prescriptions, mental disorder diagnoses). In order to be able to detect an effect size of .20 at an alpha level of .01, we recruited a total of 450 participants (including 150 each that were oversampled for mental health or judicial involvement). Inclusion criteria were U.S. residency and age (at least 18 years). Determination of U.S. residency was completed automatically by Amazon based on participants' ownership of a U.S. bank account.

After determination of eligibility, participants were directed via hyperlink to Qualtrics to complete this study. Average participation time across participants was approximately 81 minutes. After completion of the study, participants were provided a unique confirmation code and directed to enter it on MTurk. This confirmation code was used to verify completion of the questionnaires and behavioral task and subsequently provide payment authorization. Participants were compensated $3.00, plus a "bonus" of 10% of their individual winnings from the BART. The average rate

of pay based on approximate completion time ($2.22/hour) is substantially more than the median hourly wage for tasks performed on MTurk ($1.35/hour) (Horton & Chilton, 2010). The average bonus payment was $1.62.

Participants ranged from 18 to 75 years old, with a mean age of 34.67 (*SD* = 10.31). Fifty-two percent identified as male (*N* = 234) and most identified as non-Hispanic or Latino (94%; *N* = 422). A majority identified themselves as Caucasian (84%), while 8% identified as Black, 3% as Asian, 1% as American Indian, and 4% as multiracial.

Measures

International Personality Item Pool NEO (Goldberg et al., 2006)

The IPIP-NEO is a 300-item self-report inventory assessing the FFM of personality modeled after the NEO-PI-R (Costa & McCrae, 1992). The full measure produces scores for 5 domains composed of 6 facets each (30 facets total) scored on a Likert-type scale ranging from *Strongly Agree* to *Strongly Disagree*. Four facet scales of interest were selected as proxies of those facets from the NEO-PI-R most closely related to the construct of impulsivity as identified by Whiteside & Lynam (2001): Immoderation (NEO-PI-R Impulsiveness [N5]), Excitement Seeking (NEO-PI-R Excitement Seeking [E5]), Self-discipline (NEO-PI-R Self-discipline [C5]), and Cautiousness (NEO-PI-R Deliberation [C6]).

PID-5 (Krueger et al., 2012)

The PID-5 is a 220-item measure of personality pathology developed for the dimensional model of personality disorders included in section 3 of the DSM-5. Items are scored on a 4-point Likert-type scale, which includes response options of *very false*

or often false, s*ometimes or somewhat false*, *sometimes or somewhat true*, and *very true or often true*. The 46-items that assess the following five lower-order facets relevant to disinhibition were included: distractibility, impulsivity, irresponsibility, (lack of) rigid perfectionism, and risk taking. The PID-5 has obtained evidence that it relates in expected ways with DSM-IV PD constructs personality pathology (Hopwood, Thomas, Markon, Wright, & Krueger, 2012) and relates well to established measures of normal personality, specifically the FFM (De Fruyt et al., 2013; Thomas et al., 2013; Griffin & Samuel, 2014).

CAT-PD-SF (Simms et al., 2011)

The CAT-PD-SF is the 212-item static form version of the CAT-PD model developed by Simms and colleagues (2011). This study utilizes only the (dis)constraint domain, which includes 46 items that measure the seven lower-order facets of non-planfulness, non-perseverance, risk taking, perfectionism, irresponsibility, workaholism, and rigidity. The six items that measure the facet of affective lability (from the negative emotionality scale) will also be administered. Items are scored on a scale of 1 (Very Untrue of Me) to 5 (Very True of Me).

UPPS-P (Lynam et al., 2006; Whiteside & Lynam, 2001)

The UPPS-P consists of 59 questions answered on a scale of 1 (Agree Strongly) to 4 (Disagree Strongly). The inventory assesses five distinct pathways to impulsive behavior: (negative) urgency, (lack of) perseverance, (lack of) premeditation, sensation seeking, and positive urgency. UPPS-P domains have been shown to have good internal consistency, convergent and discriminant validity (Smith et al., 2007). The measure has been used in normal and clinical populations, showing important

relationships with clinically relevant problems like substance use, self-harm, risk taking behaviors, attention problems and ADHD, general violence, intimate partner violence, and borderline personality disorder (Derefinko et al., 2011; Lynam et al., 2011; Miller et al., 2010; Tragesser & Robinson, 2009).

EASI-III Temperament Survey (Buss & Plomin, 1975)

The EASI-III measures Buss and Plomin's (1975) four-temperament theory of personality (Emotionality, Activity, Sociability Impulsivity). The impulsivity scale consists of 20 items that assess four subscales: inhibitory control, decision time, sensation seeking, and persistence. Alpha reliability coefficients are 0.61, 0.40, 0.46, and 0.54 for the inhibitory control, decision time, sensation seeking, and persistence subscales, respectively (Braithwaite, Duncan-Jones, Bosly-Craft, & Goodchild, 1984).

Outcome Measures

Automatic Balloon Analogue Risk Task (BART-Auto; Pleskac et al., 2008; Lejuez et al., 2002)

The BART is a computerized measure of risk taking behavior through modeling the real-world process of examining the potential for gain versus loss. Psychometric properties of the BART are sound, with good within-session and test-retest reliabilities (Lejuez et al., 2002; White, Lejuez, & de Wit, 2008). Scores on the BART were found to predict alcohol use and abuse among college students above and beyond behavioral measures of response inhibition and delay discounting (Fernie, Cole, Goudie, & Field, 2010).

An automated version of this task, the BART-Auto (Pleskac et al., 2008), was employed. The task presents a series of 30 balloons to the participant, one at a time.

The participant is instructed to manually type in the number of times they would like to pump up the balloon. Prior to starting the task, participants are informed that each balloon is pre-set to explode randomly between 1 and 128 pumps and that the optimal number of pumps across all the balloons is therefore 64. For each pump, participants receive $0.02, so that the higher the number of entered pumps the higher the potential reward. If the participant enters a number of pumps that exceeds the balloon's explosion point, the balloon explodes and the participant does not receive any compensation for that balloon. If the participant enters a number of pumps below the balloon's explosion point, the balloon inflates and the participant is informed how much they won on that balloon. Participants received 10% of the amount of money they won across all 30 balloons as a "bonus" to their standard compensation.

Crime and Analogous Behavior Scale (CAB; Miller & Lynam, 2003)

The CAB is a 69-item inventory of various criminal behavior, substance use, and sexual experiences. For each behavior participants endorse having engaged in during their lifetime, they are asked to report the age at which they initiated the behavior and the frequency at which they have engaged in the behavior in the preceding 12 months. Three composite variables are measured: "substance use" is a straight count of the number of different drugs an individual has used, "property crime/delinquency" is a count of the different criminal acts an individual has committed, "violent crime/delinquency" is a count of the number of different violent acts an individual has committed. For those individuals who endorsed having previously engaged in sexual intercourse, a risky sexual behavior composite scale was

computed from the criteria outlined by Miller & Lynam (2003) (i.e., number of sexual partners, frequency of condom use outside of a relationship, and age of sexual debut).

