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The Psychopathic Personality: Measurement, Variants, And Utility Of The Construct

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THE PSYCHOPATHIC PERSONALITY:
MEASUREMENT, VARIANTS, AND UTILITY OF THE CONSTRUCT

A Dissertation Presented

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Abstract

Antisocial behaviors (AB), which place an enormous burden on society, are committed by a heterogeneous population, including psychopaths (Poythress et al., 2010). Psychopathy denotes a more serious and entrenched pattern of AB (Hare, 1996) and appears to be a heterogeneous construct as well. In fact, Primary and Secondary psychopathic variants are consistently identified in a variety of samples using person-centered analysis (Drislane et al., 2014; Gill & Stickle, 2016). Both Reinforcement Sensitivity Theory (Gray & McNaughton, 2000) and the Triarchic Model of Psychopathy (Patrick, Fowles, & Krueger, 2009) provide useful frameworks to understand the etiology of the psychopathic variants. The current study identified Primary and Secondary Trait groups in a sample of criminally justice involved adults ($N = 377$), which differed on measures of negative emotionality. However, the Psychopathic trait groups did not differ on the boldness or meanness domains of the Triarchic Model (Patrick, Fowles & Kreuger). The disinhibition domain of the Triarchic model was significantly associated with aggression, and this association was partially mediated by levels of anxiety. Anxiety is an important dimension to assess in research, evaluation, and treatment of individuals with high levels of antisocial behavior.

Keywords: Psychopathy, variants, Triarchic, measurement, antisocial behavior

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Introduction

Antisocial behaviors (AB) place tremendous financial burden and psychological burden on society (Cohen & Piquero, 2009; McCollister, French, & Fang, 2010). The ripple effects of AB, specifically violent AB, include both the direct financial, medical, and psychological effects on victims and communities, and the indirect effects, such as long-term psychological and medical effects, productivity losses, and future criminality of those involved. The financial burden of violent AB in the US has been estimated to be more than $300 billion per year, including the associated healthcare, policing and incarceration expenses (U.S. Executive Office of the President, 2016). Astonishingly, this economic burden may be placed on society by a relatively small group of individuals (Cohen & Piquero, 2009). Across several studies, a small percentage of individuals (as small as 6% of offenders), which included adults and youth, accounted for most of the violent crime (as much as 70%; Beaver, 2013; Wolfgang, Figlio, & Sellin, 1972; Wolfgang, 1976). Therefore, research into this small population of individuals has the potential to advance understanding of etiological mechanisms that contribute to the risk for life-course persistent antisocial trajectories.

The small percentage of individuals with severe and persistent antisocial behaviors appear to be a heterogeneous population (Brinkley, Newman, Widiger, & Lynam, 2004). Since AB comprise a wide variety of behaviors (from minor property damage to severe violence against persons) committed by a heterogeneous population, numerous methods have been developed to study and subtype individuals who display AB. One well-documented and fruitful approach is the examination of developmental

trajectories of individuals who display AB. Moffitt (1993) proposed two distinct

developmental trajectories within this population: life-course-persistent AB and

adolescence-limited AB. Since most individuals with life-course-persistent AB meet

diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders, 5th

edition, (DSM-5; American Psychiatric Association, 2013) for conduct disorder (CD) in

childhood and antisocial personality disorder (ASPD) in adulthood, Moffit's

developmental trajectories have provided a useful framework for understanding the

developmental progression of AB for many individuals (Moffitt & Caspi, 2001; Moffitt,

Caspi, Harrington, & Milne, 2002). Nevertheless, this framework is incomplete for

understanding the etiology of severe and persistent AB, since individuals with life-

course-persistent AB are themselves a heterogeneous population (Poythress et al., 2010;

Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). As first noted by Pilkonis and

Klein (1997), the use of multidimensional trait models to identify relatively homogeneous

subgroups of individuals within ASPD starts with identification of valid dimensional

measures of characteristics or traits associated with ASPD.

Among individuals with ASPD and CD, the presence of callous-unemotional

(CU) traits predicts a more serious and entrenched behavioral style (Frick, Ray,

Thornton, & Kahn, 2014; Frick & White, 2008). Broadly, CU traits refer to a set of

affective and behavioral characteristics including deficient remorse or guilt, deficient or

shallow affect, deficient empathy or concern for the feelings of others, and an uncaring

attitude towards performance in important activities (Frick, Stickle, Dandreaux, Farrell,

& Kimonis, 2005; Frick & White, 2008).   In fact, a 'limited prosocial emotions'

specifier, which measures these four CU trait dimensions, was added to the DSM-5

diagnosis for CD in juveniles (American Psychiatric Association, 2013). Further, CU

traits are a prominent feature of psychopathy, a narrower clinical construct than ASPD,

commonly characterized by extreme AB, violations of social norms, and a narcissistic-

manipulative interpersonal style (Hare & Neumann, 2008). The study of psychopathy

(and CU traits in youth) has clarified some of the heterogeneity within the ASPD (and

CD in youth) population by defining a constellation of coexisting traits that many

individuals with extreme AB consistently display.

Psychopathy and Psychopathic Variants

Psychopathy is a constellation of behavioral and personality characteristics

classically described by Hervey Cleckley in his seminal work *The Mask of Sanity*

(1941/1988). After years of clinical observation, Cleckley outlined 16 core traits of

psychopaths. These traits were described broadly as a glib, manipulative interpersonal

style devoid of empathy or genuine insight, including; superficial charm, untruthfulness,

poor judgment, and unreliability. In addition to the affective and interpersonal traits,

decades of research have identified antisocial or deviant lifestyle traits, including

employment problems, relationship instability and criminal behavior, to be well

established behavioral correlates of psychopathy (for example see, Leistico, Salekin,

DeCoster, & Rogers, 2008).

One commonly used measure of psychopathy is the Psychopathy Checklist-

Revised (PCL-R; Hare, 1991), which operationalized and expanded Cleckley's

observations into a semi-structured interview assessment. The two factors of the PCL-R

measure the interpersonal and affective facets (factor 1), and the lifestyle and antisocial

behaviors (factor 2) associated with psychopathy. Although most prisoners meet criteria

for ASPD, only a minority meet criteria for PCL-R defined psychopathy (Hare, 1996; Ogloff, 2006). Compared to ASPD, the narrower construct of psychopathy does not solely rely on behavioral indicators and denotes individuals at higher risk for recidivism, persistent antisocial behavior such as future violence, and institutional infractions (Hare, 1996; Rutter, 2005; Vincent, Odgers, McCormick, & Corrado, 2008).

Since its introduction to the literature, psychopathy has been thought to be a heterogeneous construct, and numerous theorists have proposed many different variants or typologies of psychopathy (see Skeem, et al, 2003 for a comprehensive review). Several theorists hypothesized psychopathic variants based upon distinct etiological theories. For instance, etiological theories of innate biological differences in fear processing and those of learned or socially shaped differences are common in the literature. Over the last decade, use of contemporary data analytic approaches to conduct numerous person-centered analyses in adult and juvenile samples has confirmed the suspected heterogeneity within psychopathy by consistently identifying two of the many proposed subtypes referred to as Primary and Secondary psychopathic variants (Poythress et al., 2010; Skeem et al., 2003).

Primary psychopathy, the 'Cleckleyian' prototype (1941/1988) of a psychopath is typified by CU traits including shallow emotions, a glib and charming interpersonal style, as well as calculating and manipulative behaviors. Consistent with Cleckley's original conceptualization, Primary psychopaths are characterized by their lack of anxiety and apparent immunity to negative emotional states (Kimonis, Frick, Cauffman, Goldweber, & Skeem, 2012; Skeem, Johansson, Andershed, Kerr, & Louden, 2007), their 'mask of sanity' (Cleckley, 1941/1988). Lykken (1957) theorized that a fearless temperament

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accounted for the Primary psychopath's lack of morals, due to these individuals' inability to be socialized through traditional discipline methods or fear of consequences. Current psychopathy theorists concur that Primary psychopathy is characterized by CU traits and a fearless temperament, but disagree about the extent of emotional stability present within the psychopathic personality (Lilienfeld et al., 2012; Neumann, Malterer, & Newman, 2008). In addition, Primary psychopathy has an acknowledged genetic component with observable infant temperamental correlates and an entrenched behavioral style (Glenn, Raine, Venables, & Mednick, 2009; Viding, Blair, Moffitt, & Plomin, 2005). Overall, in line with characteristics consistent with Cleckley's prototypical psychopath, person-centered analyses have consistently found individuals in Primary variant groups to have less self-reported negative emotionality, fewer anxiety symptoms, and more emotional stability than individuals in Secondary variant groups (Kimonis et al., 2012; Skeem et al., 2007).

Secondary psychopathy, first described by Karpman (1941/1948), was conceptualized as a socially shaped variant. The Secondary variant's "psychopathic behavior (most notably hostility) is an emotionally conditioned reaction (Karpman, 1941/1948, p. 457-458)," stemming from disruptive family relationships. Karpman argued that Secondary psychopaths "are primarily neurotic and only *secondarily* or symptomatically psychopathic (p. 458, emphasis added)." According to Karpman's theory, the Primary psychopath is deliberate and planful, whereas the Secondary psychopath is impulsive and reactively aggressive. Theories of Secondary psychopathy have remained central in the variant literature (Skeem et al., 2003). For example, Porter (1996) hypothesized that Secondary psychopathy stems from interpersonal family

dynamics, especially childhood maltreatment (see Skeem, et al., 2003 for a comprehensive review). Corresponding to Karpman's theory, individuals within Secondary variant groups consistently have more self-reported anxiety, histories of childhood abuse, impulsivity, depression, psychological distress, institutional violence, and peer problems as compared to individuals within Primary variant groups (Kimonis, et. al, 2011; Poythress, et.al., 2010).

By utilizing contemporary person-centered data analytic techniques, studies of psychopathic variants observe a variety of associated characteristics. In one such study, a subgroup of adolescent male offenders with elevated Youth Psychopathic Traits Inventory scores (YPI; Andershed, Kerr, Stattin, & Levander, 2002) were disaggregated into two groups theoretically consistent with Primary and Secondary psychopathy (Kimonis et al., 2012). Individuals in the Secondary group self-reported more anxiety, depression, attention problems, anger problems and childhood maltreatment. Further, individuals in the Secondary group were more responsive to a dot-probe stimulus during the presentation of distressing pictures (e.g., a child crying) than individuals in the Primary group (Kimonis et al., 2012), evidence of an intact ability to empathize with another's pain. Similarly, Tatar, Cauffman, Kimonis, and Skeem (2012) found two groups consistent with Primary and Secondary psychopathy in a large sample of adolescent male offenders by statistically clustering youth high on psychopathic traits with scales from the YPI and a measure of state anxiety. They found youth in the Secondary group reported more past posttraumatic stress disorder (PTSD) symptoms than youth in the Primary group, but they were not more likely to report experiencing current PTSD symptoms, dissociation, or to have a current PTSD diagnosis. Notably, no

significant differences in the affective or interpersonal psychopathy scale scores of the YPI existed between the cluster groups. The Secondary group, however, did have greater lifestyle (i.e., a composite score measuring various AB) and total YPI scores as compared to the Primary group.

Person-centered analyses of adult samples have identified groups consistent with theoretical variants of psychopathy using a variety of measures and assessment methods. Skeem et al. (2007) found Primary and Secondary variant groups in a sample of violent male offenders whose PCL-R (Hare, 1991) scores were in the top third of the sample. These high PCL-R individuals were clustered on the factors of the PCL-R as well as a measure of trait anxiety. Surprisingly, the variant groups' PCL-R profiles were almost indistinguishable, with trait anxiety being the key delineator between groups. Moreover, they found Secondary psychopaths were only distinguishable from Primary psychopaths by their emotional disturbances, interpersonal hostility, and interpersonal submissiveness, suggesting Primary psychopaths may have a more dominant interpersonal style. These emotional reactivity and interpersonal differences along with the PTSD findings described previously (Tatar et al., 2012) are consistent with Karpman's (1941/1945) and Porter's (1996) theories of Secondary psychopathy.

Hicks, Vaidyanathan, and Patrick (2010) found groups consistent with Primary and Secondary psychopathy among a sample of female offenders by using a general personality measure. Hicks and colleagues clustered females with a minimum PCL-R score of 25 on 11 Primary trait scales of the Multidimensional Personality Questionnaire-Brief Form (Patrick, Curtin, & Tellegen, 2002). Notably, the cluster groups did not differ on PCL-R F1 (interpersonal/affective) scores, but did differ on PCL-R F2

(lifestyle/antisocial) scores due to a higher incidence of childhood onset CD in the Secondary group, one of the items on the lifestyle factor. In addition, the Secondary group had higher rates of institutional misconduct, illicit drug use, and greater trauma history when compared to the Primary group.

Although Primary and Secondary variant trait groups identified in community samples have lower overall levels of psychopathic or antisocial traits than those in offender samples, these traits are still present at measurable levels. For instance, Fanti, Demetriou, and Kimonis (2013) found two clusters consistent with Primary and Secondary psychopathic traits within a large sample of Greek-Cypriot adolescents in the community. Utilizing latent profile analysis, adolescents were clustered based on their Inventory of Callous-Unemotional Traits (ICU) scores, conduct problems, and anxiety symptom scores. Four subgroups of interest emerged: a Primary group, a Secondary group, an anxious group, and a healthy, low risk group. Similar to research in offender samples, individuals in the Secondary group reported greater levels of anxiety, conduct problems, and proactive and reactive aggression compared to the Primary group. Similarly, Salihovic, Kerr, and Stattin (2014) found Primary and Secondary variant clusters amongst a Swedish urban adolescent sample. In contrast to the Greek-Cypriot sample, the Primary group's levels of YPI rated CU traits were higher than the Secondary group's levels of CU traits in the Swedish sample. In line with offender samples, levels of CU traits are inconsistent in terms of their equivalence between variant groups across studies in the community.

Although this review of psychopathic variant research is by no means exhaustive (e.g., see Lee & Salekin, 2010; Lee, Salekin, & Iselin, 2010; Poythress et al., 2010), it

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highlights several important findings. First, a large portion of the heterogeneity within psychopathy can be understood through person-centered analyses, such as model based cluster analysis or latent profile analysis. In addition, the results of these analyses correspond to etiological theories of psychopathy (Karpman, 1941; Lykken, 1957; Porter, 1996). Since numerous researchers empirically identified groups consistent with theoretical psychopathic variants in both community and forensic samples (Fanti et al., 2013; Poythress et al., 2010), it appears that variant traits (e.g., co-occurring antisocial behaviors, narcissism, disinhibition, anxiety, fearlessness) are dimensional rather than categorical. Groups consistent with psychopathic variants were found in adolescent and adult samples, suggesting distinct developmental trajectories to psychopathy, or equifinality (Kimonis et al., 2012; Skeem et al., 2007; Sroufe & Rutter, 1984).   As much of this research to date has been cross-sectional, however, longitudinal research is needed to confirm the existence of distinct developmental trajectories of Primary and Secondary psychopathy. In other words, it is still unclear if those in the variant groups found in adolescence will persist on the same trajectory into adulthood. Finally, researchers documented variant groups through a variety of self-report and clinician rated measures, including general personality measures, which adds to the evidence of validity for psychopathic variants (Cox et al., 2013; Drislane et al., 2014; Poythress et al., 2010; Skeem et al., 2007).

Measurement, Psychopathy and Psychopathic Variants

To adequately examine the heterogeneity within psychopathy, researchers must first be able to measure the construct of psychopathy validly. After the development of the PCL-R, psychopathy research flourished and numerous measures were developed

(Hare & Neumann, 2008). These measures can be roughly grouped into two broad categories, self-report instruments and semi-structured interview measures, which are rated by trained clinicians. The PCL-R, commonly referred to as the 'gold standard' for measuring psychopathy (Lilienfeld, Watts, Francis Smith, Berg, & Latzman, 2015) is largely based on Cleckley's original 16 criteria, as noted above (Hare et al., 1990). Specifically, the PCL-R is scored after an interview and file review, provides a total score, two factor scores, and four facet scores, and has clinical cut-offs for diagnosing psychopathy. Factor analyses of the PCL-R most commonly reveal two underlying factors. Factor 1 (F1) consists of a constellation of traits indicative of the prototypical psychopath's affective-interpersonal style (i.e., callous unemotional traits or a self-serving, manipulative style lacking guilt or empathy), and factor 2 (F2) consists of the behavioral correlates of psychopathy (e.g., antisocial and irresponsible behaviors; Martens, 2000).

Numerous self-report measures to assess psychopathy target a variety of populations (e.g., adults, adolescents, community, forensic), and can be labeled further as psychopathy specific or general personality measures. For instance, the Inventory of Callous-Unemotional Traits (ICU) evaluates callous-unemotional traits in adolescents and the Levenson Self-Report Psychopathy Scale (Levenson, Kiehl, & Fitzpatrick, 1995) measures psychopathic traits in adults. Broad measures of personality utilized to classify and understand the construct of psychopathy include: the antisocial behavior scale on the Personality Assessment Inventory (Morey, 2007), the psychopathic deviate scale of the Minnesota Multiphasic Personality Inventory (Butcher, Graham, Ben-Porath, Tellegen, & Dahlstrom, 2003), and the agreeableness, conscientiousness, extraversion and

neuroticism scales of the NEO Personality Inventory-Revised (Costa & McCrae, 1992) to name a few.

The multitude of measurement instruments has informed and furthered the study of psychopathic variants through theoretical hypothesis testing. Cleckley (1941/1988) and other theorists (Karpman, 1941; Skeem et al., 2003) believed Primary psychopaths would score higher on traditional measures of callous-unemotional traits and Secondary psychopaths would score higher on measures of antisocial behaviors. In fact, prior to the widespread use of person-centered analyses, several researchers classified individuals into groups based on a psychopathic measure's factor scores (Lander, Lutz-Zois, Rye, & Goodnight, 2012; Ross et al., 2007) with Primary groups consisting of individuals high on a callous-unemotional (CU) factor (or F1) and Secondary groups consisting of individuals high on antisocial/impulsive behavior factor (or F2). In theory, Primary psychopaths would display higher levels CU traits and Secondary psychopaths' higher levels of antisocial deviance (Cleckley, 1941/1988; Karpman, 1941/1948). Inconsistent with that prediction, some studies have found individuals in Secondary groups have similar levels of CU traits compared to individuals in Primary groups (Hicks et al., 2010; Skeem et al., 2007; Tatar et al., 2012). This is not a universal finding, however, because other researchers find the predicted relationships between CU trait scores and psychopathic variants (Euler et al., 2014; Salihovic et al., 2014; Vassileva, Kosson, Abramowitz, & Conrod, 2005). The inconsistency in CU trait scores across variant samples may be attributable in part, to gender specific expressions of psychopathy. It is well documented that females with psychopathic traits tend to score lower on CU measures than their male counterparts (Lee & Salekin, 2010). Some studies with notable

CU trait differences between variant groups, had a larger proportion of females within the Secondary group (Euler et al., 2014). Given the hypothesized etiology and self-reported negative emotionality of Secondary psychopathy, however, it is difficult to understand why Secondary groups score highly on measures of callous and *unemotional* traits.