Behavior Rating Form (BRF; Paunonen & Ashton, 2001)

The BRF is a 21-item self-report questionnaire that measures multiple complex behaviors (e.g. alcohol consumption, dieting, driving behaviors) and behavioral outcomes (e.g. self-perceived intelligence, grade point average, traffic violations). All behavioral variables assessed carry some social significance, with both adaptive and maladaptive behavioral engagement represented. Variables are scored on different scales, although most are measured on a 5- or 9-point Likert-type scale.

Eating Pathology Symptoms Inventory (EPSI; Forbush et al., 2013)

The EPSI is a 45-item self-report measure that provides scores on eight scales: Body Dissatisfaction, Binge Eating, Cognitive Restraint, Purging, Excessive Exercise, Restricting, Muscle Building, and Negative Attitudes toward Obesity. The measure shows good internal consistency (median coefficient alphas ranging from .84-.89) and strong convergent and discriminant validities across genders (Forbush et al., 2013; Forbush, Wildes, & Hunt, 2014).

Self-Harm Inventory (SHI; Sansone, Wiederman & Sansone, 1998)

The SHI is a 22-item behaviorally-based self-report measure which assesses for presence and frequency of specific self-harm behaviors. A total score is calculated by summing the number of unique self-harm behaviors an individual endorses with a maximum score of 22.

Data Analytic Procedures

First, the convergent validity of the PID-5 disinhibition scales with the CAT-PD (dis)constraint scales was examined. Then we investigated the convergent and discriminant validity of the PID-5 and CAT-PD scales with the impulsivity trait scales from the IPIP-NEO, UPPS-P, and EASI-III. PID-5 and CAT-PD facet scales were compared for their ability to predict functional and behavioral outcomes using hierarchical regression analyses. As the primary scales of interest, only scales oriented toward lack of inhibition or lack of constraint were included from the CAT-PD and the PID-5 in the regression analyses (excluding scales measuring perfectionism or rigidity constructs) for ease of interpretation and conceptual consistency. The facet scales of the CAT-PD were entered simultaneously in one step, followed by the facet scales from the PID-5. This was then repeated with the order of entry reversed. Because impulsivity traits and related behavioral outcomes show a consistent and distinct pattern across the lifespan, age was controlled for in all regression analyses.

RESULTS

Bivariate Relations Among Measures of Impulsivity

Bivariate correlations between the trait impulsivity self-report scales were first examined to understand the ability of the CAT-PD and the PID-5 disinhibition scales to recreate the nomological network of trait impulsivity. As can be seen in Table 1, the CAT-PD (dis)constraint and PID-5 disinhibition scales showed significant relationships with each other across most scales. Individual scales from each measure also demonstrated strong primary correlational relationships with the conceptually equivalent scale on the other measure (e.g., CAT-PD Non-Perseverance and PID-5 Distractibility scales correlating best with each other), although the scales did not reach one-to-one correspondence. The exception to this pattern was that CAT-PD affective lability did not demonstrate this type of one-to-one relationship with any of the PID-5 scales; however CAT-PD affective lability did show significant correlations with all of the PID-5 scales except risk taking.

Table 2 includes bivariate correlations between the facet scales of the CAT-PD (dis)constraint domain, the facet scales of the PID-5 disinhibition domain, and the remaining trait impulsivity self-report measures. Notably, almost all of the scales from both the CAT-PD and the PID-5 show very strong correlations with one or more of the scales from the IPIP-NEO, UPPS-P, or EASI-III, with most facets from the CAT-PD

and the PID-5 correlating highly with at least one scale from each of the other measures. PID-5 Distractibility, Impulsivity, and Irresponsibility scales each correlated at or above |.50| with 9 or more of the 13 scales included from the UPPS-P, EASI-III and IPIP-NEO. The CAT-PD Non-Planfulness scale showed the largest number of significant relationships, correlating at a magnitude of |.50| or greater with 12 of the 13 comparison scales.

Hierarchical Regression Analyses

Tables 3-8 summarize the results of the hierarchical regression analyses. The facet scales of the CAT-PD were entered simultaneously at step two, followed by the facet scales from the PID-5 at step 3. This was then repeated with the order of entry reversed. Age was controlled for in all analyses, as the variety of behaviors is a function of years of life. Step 2 served to identify specific scales that predicted the outcome within each measure, while Step 3 compared the incremental validity of individual scales across instruments.

Table 3 reviews the results of the hierarchical regression predicting behavioral measures of impulsivity (BART-Auto, delay discounting rate) and self-reported gambling. The CAT-PD scales collectively better predicted risk taking behavior on the Auto-BART and gambling, while the PID-5 scales showed incremental predictive validity over the CAT-PD for delay discounting rate. In predicting the average number of desired pumps on the Auto-BART, CAT-PD Affective Lability, Risk-Taking, and Irresponsibility were significant at Step 2 while only PID-5 Risk Taking was significant in the reciprocal Step 2. Collectively at Step 3 the CAT-PD (dis)constraint scales provided incremental predictive validity over the PID-5 disinhibition scales for

predicting average number of desired pumps on the BART-Auto; specifically, CAT-PD Affective Lability, Irresponsibility, and Risk-Taking were the strongest predictors of risk taking on the BART-Auto. For delay discounting rate, Step 2 of the regression showed no significant predictor scales from the CAT-PD and only one from the PID-5 (Irresponsibility). When all scales were entered simultaneously at Step 3, only PID-5 Irresponsibility accounted for a significant amount of unique variance. When predicting gambling behavior, Step 2 with the CAT-PD showed age, Non-Planfulness, and Risk Taking to be valid predictors, while Step 2 with the PID-5 showed age, PID-5 Risk Taking, and Distractibility as significant. At Step 3, age and PID-5 Risk Taking emerged as the only unique predictors of gambling.

Table 4 shows results of regression analyses predicting substance use and abuse variables. The PID-5 showed specific predictive validity for substance use while the CAT-PD was a stronger predictor of smoking frequency. In Steps 2 of the regressions predicting variety of lifetime substance use, CAT-PD Risk Taking, PID-5 Risk Taking, and age were significant predictors. Whereas in the subsequent simultaneous regression only age and PID-5 Risk Taking uniquely predicted variety of substances used. Predicting smoking frequency, age, CAT-PD Affective Lability, CAT-PD Risk Taking, and PID-5 Impulsivity were the most significant predictors at Steps 2. In Step 3, the CAT-PD showed some incremental predictive validity over the PID-5 with age, CAT-PD Affective Lability, and CAT-PD Risk Taking remaining uniquely predictive of increased cigarette smoking frequency.