Several notable hypotheses accounting for the Secondary variant groups high CU trait scores are important to consider. Many samples without variant group CU trait differences were drawn from offender groups (Tatar et al., 2012). The severity of the samples' AB could account for higher than average levels of CU traits, making naturally occurring differences small and impossible to detect (Skeem et al., 2007). Another possibility is that Secondary psychopaths may score highly on the callous portion of CU measures due to their interpersonal hostility (Skeem, et. al., 2007), earning a label of 'callous and emotional' (Gill & Stickle, 2016; Stickle, Marini, & Thomas, 2012). Given frequent and irrational angry outbursts, Secondary psychopaths could easily be rated highly on callous traits. Others have argued that Secondary psychopathy should not be considered a type of psychopathy at all, primarily due to anxiety being at odds with Cleckley's original criteria (Hicks & Patrick, 2006). A more nuanced view considers a dimensional view of psychopathic variant traits, with callous traits occurring independently of affective and neurotic traits. The label of 'Secondary psychopathy' is convenient and allows for comparison across studies, but it is not likely a discrete taxon (Levenson, Kiehl, & Fitzpatrick, 1995). In other words, there is the potential for overlap with other clinical constructs, such as borderline personality disorder (BPD). In fact, some authors have argued that BPD may be a female phenotypic expression of psychopathy (Sprague, Javdani, Sadeh, Newman, & Verona, 2012). Verona, Sprague,

and Javdani (2012) found BPD traits partially accounted for PCL-R F1 (CU) traits in women but not in men. However, BPD traits partially accounted for PCL-R F2 (antisocial/lifestyle) traits in men and women. They concluded, "It is important to consider whether the construct of F1 (including CU traits), as assessed by currently available instruments, differs between women and men (p. 258)." Extending this thinking to psychopathic variants, it is important to understand whether the affective and interpersonal features of psychopathy (including CU traits), differ between Primary and Secondary variants of psychopathy. Or if these differences could be better understood as overlapping clinical constructs.

Although CU trait differences between variants are somewhat controversial, there is an even greater debate about the construct and measurement of psychopathy as a consequence of the widespread use of PCL-R (Hare & Neumann, 2008). The misinformed use of the PCL-R as the definition of psychopathy, or even the 'gold standard' measure, is at the heart of this debate. Numerous authors have criticized the overreliance of the PCL-R on behavioral indicators of psychopathy, noting that this differs dramatically from Cleckley's original conceptualization (Patrick, 2006; Skeem & Cooke, 2010).

"I am aware of the fact that many persons showing the characteristics of those here described (psychopaths) do commit major crimes and sometimes crimes of maximal violence. There are so many, however, who do not, that such tendencies should be regarded as the *exceptions rather than the rule,* perhaps, as a pathologic trait independent, to considerable degree, of the other manifestations which we regard as fundamental (Cleckley, 1976, p. 262)"

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In addition, the PCL-R does not address the absence of anxiety and some apparently positive traits for which Cleckley named his work, *The Mask of Sanity*. However, Hare and Neumann (2008) responded to these critiques by citing the extremely high inter-rater reliabilities between the PCL family of instruments and 'Cleckleyian' checklists. Further, they argue that the PCL-R has enabled "an impressive body of replicable and meaningful empirical findings (Hare & Neumann, 2008; p. 240)." Finally, Hare and Neumann argue that antisocial and criminal behaviors were common in Cleckley's patients and are discussed repeatedly throughout his seminal work. They conclude their argument:

"Nonetheless, some commentators are concerned that the PCL-R has become so popular that many researchers and clinicians ostensibly confuse the measure with the construct... they seem less concerned that they might be confusing the clinician with the construct. We find it incongruous that empirical research findings should be judged by how well they fit with clinical observations described more than half a century ago… We also noted that the research on psychopathy is beginning to benefit from the use of multitrait, multimethod approaches to research (Hare & Neumann, 2008; p. 240)."

The important conclusion to draw from this debate is the necessity of an iterative process of theory informing research, which in turn, informs theory. While critics of the PCL-R cite its overreliance on behavioral indicators (Skeem & Cooke, 2010), these behaviors appear to be reliable indicators of impulsive and irresponsible personality dimensions, which are supported by decades of research (Hare & Neumann, 2008; Lilienfeld et al., 2015). Therefore, a necessary next step in the measurement of psychopathy is to identify multidimensional trait models assessed through a variety of

methods, which can be empirically tested for their reliability, associations with relevant constructs, and clinical utility. When considering the dimensions to be included within these trait models, the heterogeneous nature of psychopathy proves to be a formidable obstacle. However, the combination of multidimensional trait models and contemporary person-centered statistical analyses can identify relatively homogeneous groups whose salient features can be described (Pilkonis & Klein, 1997; Poythress et al., 2010). There is a history of using general personality instruments to measure psychopathy, but a more recent development is a psychopathy specific trait-based personality measure. A psychopathy specific personality measure provides an opportunity to identify personality dimensions that distinguish Primary and Secondary psychopathy.

The Psychopathic Personality Inventory (PPI)

Using college samples, Lilienfeld and Andrews (1996) developed the Psychopathic Personality Inventory (PPI), as a focused measure of the personality dimensions of psychopathy. They based the PPI items on 24 focal personality-based constructs gleaned from the literature, most notably Cleckley (1941/1988), with an overly inclusive stance. Several items were written to measure each of the 24 personality constructs or dimensions, (e.g., fearlessness). Items assessing antisocial behaviors were purposely avoided to keep the PPI a personality dimension focused measure. Utilizing principal components analysis iteratively over several studies, Lilienfeld and Andrews empirically refined the measure by eliminating items. In addition, two validity scales were included to identify deviant responding (DR) and inconsistent responding (Variable Response Inconsistency; VRIN). The resulting PPI consisted of 8 subscales with the following labels: Machiavellian Egocentricity, Social Potency, Coldheartedness,

Carefree Nonplanfulness, Fearlessness, Blame Externalization, Impulsive

Nonconformity, and Stress Immunity. Across the validation samples, internal

consistency of the PPI total Score ranged from .90 to .93, and the eight subscales ranged

from .70 to .90. The test-retest reliability of the PPI total score was high ($r = .95$), and

the eight subscales ranged from .82 to .94. The PPI was recently revised (PPI-R) in order

to address readability, outdated cultural references and improve poorly functioning items.

The revision retained all 8 subscales, but renamed Impulsive Nonconformity as

Rebellious Nonconformity and Social Potency as Social Influence. The PPI-R was

standardized on a community sample with a proposed two factor model of Self-Centered

Impulsivity (ScI), Fearless Dominance (FD), with the subscale of Coldheartedness

considered separately (Lilienfeld & Widows, 2005).

Initial construct validation studies demonstrated good convergent validity

between the PPI and other self-report and interview measures of psychopathy (Lilienfeld

& Andrews, 1996).   The PPI "showed discriminant validity from self-report measures of

psychosis proneness, mood disorders, social desirability (p. 516)" and other traits

theoretically unrelated to psychopathy. Finally, the PPI showed incremental validity over

the MMPI's psychopathic deviant subscale in predicting PCL-R rated psychopathy

(Lilienfeld & Andrews, 1996; Poythress, Edens, & Lilienfeld, 1998). Initial exploratory

factor analyses (EFA) revealed two higher order factors, labeled Fearless Dominance

(FD), and Self-Centered Impulsivity (ScI). The Fearless Dominance factor is

characterized by social dominance, fearlessness and stress immunity; it consists of the

Social Influence, Fearlessness and Stress Immunity subscales. The Self-Centered

Impulsivity factor is characterized by unconventional attitudes, poor planning,

aggressiveness, and social estrangement; it contains the Rebellious Nonconformity, Carefree Nonplanfulness, Machiavellian Egocentricity, and Blame Externalization subscales. The Coldheartedness scale, however, did not load onto either factor, but was retained on the PPI (Lilienfeld & Andrews, 1996), and the PPI-R as a separate scale (Lilienfeld & Widows, 2005).

The two-factor structure of the PPI and the PPI-R has received mixed support across studies. Specifically, Neumann et al. (2008) failed to replicate the two-factor structure in a male forensic sample. A follow-up split-half exploratory factor analysis resulted in a three-factor solution, however the resulting confirmatory factor analysis (CFA) of those 3 factors in the other half of the sample had poor model fit. Additionally, Gonsalves, McLawsen, Huss, and Scalora (2013) performed a confirmatory factor analysis of the PPI's original two-factor model in a male inpatient forensic sample which displayed poor fit to the data. Consequently, the investigators completed a follow-up exploratory factor analysis using a principal components analysis with varimax (orthogonal) rotation. Interestingly, the resulting model had two factors that closely resembled the original two factor model, with Fearlessness loading onto the Self-Centered Impulisivity factor and Coldheartedness not loading onto either overarching factor. Notably, the studies that have failed to replicate the original two-factor model were completed with forensic samples, in contrast to the college samples used for PPI development. Further, several other psychopathy assessments (e.g., the ICU) encountered similar difficulties discerning a consistent factor structure, suggesting the possibility that at least one of the underlying psychopathy factors functions differently between samples (Byrd, Kahn, & Pardini, 2013; Paiva-Salisbury, Gill, & Stickle, 2017).

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Whereas replications of the hypothesized two-factor structure have failed with inmate samples, the two-factor structure has been replicated in the community (which dropped the Coldheartedness subscale). In a mixed gender community sample, Anestis, Caron, and Carbonell (2011) found excellent fit of both a single factor and a two-factor model of the PPI-R when the factor loadings were allowed to freely vary by gender. Relevant to note, two of the three original development samples consisted of all male participants, possibly affecting the factor structure. Anestis, Caron, and Carbonell examined the PPI-R for evidence of gender invariance through nested comparisons of three alternative factor models (one-, two-, and three-factor models). Gender invariance was not supported in any of these three factor models, with the fearlessness subscale significantly contributing to the lack of invariance in gender within the two and three factor models. In the one factor model, both the Stress Immunity and Social Influence subscales were areas with the clearest gender invariance. This finding suggests that the constructs underlying the Fearlessness, Stress Immunity and Social Influence subscales may contribute to different overarching factors in males than in females. For example, Fearlessness may contribute to the construct of Fearless Dominance (FD) in men but not in women. Due to the importance of sample characteristics in the PPI's factor model's performance, it is yet unclear if gender differences in PPI factor structure will be evident in a forensic sample.