Table 5 contains results for regression analyses predicting (variety of) criminal behavior. Age was a significant predictor for the three categories of criminal behavior

at all Steps 2 and 3. In predicting property crime and delinquency, the CAT-PD scales of Risk Taking and Non-Planfulness were significant predictors at Step 2 and not at Step 3. Meanwhile, the PID-5 scales of Irresponsibility and Risk Taking were unique predictors of misdemeanor crime at both Steps 2 and 3. The analyses predicting IPV showed age, and CAT-PD Affective Lability and Risk Taking to be significant predictors at Step 2, but only age and CAT-PD Affective Lability remained significant in the simultaneous regression at Step 3. When predicting violent crime, age, CAT-PD Risk-Taking, and PID-5 Risk Taking were specific predictors at Step 2. At Step 3, age and CAT-PD Risk Taking accounted for significant unique variance in violent crime perpetration.

The hierarchical regressions summarized in Table 6 sought to predict risky sexual behavior and non-suicidal self-injury (NSSI). The CAT-PD scales collectively showed more predictive ability than the PID-5 for non-suicidal self-injury (NSSI) and risky sexual behavior. In Steps 2 of the analyses predicting risky sexual behaviors, age, CAT-PD Non-Planfulness, and CAT-PD Non-Perseverance were the specific indicators from the CAT-PD analysis, while the PID-5 facets of Distractibility, Impulsivity, and Risk Taking were moderate specific predictors within the PID-5 analysis. In the simultaneous regression, age and CAT-PD Non-Planfulness were the primary unique predictors of increased risky sexual behavior. The CAT-PD also better predicted engagement in self-harm behaviors above and beyond the PID-5. At Step 2 using the CAT-PD predictors, age, CAT-PD Affective Lability and Risk Taking were specific predictors. The PID-5 Impulsivity scale was the only specific predictor from

the PID-5 at Step 2. In the simultaneous analysis, age and CAT-PD Affective Lability were the only significant predictors of non-suicidal self-injury.

As shown in Table 7, the CAT-PD and PID-5 showed nearly equivalent predictive validity for binge eating and purging behaviors. At Step 2, the CAT-PD scales that demonstrated specific predictive relationships with binge eating were Affective Lability, Non-Perseverance, and Risk Taking. The PID-5 scales of Distractibility, Impulsivity, and Irresponsibility also showed specific relationships with the outcome of binge eating at Step 2. However, at Step 3 only CAT-PD Affective Lability, CAT-PD Risk Taking and PID-5 Risk Taking emerged as moderate predictors. Although both PID-5 and CAT-PD Risk Taking scales are scored in the same direction, they showed opposing predictive effects. A similar pattern emerged when predicting purging behaviors. At Step 2, CAT-PD Risk Taking, PID-5 Impulsivity, and PID-5 Irresponsibility were significant predictors. Whereas CAT-PD Risk Taking, PID-5 Irresponsibility, and PID-5 Risk Taking strongly predicted purging in the simultaneous regression at Step 3. Again the CAT-PD and PID-5 risk taking scales show directionally conflicting predictions. These results could possibly be explained by multicollinearity within our data; however, tolerance values for these analyses fell within an acceptable range (above .20).

Table 8 summarizes hierarchical regressions focused on predicting reckless driving behaviors. The CAT-PD and PID-5 showed reciprocal additive effects of predictive validity for traffic and parking violations and driving while under the influence of drugs or alcohol. When predicting traffic and parking tickets, age, CAT-PD Risk Taking and PID-5 Risk Taking were specific indicators at Step 2. At Step 3,

only age and PID-5 Risk Taking remained unique predictors. Similarly, at Step 2 of analyses predicting driving under the influence of alcohol or drugs, age, CAT-PD Non-Planfulness, CAT-PD Risk Taking, PID-5 Irresponsibility, and Risk Taking were specific predictors. However, at Step 3 only age and PID-5 Risk Taking accounted for significant unique variance. The stronger predictive validity of the PID-5 for predicting fastest driving speed was also predominantly driven by PID-5 Risk-Taking, although CAT-PD Risk-Taking also showed a moderate unique predictive relationship at Step 3. At Step 2 CAT-PD Risk Taking showed a significant relationship with the outcome, but its predictive relationship became non-significant once the PID-5 variables were included in the analysis.

DISCUSSION

This study sought to examine the ability of the impulsivity trait scales from the PID-5 and CAT-PD to capture the relevant aspects of impulsivity and recreate the nomological network of those aspects in terms of the conceptualization of trait impulsivity and relationships with related behavioral manifestations and outcomes. Using a community-based sample, we oversampled for individuals that were likely to have elevated levels of impulsivity. Most broadly, these findings demonstrate that the PID-5 and CAT-PD conceptualizations of broad trait impulsivity obtain large correlations with established measures of impulsivity. In that way, it does appear that traits included in the DSM-5 alternative PD model as well as the CAT-PD each include constructs relevant to the myriad of outcomes associated with impulsivity. Nonetheless, both the PID-5 disinhibition and CAT-PD (dis)constraint scales evinced many strong correlations across most of the UPPS-P, EASI-III and IPIP-NEO scales, which calls into question the specificity of the facet constructs within these new omnibus measures of maladaptive personality. Scales on the PID-5 evinced very few discriminant correlations with scales from other established measures of trait impulsivity, as 3 of the 4 facet scales from the PID-5 disinhibition scale each correlated highly (i.e., at or above |.50|) with 9 or more of the 13 comparison scales. For comparison, discriminant correlations between UPPS and EASI-III facet scales

calculated from our sample ranged from .12 (UPPS Sensation Seeking and EASI Persistence) to .67 (UPPS Negative Urgency and EASI Decision Time) (results from this analysis are available by request from the author). Thus, while the constructs themselves are similar, they are not as redundant as the PID-5 correlations may imply. Furthermore, facet scales from the CAT-PD (dis)constraint domain generally showed relatively better correlational specificity with the 13 scales from the UPPS-P, EASI-III, and IPIP-NEO. This pattern suggests that the PID-5 disinhibition scales collectively represent a more homogenous and less nuanced conceptualization of trait impulsivity than do the CAT-PD (dis)constraint scales.

The CAT-PD trait scales also demonstrated a better convergence pattern with the UPPS-P scales (i.e., CAT-PD Affective Lability and Non-Planfulness with UPPS-P Negative Urgency, CAT-PD Non-Planfulness with UPPS-P Lack of Premeditation, CAT-PD Non-Perseverance and Irresponsibility with UPPS-P Lack of Perseveration, CAT-PD Risk-Taking with UPPS-P Sensation Seeking), providing a closer representation of the UPPS-P model. The PID-5 scales correlate strongly with each of the UPPS-P scales, but the patterns of convergence are less easily interpreted as clearly capturing UPPS-P constructs. Each of the PID-5 facets seems to be an indicator of a component of the UPPS model, with the exception of PID-5 Impulsivity. Looking at PID-5 Impulsivity's correlational relationship with the UPPS, Impulsivity correlated almost equivalently with UPPS urgency and lack of premeditation constructs. Furthermore, UPPS lack of Premeditation was not well represented in the PID-5 facets; PID-5 Irresponsibility was expected to be the corollary for UPPS lack of Premeditation but related to that scale relatively poorly in comparison to other UPPS-P scales.

Although the construct of urgency does reflect a tendency to rash action under extreme emotion (which does necessitate some lack of planning or forethought), urgency and lack of premeditation are operationalized as related but independent constructs. The lack of distinct representation of the lack of Premeditation construct inherently costs the model some specificity. This is not to say that the CAT-PD provides a perfect duplication of the UPPS model, because it does not. CAT-PD Non-Planfulness seems to represent both constructs of UPPS Urgency and lack of Premeditation, while UPPS lack of Perseveration seems to be best represented by both CAT-PD Irresponsibility and Non-Perseverance. The same critique applied to the PID-5 Impulsivity scale could be applied to CAT-PD Non-Planfulness, except that the CAT-PD scale of Affective Lability seems to act as an equivalent indicator of the urgency construct and can be used as such, whereas the Impulsivity facet seems to truly be the best indicator of both UPPS Urgency and lack of Premeditation within the PID-5 model.

The overall conclusions that we drew from the correlational analyses were the PID-5 and CAT-PD both appear to effectively replicate the major aspects of the nomological network of trait impulsivity as conceptualized and represented by the UPPS, EASI-III, and FFM models. However, results from those analyses suggested that some facets from the PID-5 and CAT-PD may lack specificity, so we aimed to establish whether the facets represent unique and necessary contributions.

The second aim of this study was to examine the differential concurrent predictive validities of the PID-5 and CAT-PD scales for behavioral outcomes that have been shown previously to relate to trait impulsivity. The first step toward that goal was to determine which scales within each of these measures demonstrate unique

predictive validity for behavioral outcomes. By looking at step 2 of the hierarchical regression analyses we can establish the unique contributions made by facets in comparison to other scales within the same measure. Each of the CAT-PD scales was a significant predictor of at least one of the behavioral outcomes; however, only CAT-PD Risk Taking was a unique predictor of any of the behavioral outcomes (i.e., it was the only significant predictor from the CAT-PD). In fact, it was the only significant predictor of five different behavioral outcomes (substance use, violent crime, purging, driving speed, and number of traffic and parking tickets). From this it would appear that CAT-PD Risk Taking captures a construct underpinning the tendency to engage in maladaptive behaviors in general, relative to the other facets of the CAT-PD. The PID-5 scales, on the other hand, showed a specific pattern of uniquely predictive relationships with the behavioral outcome variables. PID-5 Impulsivity was the exclusive significant predictor of smoking frequency and non-suicidal self-injury, Irresponsibility predicted delay discounting rate, and Risk Taking exclusively predicted increased risky decisions on the Auto-BART, substance use, violent crime, and traffic and parking tickets.

To summarize the results of steps 3 of the hierarchical regressions, the CAT-PD scales collectively showed a unique capacity to predict the following: increased risk taking on the Auto-BART, frequency of cigarette smoking, perpetrating intimate partner violence and other violent crimes, more variety of non-suicidal self-harm behaviors, and engaging in risky sexual behavior. The PID-5 showed incremental validity over the CAT-PD when predicting: lifetime gambling behavior, delay discounting rate, variety of substance use, property crime and delinquency, and overall

risky driving (speed, traffic and parking violations, and driving under the influence). The CAT-PD and the PID-5 reciprocally contributed unique variance to predict binge eating and purging. The first point to make about these results is they demonstrate that the collective CAT-PD and PID-5 trait impulsivity scales may be differentially useful over each other in predicting specific outcomes.

In terms of the specificity of the predictive ability of the CAT-PD and PID-5 facet scales, some patterns emerge that to a certain degree support our hypotheses. Smith et al. (2007) suggested that Sensation Seeking from the UPPS model was the strongest predictor of engagement in a variety of new and risky behaviors. The risk taking scales from both measures showed robust and specific relationships with the UPPS Sensation Seeking scale and were found to be the strongest predictors of variety outcomes (e.g., variety of substances used over the lifetime), with CAT-PD Risk-Taking predicting variety of violent crimes and PID-5 Risk Taking best predicting variety of substance use and property crime/delinquency. This would suggest that the risk taking scales from both of the measures of maladaptive personality are valid representations of the construct of UPPS Sensation Seeking, in that both risk taking scales clearly relate to the original UPPS construct and they show the same general pattern in predicting outcomes.

A relationship between UPPS Urgency and degree of engagement in (or maladaptive degree of) risky behaviors has also been demonstrated previously (Smith et al., 2007). Within our study, CAT-PD Affective Lability showed a robust and specific relationship with UPPS-P Negative Urgency and it was the strongest predictor of degree of engagement in cigarette smoking. A similar argument might then be made

for considering the CAT-PD facet of Affective Lability to be measuring a very similar construct as UPPS Urgency. The CAT-PD Affective Lability scale was created as a composite of urgency and stress reactivity scales that were previously separated and is classified under the domain of negative emotionality; thus, the scale appears to function in a manner similar to the facet of Impulsiveness in the FFM (Costa &McCrae, 1992), which is conceptualized as a facet of Neuroticism but provided the basis for the construct of Urgency in the UPPS model (Whiteside & Lynam, 2001).

Based on findings from previous research we expected to find specific facets of the CAT-PD and PID-5 models selectively predicting engagement in specific behavioral outcomes. For example, bulimic symptoms (bingeing and purging), gambling, and alcohol abuse were expected to differentially relate with urgency constructs and not with sensation seeking, lack of premeditation, or lack of perseverance (Fischer and Smith, 2008). Our findings generally did not demonstrate this type of specificity. While non-suicidal self-injury related in the expected unique way to CAT-PD Affective Lability as an urgency construct (Lynam et al., 2011), most other behavioral outcomes were soundly predicted by multiple impulsivity constructs. For example, bulimic symptoms (bingeing and purging) were best predicted by CAT-PD Affective Lability, CAT-PD and PID-5 risk taking scales (constructs related to sensation seeking in the UPPS model), and PID-5 Irresponsibility. Although the expected relationship with the urgency facet scale is present, it is neither specific nor particularly strong. Furthermore, some scales did demonstrate specific relationships with behavioral outcomes that were not consistent with previous research. Gambling behavior, as an example, was expected to relate specifically to urgency (Fischer and

Smith, 2008); however, PID-5 Risk Taking was the single significant predictor of gambling behavior in our results. Taken collectively, the findings from the hierarchical regression analyses suggest that the predictive ability of these individual impulsivity facet scales may have less to do with type or content of behavior and might relate more to the pattern or quantification of engagement (e.g., variety versus frequency versus degree). In other words, some of these traits may represent an individual's predilection to a pattern of engagement with or participation in their environment, as opposed to unique vulnerabilities to specific categories of behaviors.