Correlations with criterion measures allow for the examination of the convergent and discriminant validity to assess the construct validity of the PPI. The PPI and PPI-R have extensive evidence of theoretically consistent associations with indicators and correlates of psychopathy (Miller & Lynam, 2012). Specifically, the PPI Self-Centered

Impulsivity (ScI) factor was consistently and significantly positively correlated with F1 and F2 of the PCL-R, antisocial behaviors, substance abuse, impulsivity, interpersonal dominance, neuroticism, trait anxiety, temperamental anger, sensation seeking, and 'Cluster B' personality disorders (Benning, Patrick, & Iacono, 2005; Lilienfeld & Andrews, 1996; Miller & Lynam, 2012; Patrick, Edens, Poythress, Lilienfeld, & Benning, 2006). PPI-ScI was negatively correlated with empathy, agreeableness, conscientiousness, and behavioral inhibition.

The PPI Fearless Dominance (FD) factor was positively correlated with F1 on the PCL-R (although modestly, .23 average effect size), and with extraversion, positive emotionality, sensation seeking, a measure of the behavior activation system (discussed below), fun seeking, drive, and narcissism. PPI-FD was negatively related to measures of internalizing symptoms, anxiety, mood, neuroticism, negative emotionality, fearfulness and the behavior inhibition system (discussed below). The PPI-FD further showed a pattern of negative correlations with indices of psychopathology fitting into Cleckley's (1941/1988) conceptualization of 'the mask' that psychopaths exhibit. However, the PPI-ScI showed quite the opposite pattern. The extensive and consistent associations of the PPI factors with measures of psychopathology, impulsivity, antisocial behaviors, and psychopathy provide confidence in the breadth and depth of the psychopathy specific dimensions of the PPI-R.

The PPI-R is one of the first attempts to develop a standalone psychopathy measure through personality dimensions (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003). It has received ample empirical support through consistent associations with a variety of relevant criterion measures (Benning et al., 2003; Neumann et al., 2008; Ross,

Benning, Patrick, Thompson, & Thurston, 2009). Further, discriminant and convergent

correlational evidence with the PPI and PPI-R support its validity as a personality

measure of psychopathy (Lilienfeld & Andrews, 1996; Patrick et al., 2006; Poythress et

al., 1998). Somewhat surprisingly, the developers did not appear to explicitly rely on

general personality theory to formulate the PPI (Benning et al., 2003). Though it is

impossible to know if this approach negatively affects the PPI-R's performance, an

understanding of psychopathy through the lens of general personality theory will inform

the PPI-R's utility in theory development. In particular, understanding the development

of psychopathy specific personality theory is essential to developing a comprehensive

theory of the heterogeneity of trait dimensions and characteristics within psychopathy.

Personality and Reinforcement Sensitivity Theory

The study of personality endeavors to explain, understand, and classify individual

differences and their unique influences on behavior. Rather than focusing on behaviors,

symptoms, or clinical diagnoses, personality theories describe individual differences in

terms of traits and trait dimensions (Matthews & Gilliland, 1999). Eysenck (1990)

proposed three trait dimensions to explain the heterogeneity within human personality.

Through decades of research, the personality dimensions of introversion-extraversion,

neuroticism-stability, and socialization-psychoticism were theoretically linked to

biological systems, cortical arousal, and limbic activation. Eysenck's student, Jeffrey

Gray's original personality theory and the subsequent revision (Gray & McNaughton,

2000) continued Eysenck's work of linking personality traits to biological systems.

Gray's revised theory, Reinforcement Sensitivity Theory (RST), is a biopsychosocial

theory of personality, which seeks to explain individual differences in sensitivity to

reward, punishment, and motivation (Matthews & Gilliland, 1999; Smillie, Pickering, & Jackson, 2006). RST lends itself to understanding the heterogeneity within psychopathy by hypothesizing etiological mechanisms with the potential to differentiate between psychopathy variants.

Gray and McNaughton (2000) postulate that the nervous system contains three systems that mediate between personality and behaviors. Within this model, the Behavioral Activation System (BAS) is an appetitive system corresponding to positive emotions and facilitating approach behaviors. Midbrain dopaminergic projections, especially the ventral striatum, power the BAS (Pickering & Gray, 2001). The fight-flight-freeze system (FFFS) is an aversive brain system responsible for fear reactions (but not anxiety), resulting in avoidance, fight, or escape behaviors, and comprises the periaqueductal gray matter, medial hypothalamus and the amygdala (Gray & McNaughton, 2000). In the revised RST theory, the Behavioral Inhibition System (BIS), another aversive system, mediates between the FFFS and BAS in goal directed behaviors. The BIS corresponds to anxious emotions and is associated with the septo-hippocampal system (Gray & McNaughton, 2000). Specifically, the BIS mediates between approach-avoidance conflicts (where both reward and punishment are present) by either activating or inhibiting the FFFS or the BAS systems (Bijttebier, Beck, Claes, & Vandereycken, 2009). In addition, the BIS mediates between approach-approach conflicts (two rewards are present) and avoidance-avoidance conflicts (two punishments are present; Gray & McNaughton, 2000).

RST and Psychopathy

Gray (1970) initially theorized psychopaths would have a weak Behavioral Inhibition System (BIS-) and a normal or strong Behavioral Activation System (BAS+), primarily based on the observation of reward driven behavior without fear of consequences seen within psychopathy. Gray's initial theory was easily integrated into the literature of psychopathic variants, most notably the work of Lykken (1957, 1995). Primary psychopaths, conceptualized to have a fearless temperament, were hypothesized to have a weak BIS and a normal BAS. In contrast, Secondary psychopaths would be characterized by a strong BAS (BAS+), corresponding to their impulsive reward seeking behaviors (Bijttebier et al., 2009; Lykken, 1995), which remains unchanged in the theory's revisions. In the updated RST framework, the fearless temperament of Primary psychopathy corresponds to a weak or nonexistent FFFS (FFFS-). Therefore, the role of the BIS in Primary psychopathy is greatly simplified, with a reward dominant response set in almost all situations (Gray & McNaughton, 2000). Consequently, Primary psychopaths would also be free of anxiety because the BIS would not have to resolve goal conflicts. These proposed theoretical associations have received mixed support in both forensic and community samples.

Consistent with the original BIS/BAS theory, a number of studies have found associations with Primary psychopathy and BIS-, as well as Secondary psychopathy and BAS+ (Gill & Stickle, 2015; Newman, MacCoon, Vaughn, & Sadeh, 2005). Many of these studies examined the correlations between measures of Primary and Secondary psychopathy with measures of BIS/BAS in community and mixed community/offender samples (e.g., Kimbrel, Nelson-Gray, & Mitchell, 2007; Ross et al., 2007; Uzieblo,

Verschuere, & Crombez, 2007). Other researchers utilized a person-centered approach to examine these associations. For instance, Newman et al. (2005) found individuals within a Primary psychopathic group to have average BAS reactivity and BIS-, when compared to other inmates not in the Primary psychopathic group (including those in a Secondary psychopathic group). These BIS/BAS findings would correspond to individuals in the Primary psychopathic group having a reward dominant response set as originally proposed by Gray (1970). Further, Newman and colleagues found individuals in the Secondary psychopathic group, as identified by high PCL-R and high anxiety or negative emotionality, to have BAS+ and average to strong BIS reactivity compared to all other inmates not in the Secondary psychopathic group. In a person-centered analysis of detained youth, Gill and Stickle (2016) reported youth with Secondary psychopathic traits to have BIS+ and BAS+ scores on the Carver and White's BIS/BAS scales (1994). In addition, youth with Primary psychopathic traits had BIS- and BAS- scores when compared to a general delinquent group, consistent with a reward dominant response set.

However, these BIS/BAS findings amongst psychopathic variants are not universally consistent across studies. After a person-centered analysis of college students, Falkenbach, Poythress, and Creevy (2008) found a Primary psychopathy group had lower BIS scores than a Secondary psychopathy group only. Further, the Secondary psychopathic group's BAS scores were only marginally higher compared to control and Primary psychopathic groups. Innovatively, Johnson, Sellbom, and Phillips (2014) re-examined institutional data which included a psychopathy measure, Carver and White's (1994) BIS/BAS scales and general measure of personality. In order to test the revised RST theory, Johnson, Sellbom and Phillips transformed Carver and White (1994)

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BIS/BAS scales into a five-factor structure which included a FFFS scale. In their sample, the FFFS scale mediated associations between the affective or CU trait dimensions of psychopathy (i.e., the PPI-FD and PPI-COLD scales) and AB behavior dimensions. Notably, none of the BIS or BAS scales mediated associations between PPI rated psychopathy and antisocial behavior measures, as would be expected by a reward dominant response set. Further, the FFFS scale did not mediate associations between the PPI's Self-Centered Impulsivity factor, a measure of impulsive antisociality, and antisocial behavior scales. The mixed BIS/BAS reactivity findings within psychopathic variants may be in fact due to measurement and sample differences between studies.