Moreover, the representation of pan-impulsivity on the CAT-PD and PID-5 seem to present somewhat different characterizations of the overall construct and the underlying facet constructs. Both the PID-5 and CAT-PD include facet scales intended to capture "irresponsibility" and "risk taking." At the level of item content, both measures seem to conceptualize irresponsibility as a lack of dependability (e.g., following through on commitments), but questions on the PID-5 also seem to also address an intentional evasion that is not explicit in the CAT-PD. For example, PID-5 items include "skip[ping] town to avoid responsibilities" and "mak[ing] promises I don't intend to keep." Whereas CAT-PD Irresponsibility items include things like "avoid[ing] responsibilities" and "cannot be counted on to get things done." This difference is also reflected in the fact that the PID-5 Irresponsibility scale predicted property crime above and beyond all scales on the CAT-PD except while the CAT-PD Irresponsibility scale predicted increased risky decision making on the Auto-BART above and beyond all scales on the PID-5. It appears that the PID-5 Irresponsibility

scale taps into a more antagonistic version of the trait while the CAT-PD scale taps into more carelessness and forgetfulness.

Looking at the same issue with the risk taking scales from each measure, the opposite pattern seems to hold wherein the CAT-PD seems to tap a more extreme, maladaptive version of the construct. Again examining item content, the CAT-PD items seem to focus on engagement in activities that are “dangerous” and “frightening” that “might kill me” and provide “an adrenaline rush.” While the PID-5 scale does address activities that are “dangerous,” most items’ content refers to decisions or activities that are “risky” or associated with risk. Looking at the behaviors associated with each of these constructs, the PID-5 Risk Taking scale paints a picture of recklessness—an individual who is involved in a variety of maladaptive and illegal behaviors like substance use, gambling, speeding, disobeying traffic laws, and driving under the influence of drugs or alcohol. And while there is some overlap, the CAT-PD seems to describe a more extreme picture of someone who engages in risky decision-making and also engages in violent criminal activity. The differences between these operationalizations of risk taking helps to explain how the paradoxical relationships between these scales and bingeing and purging behaviors is even possible; however, the interpretation of those findings remains difficult to comprehend.

The association between facet-level constructs and behavioral outcomes seems to be driven predominantly by the specificity of the Risk Taking scales from each measure, the Affective Lability scale from the CAT-PD, and the Irresponsibility scale from the PID-5. The Impulsivity scale from the PID-5 shows specific predictive validity over the other PID-5 scales for several outcomes, but not over CAT-PD scales.

The short answer to our research question about the specificity of the facets from each of these measures seems to be that some of the scales on the PID-5 and CAT-PD show solid specificity in terms of their relationships to other measures of impulsivity and to behavioral outcomes; however, the other scales seem to represent ambiguous concepts that could represent a mixture of different facets of impulsivity or could be a somewhat nebulous depiction of a specific construct. Either way, our results suggest that some of the specific facets within the CAT-PD and PIS-5 are less clearly articulated than others.

Limitations

The present study had limitations that must be considered. First, this study utilized primarily self-report measures of personality. The advantages and disadvantages of self-report measures have been documented extensively (e.g., Widiger & Clark, 2000), and evidence of the validity of self-reports still support their use; however, the disadvantages to this method should be kept in mind. Similarly, our measurement of behavioral outcomes relied on retrospective self-report. Retrospective recall may lead to inaccurate reporting of behavior.

The concurrent nature of our data also prevents us from drawing conclusions about the true directional nature of the relationship between impulsive traits and behavioral outcomes; however, prior evidence from longitudinal studies has shown personality to be a predictor of later maladaptive behavioral outcomes such as substance use (Sher, Bartholow, & Wood, 2000) and risky sexual behavior (Miller et al., 2004). The sample recruited in this study was community-based but not nationally representative, which could impact the findings of this study. Race, SES, and education

levels have all been identified previously as important predictor variables for the outcomes discussed in this study. Therefore, while it will be important to replicate these findings in other samples, we have no reason to expect that the demographics would influence the direction or magnitude of relations among variables.

Conclusions

This study concluded that the CAT-PD and PID-5 models of impulsivity each adequately cover the most important components of trait impulsivity. However, the specificity of the lower-order facets remains open to question. The facets correlated well with all measures, which bodes well for the conceptual coverage in general, but there were mixed results in terms of how well specific facet scales related to specific outcomes. While some of the facet-level constructs demonstrate conceptual and predictive specificity, others seem to lack a distinct operationalization in that they do not relate to or predict the external validity markers as we would expect. Several questions arose from our analyses that future research should address; specifically, looking at the conceptual alignment of the CAT-PD and PID-5 with existing measures of impulsivity and analyzing the item content of each model to better understand the nature of the coverage of the constructs.

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APPENDIX

Table 1

Bivariate Correlations Between CAT-PD and PID-5 Facet Scales

	CAT-PD Affective Lability	CAT-PD Irresponsibility	CAT-PD Non-Perseverance	CAT-PD Non-Planfulness	CAT-PD Risk-taking	PID-5 Distractibility	PID-5 Impulsivity	PID-5 Irresponsibility
CAT-PD Affective Lability	–							
CAT-PD Irresponsibility	0.50**	–						
CAT-PD Non-Perseverance	0.58**	0.73**	–					
CAT-PD Non-Planfulness	0.43**	0.56**	0.57**	–				
CAT-PD Risk-Taking	0.13**	0.25**	0.21**	0.53**	–			
PID-5 Distractibility	0.55**	0.68**	0.86**	0.58**	0.24**	–		
PID-5 Impulsivity	0.40**	0.46**	0.48**	0.84**	0.56**	0.53**	–	
PID-5 Irresponsibility	0.47**	0.78**	0.65**	0.65**	0.36**	0.65**	0.62**	–
PID-5 Risk Taking	-0.01	0.21**	0.16**	0.57**	0.73**	0.17**	0.60**	0.33**

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5.

**$p \leq .01$. *$p \leq .05$.

Table 2

Bivariate Correlations Between CAT-PD, PID-5 and Other Measures of Trait Impulsivity

	CAT-PD				
	Affective Lability	Irresponsibility	Non-Perseverance	Non-Planfulness	Risk Taking
UPPS Negative Urgency	0.68**	0.57**	0.6**	0.7**	0.38**
UPPS Lack of Premeditation	0.29**	0.46**	0.42**	0.77**	0.44**
UPPS Lack of Perseveration	0.44**	0.79**	0.8**	0.56**	0.15**
UPPS Sensation Seeking	-0.13**	0.11*	0.09	0.38**	0.67**
UPPS Positive Urgency	0.44**	0.51**	0.47**	0.65**	0.55**
IPIP Cautiousness	-0.42**	-0.52**	-0.55**	-0.85**	-0.53**
IPIP Excitement Seeking	0.02	0.19**	0.19**	0.54**	0.74**
IPIP Immoderation	0.56**	0.54**	0.6**	0.63**	0.31**
IPIP Self-Discipline	-0.44**	-0.76**	-0.8**	-0.51**	-0.11*
EASI Decision Time	0.39**	0.51**	0.54**	0.81**	0.43**
EASI Inhibitory Control	0.60**	0.48**	0.59**	0.6**	0.28**
EASI Persistence	0.33**	0.69**	0.71**	0.54**	0.19**
EASI Sensation Seeking	0.12*	0.29**	0.35**	0.59**	0.64**

(*table continues*)

	PID-5			
	Distractibility	Impulsivity	Irresponsibility	Risk Taking
UPPS Negative Urgency	0.63**	0.71**	0.65**	0.34**
UPPS Lack of Premeditation	0.45**	0.72**	0.54**	0.63**
UPPS Lack of Perseveration	0.76**	0.47**	0.73**	0.17**
UPPS Sensation Seeking	0.13**	0.4**	0.22**	0.8**
UPPS Positive Urgency	0.51**	0.71**	0.63**	0.53**
IPIP Cautiousness	-0.58**	-0.86**	-0.63**	-0.61**
IPIP Excitement Seeking	0.23**	0.58**	0.33**	0.84**
IPIP Immoderation	0.57**	0.62**	0.59**	0.32**
IPIP Self-Discipline	-0.75**	-0.4**	-0.65**	-0.14**
EASI Decision Time	0.59**	0.77**	0.58**	0.52**
EASI Inhibitory Control	0.55**	0.58**	0.55**	0.23**
EASI Persistence	0.64**	0.47**	0.66**	0.21**
EASI Sensation Seeking	0.38**	0.63**	0.41**	0.75**

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5. IPIP = International Personality Item Pool-NEO.

**$p \leq .01$. *$p \leq .05$.

Table 3

Hierarchical Multiple Regression Analyses Comparing PID-5 and CAT-PD Scales for Predicting Risky Decision Making Outcomes

Step and Variable	BART Average Pumps/Balloon			Delay Discounting Rate			Gambling		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		0.00	0.00		0.00	0.00		0.04**	0.04**
Age	0.00			0.00			0.21**		
Step 2		0.05**	0.05**		0.03*	0.03*		0.14**	0.10**
Age	0.01			0.04			0.26**		
CAT-PD Affective Lability	-0.15**			0.03			-0.10		
CAT-PD Irresponsibility	0.15*			0.11			0.03		
CAT-PD Non-Perseverance	-0.05			0.00			-0.12		
CAT-PD Non-Planfulness	-0.11			0.05			0.20**		
CAT-PD Risk-Taking	0.16**			0.01			0.19**		
Step 3		0.06	0.02		0.05	0.02		0.16*	0.02*
Age	0.00			0.03			0.28**		
CAT-PD Affective Lability	-0.16**			0.00			-0.05		
CAT-PD Irresponsibility	0.24**			0.01			0.01		
CAT-PD Non-Perseverance	-0.06			0.03			-0.03		
CAT-PD Non-Planfulness	0.03			-0.05			0.08		
CAT-PD Risk-Taking	0.23**			0.01			0.08		
PID-5 Distractibility	0.03			-0.07			-0.11		

(*table continues*)

Step and Variable	BART Average Pumps/Balloon			Delay Discounting Rate			Gambling		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
PID-5 Impulsivity	-0.09			0.12			0.05		
PID-5 Irresponsibility	-0.17*			0.20*			0.05		
PID-5 Risk Taking	-0.07			-0.07			0.19**		
Step 1		0.00	0.00		0.00	0.00		0.04**	0.04**
Age	0.00			0.00			0.21**		
Step 2		0.01	0.01		0.05**	0.05**		0.16**	0.11**
Age	0.00			0.03			0.28**		
PID-5 Distractibility	0.02			-0.05			-0.13*		
PID-5 Impulsivity	-0.11			0.09			0.10		
PID-5 Irresponsibility	-0.05			0.20**			0.06		
PID-5 Risk Taking	0.12*			-0.07			0.27**		
Step 3		0.06**	0.05**		0.05	0.00		0.16	0.01
Age	0.00			0.03			0.28**		
PID-5 Distractibility	0.03			-0.07			-0.11		
PID-5 Impulsivity	-0.09			0.12			0.05		
PID-5 Irresponsibility	-0.17*			0.20*			0.05		
PID-5 Risk Taking	-0.07			-0.07			0.19**		
CAT-PD Affective Lability	-0.16**			0.00			-0.05		

(*table continues*)

Step and Variable	BART Average Pumps/Balloon			Delay Discounting Rate			Gambling		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
CAT-PD Irresponsibility	0.24**			0.01			0.01		
CAT-PD Non-Perseverance	-0.06			0.03			-0.03		
CAT-PD Non-Planfulness	0.03			-0.05			0.08		
CAT-PD Risk-Taking	0.23**			0.01			0.08		

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5.

**$p \leq .01$. *$p \leq .05$.

Table 4

Hierarchical Multiple Regression Analyses Comparing PID-5 and CAT-PD Scales for Predicting Substance Use Outcomes

	Substance Use Variety			Smoking Frequency		
Step and Variable	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		0.02**	0.02**		0.01	0.01
Age	0.14**			0.09		
Step 2		0.10**	0.08**		0.09**	0.08**
Age	0.22**			0.17**		
CAT-PD Affective Lability	-0.04			0.21**		
CAT-PD Irresponsibility	0.07			0.10		
CAT-PD Non-Perseverance	-0.02			-0.15*		
CAT-PD Non-Planfulness	0.11			0.04		
CAT-PD Risk-Taking	0.21**			0.17**		
Step 3		0.12*	0.02*		0.10	0.01
Age	0.23**			0.18**		
CAT-PD Affective Lability	0.02			0.19**		
CAT-PD Irresponsibility	0.07			0.09		
CAT-PD Non-Perseverance	-0.07			-0.14		
CAT-PD Non-Planfulness	0.01			-0.07		
CAT-PD Risk-Taking	0.08			0.16*		
PID-5 Distractibility	0.09			-0.03		
PID-5 Impulsivity	-0.02			0.17		
PID-5 Irresponsibility	0.01			0.04		
PID-5 Risk Taking	0.25**			-0.04		
Step 1		0.02**	0.02**		0.01	0.01
Age	0.14**			0.09		
Step 2		0.12**	0.10**		0.06**	0.05**
Age	0.22**			0.13**		
PID-5 Distractibility	0.07			-0.05		
PID-5 Impulsivity	0.00			0.20**		
PID-5 Irresponsibility	0.04			0.10		
PID-5 Risk Taking	0.29**			-0.01		