It is important to note several limitations to these studies when interpreting the results. With a few exceptions (Gill & Stickle, 2015; Newman et al., 2005), these studies found correlations amongst measures of psychopathy and BIS/BAS scales. Donahue and Caraballo (2015) questioned the validity of currently available measures of the BIS, BAS, and FFFS constructs. Person-centered analyses may reveal more consistent patterns of associations between psychopathic variants and RST constructs. In addition, studies which employ multiple measures of these constructs (e.g., psychophysiological measures, behavioral indices, interview based, etc.) are needed as the potential methodological overlap of relying solely on self-report is yet unknown. Finally, the joint subsystems hypothesis (JSH; Corr, 2002) may account for the disparate findings amongst studies. Instead of separate systems working independently of one another, the JSH proposes the BIS/FFFS and BAS subsystems may have antagonistic, complementary, or independent effects depending upon the mixture of personality traits and reward and punishment contingencies involved. In other words, individuals with a reward dominant response set

due to FFFS- (i.e., Primary psychopaths) may respond differently than individuals with a reward dominant response set due to BAS+ depending upon the relative strength of the reward and potential punishments in any given situation. The JSH has received preliminary support with a functional magnetic resonance imaging priming task study (Mortensen, Lehn, Evensmoen, & Håberg, 2015).

In summary, RST conceptualization may assist us in clarifying the heterogeneity seen within individuals presenting with antisocial behaviors as well as individuals within the narrower construct of psychopathy. Psychopathic variants show differential patterns of several personality and behavioral dimensions, including severe and persistent antisocial behaviors, trait anxiety, fearlessness, negative emotionality, and interpersonal dominance (Cox et al., 2013; Docherty, Boxer, Huesmann, O'Brien, & Bushman, 2016; Drislane et al., 2014; Fanti et al., 2013; Gill & Stickle, 2015; Skeem et al., 2007). Therefore, Gray's RST theory provides a general framework for conceptualizing potential mechanisms contributing to the variants' distinct developmental trajectories. Namely, Primary psychopaths may have a weak or nonexistent FFFS leading to impairment in or a complete lack of inhibitory control in the face of rewards. Secondary psychopaths, on the other hand, have an overactive BAS leading to impulsive goal-driven behaviors regardless of most consequences. Interestingly, these two separate etiological mechanisms may both result in the outcome of psychopathy, a concept known as equifinality (Sroufe & Rutter, 1984). Although Gray's RST theory assists in conceptualizing biological mechanisms underlying general individual differences in reward and punishment sensitivity, as well as motivation (Gray & McNaughton, 2000), it does not account for the constellation of personality traits specific to psychopathy. In

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contrast, largely developed through research with the PPI and PPI-R, the Triarchic model

of psychopathy (a recently postulated theory, (Patrick, 2010) incorporates the

constellation of psychopathy relevant personality traits in one comprehensive theory.

The Triarchic Model of Psychopathy

The Triarchic conceptualization of psychopathy provides a theoretical framework

for understanding heterogeneity across historical theories and measurement structures of

psychopathy. Patrick (2010) collapsed numerous psychopathy relevant constructs into

three broad phenotypic domains, boldness, meanness, and disinhibition. Boldness is the

prototypical fearless temperament of psychopaths (a weak FFFS), characterized by

sensation seeking, stress immunity, and social dominance (Patrick et al., 2009).

Representative of Cleckley's (1941/1988) "mask of sanity," boldness is normally

associated with signs of robust mental health. Meanness, characterized by callousness,

manipulativeness, and interpersonal exploitativeness, is commonly associated with

accounts of callous-unemotional traits (Frick & White, 2008). A tendency towards

impulsivity (a strong BAS), irresponsibility, emotional reactivity, and poor behavioral

controls are captured in the disinhibition domain of the Triarchic model.

From a measurement perspective, boldness is associated with measures of social

potency, stress immunity, and fearlessness (i.e., PPI-R FD). Meanness is associated with

measures of coldheartedness, CU traits, egocentricity, narcissism, poor empathy, and low

BIS activity (Sellbom & Phillips, 2013). Finally, disinhibition is associated with

measures of antisocial behaviors, impulsivity, blame externalization, rebellious

nonconformity, and carefree nonplanfulness (i.e., PPI-R Sci; Sellbom & Phillips, 2013).

Hall et al. (2014) developed a measure of the three Triarchic domains utilizing items of

the PPI. The PPI-based Triarchic scales showed good internal consistency and predicted associations with psychopathy relevant criterion measures. In a recent study of undergraduates, Donahue and Caraballo (2015) found some of the expected associations between the Triarchic domains and RST. Specifically, they found positive correlations between measures of PPI-Boldness, PPI-Disinhibition and BAS sensitivity. Further, an FFFS measure was negatively correlated with PPI-Boldness and positively correlated with PPI-Disinhibition. Although the BIS measure utilized did not show associations consistent with past research or the Triarchic theory, neither did it appear to provide valid measurement of the BIS construct. Promisingly, initial empirical associations with psychopathy relevant constructs appear to provide preliminary support to the Triarchic domains.

Developmentally, Patrick et al. (2009) proposed two distinct pathways to psychopathy: the difficult temperament and the low fear pathways. In the difficult temperament pathway, family dynamics combined with the child's temperament contribute to the development of disinhibition and meanness domains. This proposal conceptually fits the description of Secondary psychopathy (i.e., emotional reactivity) as being a socially shaped variant. The low fear pathway contributes to the development of meanness and boldness, consistent with descriptions of Primary psychopathy. The difficult temperament and low fear pathways parallel Secondary and Primary psychopathy respectively. However, it is still unclear if these three broad phenotypic domains will emerge in person-centered analyses of Primary and Secondary variant groups.

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In summary, violent antisocial behaviors (AB), committed by a minority of the population, place an enormous burden on society (U.S. Executive Office of the President, 2016). These AB appear to be committed by a heterogeneous group of individuals, which includes the narrower construct of psychopathy (Poythress et al., 2010). Psychopathy denotes a more serious and entrenched pattern of antisocial behaviors, and negative lifestyle outcomes (Hare, 1996). Our understanding of psychopathy has progressed to include at least two distinct variants, Primary and Secondary psychopathy (Skeem et al., 2003). These variants have been measured and understood through a variety of methods, most promisingly personality assessment methods (Docherty et al., 2016; Drislane et al., 2014; Gill & Stickle, 2016). The PPI-R was specifically developed to measure psychopathy through personality dimensions (Benning et al., 2003). Conflicting findings in the factor structure of psychopathic trait measures, and in the associations of various criterion measures amongst subgroups and variants, suggests the need for continued research on patterns between variants (Cox et al., 2013; Neumann et al., 2008; Patrick et al., 2006). An understanding of the PPI-R's functioning in relation to psychopathic variants could promote the further development of theories of general personality and of psychopathy, namely RST and the Triarchic model of psychopathy (Gray & McNaughton, 2000; Patrick et al., 2009).

The Current Study

In a sample of forensically involved adults, the current study seeks to understand a portion of the heterogeneity within psychopathy by identifying potential etiological mechanisms within Primary and Secondary psychopathic variants to antisocial behaviors. The first aim is to is to empirically identify groups of individuals consistent with

psychopathic variants in a criminally involved sample. The second aim of the study is to test the utility of the Triarchic domains in the prediction of aggression within psychopathic variants. Based on previous findings, it is hypothesized that the Triarchic domains of disinhibition and meanness will be significantly associated with concurrent aggression. Since anxiety is potentially a key etiological mechanism for Secondary psychopathy, it is further hypothesized that anxiety will account for some of the relationship between meanness and aggression for individuals in the Secondary psychopathic group but not in the Primary group. Finally, the third aim is to systematically test a pattern of associations between important clinical constructs and psychopathic variants. Specifically, it is hypothesized that the Secondary psychopathic group will have stronger associations with measures of BPD and indicators of negative emotionality (e.g., depression) than the Primary psychopathic group.

Methods

Participants

Participants included 404 adult men and women who were justice system involved and sought services, on their own or through an agent, typically a lawyer, through Vermont Forensic Assessment. Vermont Forensic Assessment provides forensic psychological assessments of individuals to a requesting agency, for example, the court, the Department of Corrections, the Department for Children and Families, or a lawyer. Therefore, the population served by Vermont Forensic Assessment is not exclusively an offender sample. Of the 404 participants, 392 completed the Personality Assessment Inventory (PAI), and 134 completed the Psychopathic Personality Inventory- Revised (PPI-R) as part of their assessment. In total, 125 participants completed both the PAI and

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the PPI-R. The sample self-identified on the PAI and the PPI-R as predominantly male (83.7%), with an average age of 37.98 years (*SD* = 14.02, range 18-83) and typically high school graduates (years of education, *M*= 12.36, *SD* = 2.41, range 0-20). Half of the sample identified as single (50%), with the rest identifying as divorced (23.8%), married (19.6%), widowed (1.5%), or other (5.2%). Of the 42.33% of the sample who chose to self-identify on race and ethnicity, most identified as Caucasian (92.4%), with the remainder identifying as Black (5.85%), Chinese (1.18%), or Native American (.59%).

Materials and Procedure

A file review of 404 individuals compiled existing data from Vermont Forensic Assessment on gender, age in years at the time of testing, marital status, education, race and ethnicity, as well as scores on the Psychopathy Personality Inventory- Revised (PPI-R), and the Personality Assessment Inventory (PAI). Under the direction of the associates at Vermont Forensic Assessment a trained research assistant, who is not the primary investigator, conducted digital file reviews to identify eligible cases (those cases with complete PPI-R or PAI data) and entered that data into a database at Vermont Forensic Assessment without any identifying information. The research assistant assigned an identification number to each participant and gathered data relevant to that individual without identifying information. An identifier list was kept at Vermont Forensic Assessment in a secured area for the purposes of data collection and the research assistant signed a legally binding contract to not disclose the list to the primary investigator under any circumstances. Files were digitally reviewed retrospectively starting from the previous calendar month and continued in a retrospective manner for a total of 404 cases with relevant data. After the data compilation, the identifier list was

destroyed. Only cases archived prior to the commencement of data collection were reviewed. The primary investigator did not have access to any identifying information at any time. Information regarding the participants race, ethnicity, marital status, gender, and age in years at the time of testing was coded if indicated on either measure.

Cluster Variables for Subtyping Participants

Psychopathic variant relevant scales of the Personality Assessment Inventory (PAI). The PAI is a 344-item comprehensive self-report inventory of adult personality features that provides information on a number of clinical variables (Morey, 1991). It includes eleven clinical scales (Somatic Complaints, SOM; Anxiety, ANX; Anxiety Related Disorders, ARD; Depression, DEP; Mania, MAN; Paranoia, PAR; Schizoid, SCZ; Borderline Features, BOR; Antisocial Features, ANT; Alcohol Problems, ALC; and Drug Problems, DRG), four validity scales (Infrequency, INF; Inconsistency. ICN; Negative Impression Management, NIM; and Positive Impression Management, PIM), five treatment scales (Aggression, AGG; Suicidality, SUI; Stress, STR; Nonsupport, NON; and Treatment Rejection, RXR), and two interpersonal scales (Dominance, DOM; and Warmth, WRM). The PAI has a four-point Likert scale, from 'False, not at all true' to 'Very true.' It is a widely used personality assessment tool with good psychometric properties with all scales demonstrating excellent to good internal consistency in the current study ($\alpha \geq .80$) except the Dominance scale which had adequate internal consistency ($\alpha = .77$), consistent with past research (Edens, Hart, Johnson, Johnson, & Olver, 2000; Edens & Ruiz, 2008). Scales relevant to the assessment of psychopathy include the ANT, AGG and Warmth. Previous research provides support for the validity of ANT, AGG and Warmth scales of the PAI for measuring psychopathy (Edens, et al.,

2000; Edens & Ruiz, 2005; Patrick, et al., 2006). In addition, the ANX scale was

included to distinguish Primary and Secondary psychopathy.

Criterion Variables for Validating Clusters

Psychopathic Personality Inventory–Revised (PPI-R). The PPI-R (Lilienfeld &

Widows, 2005) is a 154-item self-report measure both of global psychopathy and of its

component traits. The PPI-R measures the continuum of psychopathic personality traits.

It yields a total score and two factors comprised of eight subscales: Self-Centered

Impulsivity (ScI; Carefree Nonplanfulness, Impulsive Nonconformity, Machiavellian

Egocentricity, and Blame Externalization), Fearless Dominance (FD; Social Potency,

Stress Immunity, and Fearlessness), and Coldheartedness which does not generally load

on either factor (Benning, et. al., 2003). The PPI-R demonstrated acceptable to good

internal consistency as measured by Cronbach's alpha. In the current study, the PPI total

Score was good ($\alpha = .92$), and the eight subscales ranged from acceptable ($\alpha = .76$) to

good ($\alpha = .91$). Across studies, internal consistency of the PPI total Score was good ($\alpha =$

.90 to .93), and the eight subscales ranged from acceptable ($\alpha = .70$) to good ($\alpha = .90$).

The test-retest reliability of the PPI total score was high ($r = .95$), and the eight subscales

ranged from .82 to .94 (Gonsalves et al., 2013; Miller & Lynam, 2012; Ross, Benning,

Patrick, Thompson, & Thurston, 2008).

Data Analysis Plan

Latent profile analysis (LPA). LPA was used to determine categorical latent

variables that represent classes of individuals who share similar profiles on the ANT,

WARM, and ANX scales of the PAI. LPA uses maximum likelihood estimation to

define classes based on several continuous variables (Little & Rubin, 2002). In addition

to class membership, the probability that any given participant was correctly classified is estimated (Flaherty & Kiff, 2012; Little & Masyn, 2013). Latent profile analysis was conducted in MPlus Version 6 (Muthén & Muthén, 2012). Classes were increased from 1 to 5 and the resulting solutions were compared for statistical as well as theoretical fit to the data. The solutions were compared for fit to the data based on numerous indices of fit including information criteria (IC), entropy, and model comparison likelihood ratio tests. Lower values on the IC fit statistic of Bayesian Information Criteria (BIC; Schwarz, 1978), Akaike Information Criteria (AIC; Akaike, 1974), and Adjusted BIC (Sclove, 1987) indicate better model fit. Entropy, which ranges from 0 to 1, is the accuracy with which a model classifies individuals into their most likely class with 1 representing perfect accuracy. Model comparison likelihood ratio tests included the Lo-Mendell-Rubin test (LMR; Lo, Mendell, & Rubin, 2001) and the Bootstrap Likelihood Ratio Test (BLRT; McLachlan & Peel, 2004) compare model improvement from subsequent class models (e.g., 2 vs. 3 classes), and allow a comparison of a statistically significant improvement in fit as each additional class is added. The LMRT and BLRT significance values indicate whether the solution with more classes ($p < .05$) or fewer classes ($p > .05$) fits better. Since classes containing less than 5% of the sample are likely the result of extracting too many classes, they are commonly considered to be spurious (Hipp & Bauer, 2006). Therefore, class size was also considered when interpreting class solutions. Finally, each model was evaluated based on its interpretability, or the ability of each class to represent distinct groups (Muthén, 2006).

In this latent profile analysis, classes dimensionally consistent with Primary and Secondary psychopathy were anticipated. In addition, a control group that has average to

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low levels on each of the scales in the LPA was expected. Specifically, the Primary psychopathy trait group was expected to have significantly lower scores on the WARM scale and the ANX scale compared to the Secondary psychopathy trait group. Both the Primary psychopathy trait and Secondary psychopathy trait groups were expected to have significantly higher scores on the ANT scale relative to a non-psychopathic offender group. However, significant differences on the ANT and scales were not anticipated between the Primary psychopathy trait and Secondary psychopathy trait groups.

Descriptive comparisons. Planned comparisons were tested using General Linear Model (GLM) analyses to compare the identified class groups on scales used in the latent profile analysis, the ANX, ANT, Warmth scales of the PAI. To minimize Type I error rates due to the number of comparisons, the Holm method (Holm, 1979) of adjusting alpha levels within each set of analyses was utilized as described in Jaccard and Guilamo-Ramos (2002). The Holm method specifies adjusting alpha levels by the number of outcome variables in a family of comparisons. For this analysis, there were three outcome variables with four separate univariate GLMs. The first step is to find the analysis with the smallest p value and compare that to the adjusted value of $.05/4 = p = .0125$. If the smallest p value is smaller than .0125, the corresponding analysis is interpreted as significant. It then compares the next smallest p value to the adjusted value of $.05/3 = p = .017$.   If the next smallest p value is smaller than .017, the corresponding GLM is significant. Evaluation continued in this fashion for all three comparisons until a nonsignificant effect was found. All remaining comparisons were considered nonsignificant.

Criterion-related validity of class groups. The identified class groups were compared on the following scales external to the latent profile analysis to assess convergent and discriminant validity of the classes: The Self-centered Impulsivity (ScI) and Fearless Dominance (FD) factors of the PPI-R, as well as the coldheartedness scale, was considered a family of outcomes. The Somatic Concerns (SOM), Anxiety Related Disorders (ARD), Depression (DEP), Mania (MAN), Borderline Features (BOR), Paranoia (PAR), and Schizophrenia (SCZ) of the PAI was considered a family of outcomes related to negative emotionality. The Infrequency (INF), Inconsistency (ICN), Negative Impression Management (NIM), and Positive Impression Management (PIM) scales of the PAI was considered a family of outcomes. To test the hypothesis that the Secondary psychopathic group would have stronger associations with measures of BPD and indicators of negative emotionality (e.g., depression) than the Primary psychopathic group, ANOVAs were performed on the above listed scales and follow-up comparisons used the Holm method for adjusting alpha levels by family of outcomes. Specifically, it was anticipated that the Primary psychopathy trait group would display significantly higher scores on the Coldheartedness subscale, and the fearless dominance factor of the PPI-R, as well as the MAN and PIM scales of the PAI relative to the Secondary psychopathy trait group. The Secondary psychopathy trait group was expected to have significantly higher scores on the Self-Centered Impulsivity factor of the PPI-R and the SOM, ARD, DEP, BOR, and NIM of the PAI relative to the Primary psychopathy trait group. Specific hypotheses regarding differences between the variant groups on the remaining scales of the PAI were not made due to insufficient theoretical or empirical data regarding these specific constructs.

Confirmatory factor analysis (CFA). A baseline CFA of the three-factor

solution identified by Lilienfeld and Widows (2005) was conducted in Mplus Version 6

(Muthén & Muthén, 2010) with robust maximum likelihood estimation. Model fit was

evaluated using the $\chi2$ fit statistic, the comparative fit index (CFI; Bentler, 1990), the

Tucker-Lewis Index (TLI; McDonald & Marsh, 1990), the root mean square error of

approximation (RMSEA), and the standard root mean square residual (SRMR). Good

model fit is indicated by acceptable values on all noted fit statistics. Specifically, good fit

is indicated by values above .95 on the CFI and TLI, with values above .90 indicative of

adequate fit. A RMSEA value below .05 is indicative of good fit, values of .05- .08 are

acceptable, and above .10 is indicative of a poor fitting model (MacCallum, Browne, &

Sugawara, 1996). Finally, a SRMR value below .08 is indicative of acceptable fit (Hu &

Bentler, 1999). This model will be compared for fit to the data with one-factor and two-

factor models.