(*table continues*)

Step and Variable	Substance Use Variety β	Substance Use Variety R^2	Substance Use Variety ΔR^2	Smoking Frequency β	Smoking Frequency R^2	Smoking Frequency ΔR^2
Step 3		0.12	0.00		0.10**	0.04**
Age	0.23**			0.18**		
PID-5 Distractibility	0.09			-0.03		
PID-5 Impulsivity	-0.02			0.17		
PID-5 Irresponsibility	0.01			0.04		
PID-5 Risk Taking	0.25**			-0.04		
CAT-PD Affective Lability	0.02			0.19**		
CAT-PD Irresponsibility	0.07			0.09		
CAT-PD Non-Perseverance	-0.07			-0.14		
CAT-PD Non-Planfulness	0.01			-0.07		
CAT-PD Risk-Taking	0.08			0.16*		

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5.

**$p \leq .01$. *$p \leq .05$.

Table 5

Hierarchical Multiple Regression Analyses Comparing PID-5 and CAT-PD scales for Predicting Criminal Behavior Outcomes

Step and Variable	Property Crime/Delinquency			Intimate Partner Violence			Violent Crime		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		0.01	0.01		0.00	0.00		0.01*	0.01*
Age	0.07			0.04			0.10*		
Step 2		0.12**	0.11**		0.08**	0.07**		0.10**	0.09**
Age	0.17**			0.13**			0.17**		
CAT-PD Affective Lability	0.03			0.20**			-0.01		
CAT-PD Irresponsibility	0.13			0.04			0.00		
CAT-PD Non-Perseverance	-0.02			-0.10			-0.03		
CAT-PD Non-Planfulness	0.16*			0.07			0.00		
CAT-PD Risk-Taking	0.14**			0.15**			0.32**		
Step 3		0.14*	0.02*		0.09	0.01		0.12	0.01
Age	0.18**			0.13**			0.18**		
CAT-PD Affective Lability	0.07			0.20**			0.02		
CAT-PD Irresponsibility	0.02			-0.03			-0.01		
CAT-PD Non-Perseverance	-0.04			-0.18			0.10		
CAT-PD Non-Planfulness	0.14			-0.04			-0.03		
CAT-PD Risk-Taking	0.06			0.10			0.26**		
PID-5 Distractibility	0.03			0.09			-0.17		

(*table continues*)

Step and Variable	Property Crime/Delinquency			Intimate Partner Violence			Violent Crime		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
PID-5 Impulsivity	-0.13			0.07			0.00		
PID-5 Irresponsibility	0.18*			0.12			0.04		
PID-5 Risk Taking	0.17*			0.04			0.11		
Step 1		0.01	0.01		0.00	0.00		0.01*	0.01*
Age	0.07			0.04			0.10*		
Step 2		0.13**	0.12**		0.05**	0.05**		0.08**	0.07**
Age	0.16**			0.10*			0.16**		
PID-5 Distractibility	0.05			0.01			-0.09		
PID-5 Impulsivity	-0.02			0.13			0.03		
PID-5 Irresponsibility	0.22**			0.10			0.06		
PID-5 Risk Taking	0.20**			0.04			0.25**		
Step 3		0.14	0.01		0.09**	0.03**		0.12**	0.03**
Age	0.18**			0.13**			0.18**		
PID-5 Distractibility	0.03			0.09			-0.17		
PID-5 Impulsivity	-0.13			0.07			0.00		
PID-5 Irresponsibility	0.18*			0.12			0.04		
PID-5 Risk Taking	0.17*			0.04			0.11		
CAT-PD Affective Lability	0.07			0.20**			0.02		

(*table continues*)

Step and Variable	Property Crime/Delinquency			Intimate Partner Violence			Violent Crime		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
CAT-PD Irresponsibility	0.02			-0.03			-0.01		
CAT-PD Non-Perseverance	-0.04			-0.18			0.10		
CAT-PD Non-Planfulness	0.14			-0.04			-0.03		
CAT-PD Risk-Taking	0.06			0.10			0.26**		

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5.

**$p \leq .01$. *$p \leq .05$.

Table 6

Hierarchical Multiple Regression Analyses Comparing PID-5 and CAT-PD Scales for Predicting Non-Suicidal Self-Injury and Risky Sexual Behavior Outcomes

	Non-Suicidal Self-Injury			Risky Sex		
Step and Variable	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		0.00	0.00		0.02**	0.02**
Age	-0.03			0.15**		
Step 2		0.18**	0.18**		0.14**	0.12**
Age	0.09*			0.22**		
CAT-PD Affective Lability	0.32**			0.08		
CAT-PD Irresponsibility	-0.01			0.07		
CAT-PD Non-Perseverance	0.03			-0.28**		
CAT-PD Non-Planfulness	0.08			0.31**		
CAT-PD Risk-Taking	0.17**			0.10		
Step 3		0.19	0.01		0.14	0.00
Age	0.10*			0.22**		
CAT-PD Affective Lability	0.35**			0.09		
CAT-PD Irresponsibility	0.01			0.03		
CAT-PD Non-Perseverance	0.06			-0.25*		
CAT-PD Non-Planfulness	-0.05			0.32**		
CAT-PD Risk-Taking	0.08			0.08		
PID-5 Distractibility	-0.04			-0.05		
PID-5 Impulsivity	0.11			-0.05		
PID-5 Irresponsibility	-0.02			0.06		
PID-5 Risk Taking	0.14			0.04		
Step 1		0.00	0.00		0.02**	0.02**
Age	-0.03			0.15**		
Step 2		0.11**	0.11**		0.10**	0.08**
Age	0.05			0.22**		
PID-5 Distractibility	0.12			-0.14*		
PID-5 Impulsivity	0.19**			0.17*		
PID-5 Irresponsibility	0.06			0.11		
PID-5 Risk Taking	0.06			0.13*		

(*table continues*)

Step and Variable	Non-Suicidal Self-Injury β	Non-Suicidal Self-Injury R^2	Non-Suicidal Self-Injury ΔR^2	Risky Sex β	Risky Sex R^2	Risky Sex ΔR^2
Step 3		0.19**	0.08**		0.14**	0.04**
Age	0.10*			0.22**		
PID-5 Distractibility	-0.04			-0.05		
PID-5 Impulsivity	0.11			-0.05		
PID-5 Irresponsibility	-0.02			0.06		
PID-5 Risk Taking	0.14			0.04		
CAT-PD Affective Lability	0.35**			0.09		
CAT-PD Irresponsibility	0.01			0.03		
CAT-PD Non-Perseverance	0.06			-0.25*		
CAT-PD Non-Planfulness	-0.05			0.32**		
CAT-PD Risk-Taking	0.08			0.08		

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5.