Structural equation model (SEM). To test the hypothesis that the Triarchic

domains of disinhibition and meanness would significantly predict concurrent AB, a

structural equation model examined the proportion of variance in AB accounted for by

the three Triarchic domains of boldness, disinhibition, and meanness. Using Mplus

Version 6 (Muthén & Muthén, 2010) with robust maximum likelihood estimation, a SEM

model tested whether anxiety partially mediated the proportion of variance in AB

accounted for by the Triarchic domains. The following steps were followed for this

model test. In anticipation of a full SEM model, an initial measurement model used the

subscales from the PPI-R to represent the Triarchic domains. Model fit was evaluated

using the $\chi2$ fit statistic, the comparative fit index (CFI; Bentler, 1990), the Tucker-Lewis

Index (TLI; McDonald & Marsh, 1990), the root mean square error of approximation (RMSEA), and the standard root mean square residual (SRMR) using the values detailed above to evaluate model fit. Since adequate fit of the structural model was not achieved, a path analysis was conducted to examine the proportion of variance in concurrent aggression accounted for by the three Triarchic domains of boldness, disinhibition, and meanness. The three domains of the Triarchic model were represented by standardized mean scores on the PPI-R factors of fearless dominance, self-centered impulsivity, and coldheartedness, respectively. The model fit of the path analysis was evaluated on the fit statistics described above.

  Data cleaning. Of the 392 PAI administrations, 2 were dropped due to an incomplete administration, and 12 were eliminated due to invalid protocols. Invalid protocols on the PAI were determined by a score of 13 or greater on the inconsistency scale, or 9 or greater on the infrequency scale. One additional PAI administration was eliminated due to having 2 valid protocols administered to the same individual 18 months apart. The participant's initial administration was retained. Of the 134 PPI-R administrations, none were eliminated due to having greater than 20% missing, but 2 were eliminated due to invalid protocols. Invalid protocols on the PPI-R were determined by a score of 45 or greater on the Inconsistent Responding 40 scale. Of the 132 PPI-R administrations, 119 individuals had both a PAI and a PPI-R administration. Missing data in all analyses was handled through maximum likelihood estimation, the default in Mplus (Muthén & Muthén, 2012), or through multiple imputation.

<center>**Results**</center>

Latent Profile Analysis

The latent profile analysis on the 377 valid PAI administrations resulted in a 4-class solution with acceptable theoretical and statistical fit. The fit statistics across 1-5 classes are presented in Table 1. Incrementally better fit was demonstrated across all of the IC indices of fit as class size grew, i.e., AIC, BIC, and SSA-BIC. In addition, entropy was acceptable across each of the solutions ranging from .974 to .985 accuracy. The LMRT and BLRT indicated that the 2-class solution fit better than the 1 class solution. The 3-class solution had mixed fit indices. Lower SSA-BIC and AIC values and a significant BLRT value ($p < .001$) suggested improved fit, while a non-significant LMRT ($p = .173$) suggested non-significant difference from the 2-class solution. Similarly, the 4-class solution had mixed fit indices. Lower SSA-BIC and AIC values and a significant BLRT value ($p < .001$) suggested improved fit, while a non-significant LMRT ($p = .538$) suggested non-significant difference from the 3-class solution. The 5-class solution also had mixed fit indices, lower SSA-BIC and AIC values and a significant BLRT value ($p < .001$) suggested improved fit, while a non-significant LMRT ($p = .818$) suggested non-significant difference from the 4-class solution.

From a theoretical perspective, the 5-class solution did not add theoretical meaning to the solution over the 4-class solution. In other words, the additional 5th class extracted was theoretically identical to the 4th class, except with a slightly higher level of anxiety symptomatology. In addition, the added class was a small proportion of the sample (6.37%), which is small enough to be a spurious class (Hipp & Bauer, 2006). Therefore, the 4-class solution was retained for further analysis based on theoretical

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clarity, fit statistics, and adequate class size. The 4-class solution resulted in 2 trait groups with significantly higher levels of antisocial behaviors on the ANT scales of the PAI than the other groups. One of these groups, labeled Primary Trait Group ($n = 39$), reported sample average levels of anxiety (the ANX scale of the PAI) and below sample average warmth on the PAI. The group labeled Secondary Trait group ($n = 44$) reported significantly higher levels of anxiety, and below average warmth as compared to the other groups. A group labeled Low-Anxious ($n = 180$) reported low levels of antisocial behavior and anxiety, as well as significantly higher levels of warmth. Finally, a group labeled Normative Trait ($n = 104$) reported near average levels of antisocial behaviors, anxiety, and warmth.

Descriptive Comparisons

As displayed in Table 2, the descriptive comparisons internal to the LPA analysis, the antisocial (ANT), anxiety (ANX), and Warmth scales of the PAI each had significant differences across classes. Specifically, the Primary trait group had significantly higher levels of ANT traits as compared to the Secondary, Normative, and Low-Anxious trait groups. Additionally, the Primary trait group's mean anxiety and warmth scores did not significantly differ from the Normative trait group. As expected, the Secondary Trait group had significantly higher self-reported levels of anxiety as compared to all other groups. The Secondary Trait group also had significantly higher antisocial scores as compared to the Normative and Low-Anxious trait groups. The level of self-reported warmth in the Secondary Trait group was not significantly different from the Primary or Normative Trait groups. Notably, the Low-Anxious Trait group had significantly higher

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self-reported Warmth scores, and significantly lower self-reported levels of anxiety and antisocial behaviors than all other groups.

Criterion Related Validity of the Cluster Groups

The descriptive statistics of the scales used to test the criterion related validity are shown in Table 3, and Table 4 contains the correlations amongst these scales. The profile groups had a fairly consistent pattern of outcomes on the negative emotionality family of outcomes as depicted in Table 5. Specifically, the Secondary Trait group reported the highest levels of negative emotionality. However, for mania and borderline traits, the Primary and Secondary Trait groups had significantly higher scores than the Normative and Low-Anxious Trait groups, but did not significantly differ from each other. Further, the Primary Trait group score on the Schizophrenia scale was significantly higher than the Normative Trait and Low-Anxious trait groups, and significantly lower than the Secondary Trait group. On all negative emotionality scales except mania, the Low-Anxious Trait group reported significantly lower scores than each of the other trait groups.

The results from the impression management family of outcomes are displayed in Table 6. There were no significant differences amongst the groups on the total infrequency scale scores. The Low-Anxious Trait group had significantly lower scores on the Negative impression management and significantly higher scores on the Positive impression management scales. Further, the Low-Anxious Trait group had a significantly lower inconsistency scale score as compared to the Primary and Normative Trait groups. Notably the Secondary Trait group had significantly higher Negative impression management scores as compared to each of the other groups. Both the

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Primary and Secondary Trait groups scored significantly lower on levels of Positive

impression management than the Normative or Low-Anxious Trait groups.

Linear regression analysis ($n = 119$) was used to test whether group membership

significantly predicted participants' ratings on the three domains of the Triarchic model,

represented by the factors of the PPI-R. The results of the regression on meanness

indicated that group membership did not significantly explain the variance in meanness

($R^2 = .009$, $p = .63$). The Primary Trait group ($M = 35.41$, $SD = 6.54$), the Secondary

Trait group ($M = 36.84$, $SD = 11.64$), the Normative Trait group ($M = 36.29$, $SD = 9.99$),

and the Low-Anxious group ($M = 37.98$, $SD = 8.95$) reported similar levels of meanness

in this sample. The results of the regression on Boldness indicated that group membership

did not significantly explain the variance in Boldness ($R^2 = .02$, $p = .5$). The Primary

Trait group ($M = 108.33$, $SD = 14.31$), the Secondary Trait group ($M = 104.16$, $SD =$

16.74), the Normative Trait group ($M = 103.11$, $SD = 13.49$), and the Low-Anxious

group ($M = 107.1$, $SD = 15.24$) did not differ in self-reported Boldness.

The results of the regression on Disinhibition indicated that group membership

did explain 22.4% of the variance in Disinhibition ($R^2 = .23$, $p = .002$). The Primary Trait

group ($M = 165.08$, $SD = 13.67$), and the Secondary Trait group ($M = 160.16$, $SD =$

20.76), had significantly higher scores than the Normative Trait group ($M = 145.89$, $SD =$

25.51, $p = .01$ and $p = .027$, respectively), and the Low-Anxious group ($M = 134.53$, SD

$= 21.12$, with both $p < .001$). In addition, the Low-Anxious group had significantly lower

scores than the Normative Trait group on self-reported Disinhibition ($p = .03$).

Confirmatory Factor Analysis

A baseline CFA (n = 119) of the three-factor solution identified by Lilienfeld and Widows (2005) did not converge with either full information maximum likelihood estimation or multiple imputation to handle missing data. A two-factor confirmatory factor analysis without the coldheartedness subscale had a $\chi2(7373)$ = 35034.72, $p < .01$, indicating poor model fit. Other measures of model fit also indicated poor model fit (CFI = .004, TLI = .003, SRMR = .174, RMSEA = .19, 90% CI= .18 - .19). The standardized factor loadings, shown in Table 7, indicated that two subscales had strong positive loadings on the Self-Centered Impulsivity factor, (Machievallian egocentricity = 0.68, $p < .01$; Rebellious nonconformity = .99, $p < .01$), and only one subscale had a strong positive loading on the Fearless Dominance factor (Fearlessness = 1.08, $p < .01$). Two subscales had weak loadings on the Self-Centered Impulsivity factor, (Blame externalization = 0.31, $p < .01$; Careless nonconformity = .27, $p < .01$). In addition, two subscales did not strongly load on the Fearless Dominance factor, (Stress immunity = 0.09, $p = .31$; Social influence = .26, $p = .09$). Theoretically grounded modifications were attempted to improve the fit of the model, e.g., a bifactor model was tested. However, the modifications did not improve the model fit.