**$p \leq .01$. *$p \leq .05$.

Table 7

Hierarchical Multiple Regression Analyses Comparing PID-5 and CAT-PD Scales for Predicting Eating Behavior Outcomes

	Binge Eating			Purging		
Step and Variable	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		0.01*	0.01*		0.02**	0.02**
Age	-0.12*			-0.14**		
Step 2		0.18**	0.17**		0.11**	0.09**
Age	0.00			-0.05		
CAT-PD Affective Lability	0.19**			0.10		
CAT-PD Irresponsibility	0.01			0.04		
CAT-PD Non-Perseverance	0.16*			0.00		
CAT-PD Non-Planfulness	0.10			0.08		
CAT-PD Risk-Taking	0.11*			0.19**		
Step 3		0.20*	0.02*		0.16**	0.05**
Age	-0.01			-0.06		
CAT-PD Affective Lability	0.14*			0.02		
CAT-PD Irresponsibility	-0.07			-0.11		
CAT-PD Non-Perseverance	0.05			-0.14		
CAT-PD Non-Planfulness	0.03			-0.01		
CAT-PD Risk-Taking	0.15*			0.27**		
PID-5 Distractibility	0.11			0.14		
PID-5 Impulsivity	0.11			0.14		
PID-5 Irresponsibility	0.15			0.26**		
PID-5 Risk Taking	-0.14*			-0.22**		
Step 1		0.01*	0.01*		0.02**	0.02**
Age	-0.12*			-0.14**		
Step 2		0.18**	0.17**		0.12**	0.10**
Age	-0.03			-0.08		
PID-5 Distractibility	0.18**			0.02		
PID-5 Impulsivity	0.19**			0.19**		
PID-5 Irresponsibility	0.15*			0.18**		
PID-5 Risk Taking	-0.09			-0.06		

(*table continues*)

Step and Variable	Binge Eating β	Binge Eating R^2	Binge Eating ΔR^2	Purging β	Purging R^2	Purging ΔR^2
Step 3		0.20*	0.03*		0.16**	0.04**
Age	-0.01			-0.06		
PID-5 Distractibility	0.11			0.14		
PID-5 Impulsivity	0.11			0.14		
PID-5 Irresponsibility	0.15			0.26**		
PID-5 Risk Taking	-0.14*			-0.22**		
CAT-PD Affective Lability	0.14*			0.02		
CAT-PD Irresponsibility	-0.07			-0.11		
CAT-PD Non-Perseverance	0.05			-0.14		
CAT-PD Non-Planfulness	0.03			-0.01		
CAT-PD Risk-Taking	0.15*			0.27**		

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5.

**$p \leq .01$. *$p \leq .05$.

Table 8

Hierarchical Multiple Regression Analyses Comparing PID-5 and CAT-PD Scales for Predicting Driving Behavior Outcomes

Step and Variable	Fastest Driving Speed			Total Number of Tickets (Traffic and Parking)			Driving Under the Influence (Drugs or Alcohol)		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Step 1		0.00	0.00		0.01*	0.01*		0.02**	0.02**
Age	-0.01			0.11*			0.15**		
Step 2		0.18**	0.18**		0.03	0.02		0.10**	0.08**
Age	0.07			0.14**			0.23**		
CAT-PD Affective Lability	-0.04			-0.06			0.01		
CAT-PD Irresponsibility	-0.01			0.06			0.10		
CAT-PD Non-Perseverance	0.01			-0.03			-0.03		
CAT-PD Non-Planfulness	-0.01			0.01			0.13*		
CAT-PD Risk-Taking	0.33**			0.12*			0.14**		
Step 3		0.14**	0.04**		0.05	0.02		0.11	0.02
Age	0.09			0.15**			0.24**		
CAT-PD Affective Lability	0.04			-0.01			0.06		
CAT-PD Irresponsibility	-0.03			0.03			0.08		
CAT-PD Non-Perseverance	0.03			0.05			0.05		
CAT-PD Non-Planfulness	-0.03			-0.08			0.03		
CAT-PD Risk-Taking	0.17*			0.01			0.04		

(*table continues*)

Step and Variable	Fastest Driving Speed			Total Number of Tickets (Traffic and Parking)			Driving Under the Influence (Drugs or Alcohol)		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
PID-5 Distractibility	0.01			-0.09			-0.09		
PID-5 Impulsivity	-0.17			0.00			0.01		
PID-5 Irresponsibility	0.02			0.06			0.06		
PID-5 Risk Taking	0.34**			0.20**			0.19**		
Step 1		0.00	0.00		0.01*	0.01*		0.02**	0.02**
Age	-0.01			0.11*			0.15**		
Step 2		0.12**	0.12**		0.05**	0.04**		0.11**	0.08**
Age	0.07			0.15**			0.23**		
PID-5 Distractibility	0.03			-0.06			-0.01		
PID-5 Impulsivity	-0.15*			-0.05			0.04		
PID-5 Irresponsibility	0.02			0.08			0.13*		
PID-5 Risk Taking	0.42**			0.20**			0.20**		
Step 3		0.14	0.02		0.05	0.00		0.11	0.01
Age	0.09			0.15**			0.24**		
PID-5 Distractibility	0.01			-0.09			-0.09		
PID-5 Impulsivity	-0.17			0.00			0.01		
PID-5 Irresponsibility	0.02			0.06			0.06		

(*table continues*)

Step and Variable	Fastest Driving Speed			Total Number of Tickets (Traffic and Parking)			Driving Under the Influence (Drugs or Alcohol)		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
PID-5 Risk Taking	0.34**			0.20**			0.19**		
CAT-PD Affective Lability	0.04			-0.01			0.06		
CAT-PD Irresponsibility	-0.03			0.03			0.08		
CAT-PD Non-Perseverance	0.03			0.05			0.05		
CAT-PD Non-Planfulness	-0.03			-0.08			0.03		
CAT-PD Risk-Taking	0.17*			0.01			0.04		

Note. CAT-PD = Computerized Adaptive Test of Personality Disorder. PID-5 = Personality Inventory for DSM-5.

**$p \leq .01$. *$p \leq .05$.