Path Analysis

Since adequate model fit was not achieved for the structural Triarchic model, a path analysis using composite variables of constructs rather than latent variables was conducted in Mplus Version 6 (Muthén & Muthén, 2010), using multiple imputation. That is, standardized means of the PPI-R factor scales were computed to represent the construct domains of the Triarchic Model. Descriptive statistics of the scales (N = 119)

utilized in the path analysis are displayed in Table 8. Results of the path analysis are presented in Table 9 and the standardized coefficients for the significant pathways can be found in Figure 1. All three pathways from the Triarchic domains to Anxiety were significant, as well as the three pathways from Triarchic domains to aggression. However, the pathway from Meanness to Aggression was not in the hypothesized direction. The total, direct, and indirect effects from each of the Triarchic domains as mediated by anxiety are represented in Table 10. Specifically, the indirect effect of Disinhibition on Aggression through Anxiety was significant. In addition, the indirect effect of Meanness on Aggression through anxiety was significant, but substantially smaller. The indirect effect of Boldness on Aggression through Anxiety was non-significant. The pattern of these indirect effects suggests different mediating pathways consistent with trait differences in primary and secondary variants.

Discussion

The results of this study suggest that Primary and Secondary psychopathic trait groups can be identified through a general personality measure in a sample of adults who were involved in the justice system. The psychopathic trait groups are consistent with previous person-centered analyses of inmate populations and community populations, which used similar trait dimensions to form groups (Drislane et al., 2014; Kimonis et al., 2012; Vidal, Skeem, & Camp, 2010). Antisociality, anxiety, and interpersonal warmth, the three dimensions utilized in the current study to form the profile groups, correspond to three domains theorized by Cleckley (1941/1988), Lykken (1947), and Karpman (1941) to contribute to Primary and Secondary psychopathy, namely a lack of moral character, fearlessness, and interpersonal manipulativeness. The Triarchic model of

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psychopathy posits disinhibition, meanness, and boldness are the three requisite domains of psychopathy (Patrick et al., 2009). Combining historical theory, previous research, and the Triarchic model led to the hypothesis that the Primary trait group would have higher levels of boldness and lower levels of disinhibition and negative emotionality relative to the Secondary group. The Primary and Secondary Trait groups were not hypothesized to differ in their levels of meanness, as previous studies report both equivalence and disparity in levels of callous-unemotional traits between variants (Hicks et al., 2010; Salihovic et al., 2014).

Differences on the Psychopathic Personality Inventory-Revised for the latent profile groups, utilized to represent the Triarchic domains in the current study, were counter to hypotheses. Specifically, the Primary and Secondary variant groups did not significantly differ on any of the Triarchic domains. There are several plausible explanations for the lack of differences in the current sample. One possibility is Primary and Secondary psychopathy lead to distinct pathways to disinhibition which then increases their risk for antisocial outcomes. Disinhibition is a broadband risk factor in many negative outcomes, including problematic alcohol use, antisocial behaviors, and gambling (Dawe & Loxton, 2004; Goudriaan, Oosterlaan, De Beurs, & Van Den Brink, 2007; Reidy, Shelley-Tremblay, & Lilienfeld, 2011). Both Primary and Secondary Trait groups had significantly higher scores of self-reported disinhibition than the other latent groups, which supports this hypothesis. Regarding the boldness domain, there were slight mean differences in the expected directions, suggesting the possibility that there was not enough statistical power to detect an effect. In addition, sample characteristics of the individuals may have caused a ceiling effect for many of the domains utilized in this

study. In other words, individuals requiring a psychological assessment in the justice

system are likely to have elevated levels of boldness, disinhibition, and meanness making

it difficult to detect differences without large sample sizes.

In the current study, the Primary Trait group had significantly higher levels of

antisocial traits as compared to each of the other groups, indicative of a higher level of

severity for this group. Somewhat surprisingly, the Primary group had levels of anxiety

and warmth at about the sample mean. However, the sample was a criminal justice

involved sample (i.e., the individuals were being evaluated due to a suspected crime, an

earlier conviction, or a civil dispute), which may have decreased the mean of the sample

on warmth and increased the mean on anxiety, relative to normative levels. Similarly, the

Primary group had near sample mean levels on measures of negative emotionality such as

somatic complaints and depression. Consistent with hypotheses and previous research on

variant trait groups (Euler et al., 2015; Tatar, Cauffman, Kimonis, & Skeem, 2014) the

Primary Trait group had significantly lower levels of negative emotionality with a few

exceptions. Notably, the Primary Trait group had significantly higher scores on thought

disorder or perception related scales (e.g., Paranoia, Mania), when compared to the

Normative Trait group. These differences are consistent with an emerging literature that

finds associations between psychopathic traits, persecutory ideation, and reactive

aggression (van Dongen, Buck, & van Marle, 2016). The cognitive components involved

in the maintenance of antisocial behaviors are not well understood, but may be related to

an increase or distortion in cognitive biases/errors processes (Reidy et al., 2011).

Contrary to my hypothesis, the Primary Trait group had significantly higher levels of

borderline traits than the Normative and Low-Anxious Trait groups, and did not

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significantly differ from the Secondary Trait group. This pattern could have been the result of low statistical power, however, as there were slight mean differences in the hypothesized direction, i.e., the Secondary Trait group had a slightly higher mean score of borderline traits than the Primary Trait group.

The Secondary Trait group scores on the outcome measures were broadly consistent with hypotheses in the current study. Specifically, the Secondary Trait group had significantly higher scores on anxiety, antisociality, and indices of negative emotions (e.g., somatic complaints, paranoia, borderline traits) when compared to the Normative Trait group. These results are consistent with the hypothesis that the Secondary Trait group is primarily dysregulated and only secondarily psychopathic (Karpman, 1941). In other words, the dysregulation is hypothesized to be the causal factor which results in aggression and violence, consistent with studies of aggressive behaviors amongst psychopathic variants (Docherty et al., 2016; Vidal et al., 2010). In addition to the correlates of the psychopathy trait groups observed, the results of the path analysis support a model of anxiety mediating aggressive behavior in psychopathy.

In the path analysis, all three domains of the Triarchic model (disinhibition, boldness, and meanness) of psychopathy were significantly associated with self-reported aggression. Notably, disinhibition had a stronger association with aggression than boldness and meanness. Disinhibition is defined as a lowered or lack of inhibiting reactive impulses. In Gray's Reinforcement Sensitivity Theory (RST), Disinhibition is associated with a weak Behavioral Inhibition System (BIS-). Disinhibition in the face of provocation has been shown to increase reactive aggression in numerous studies (e.g., Siever, 2008). In addition, anxiety was a strong mediator of the path from disinhibition

to aggressive behavior. This mediated effect suggests that extreme anxiety, and likely other negative emotional states, decrease the ability to inhibit or conform behavior to social norms and expectations. Likewise, boldness was significantly associated with self-reported aggression, but this association was not significantly mediated by anxiety. As expected, boldness and anxiety were negatively correlated in the current study. RST posits Boldness to increase approach behaviors towards reward in spite of negative consequences, therefore, resulting in higher levels of aggression. Boldness in the absence of anxiety would be consistent with a weak fight-flight-freeze system (FFFS), and such weakness is theorized to be an etiological mechanism for Primary psychopathy (Gray & McNaughton, 2000). However, not all the Triarchic Domains had the expected relationships with aggression.

Specifically, the Triarchic domain of meanness was negatively associated with self-reported aggression. In addition, there was a significant and moderate negative relationship between meanness and anxiety. Given this negative association and the elevated levels of self-reported anxiety in the current sample, the anxiety trait dimension is likely driving the negative relationship between meanness and aggression. The context of completing these questionnaires for a psychological evaluation in response to a criminal charge or another emotionally charged legal context (e.g., civil complaint) could also have contributed to the high levels of negative emotionality reported in the current sample. High levels of reported negative emotionality may be contextually appropriate, or may be a strategy to manage their current legal context.

Although there were no differences between Psychopathic Trait groups in levels of the validity scale scores of inconsistency or infrequency, there were slight differences

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in impression management scores. Both Psychopathic Trait groups had higher levels of negative impression management and lower levels of positive impression management than the Normative or Low-Anxious Trait groups. Some impression management elevations are expected when there are legal incentives for a given outcome (Melton, Petrila, Poythress, & Slobogin, 2007).

In addition to the expected minor elevations on impression management scores of the Primary and Secondary Trait groups, the Low-Anxious Trait group had a pattern of scores across measures that suggest a "faking good" profile. For example, the Low-Anxious Trait group had significantly higher self-reported warmth, positive impression management scores, and significantly lower self-reported levels of negative emotionality, negative impression management, and antisocial behaviors. The possibility of method effects contributing to the observed associations in published studies is not a new concept (Cote & Buckley, 1987; Tomas & Oliver, 1999), and has been observed in a measure of callous-unemotional traits in juveniles (Paiva-Salisbury et al., 2017). The context of any self-report measure may contribute to its psychometric properties because of social demand characteristics (Orne, 1962). The presence of a group of individuals actively 'faking good' may alter the observed associations and performance of the measures in the current study.

In the current sample, the original two factor structure of the Psychopathic Personality Inventory-Revised (PPI-R) was not replicated. Numerous theoretically driven modifications did not improve the fit of the model. A model which included the PPI-R subscale of coldheartedness as a separate factor failed to converge (i.e., reach an empirical solution). A failure of convergence could be due to too much error variance or

a small sample size, both of which are likely contributors in the current study. Several

other explorations of the PPI-R have failed to replicate the factor structure, specifically

with inmate samples (Neumann et al., 2008). While the current sample was not entirely

an incarcerated sample, they did have higher mean levels of antisocial behaviors than a

community sample. Further exploration of the personality dimensions targeted by

psychopathy researchers (e.g., disinhibition) should consider that the measurement of the

dimension may differ in community and incarcerated populations. Disinhibition, for

example, may be readily endorsed by incarcerated populations not as a function of blame

externalization (a subscale of the Disinhibition domain on the PPI-R), but due to a higher

reward perception associated with risky decisions. Item response theory analyses with a

diverse population, both community and incarcerated samples, may be fruitful in the

exploration of these dimensions (An & Yung, 2014).

When considering the totality of the current results from a Reinforcement

Sensitivity Theory framework (Gray, 1978), the lack of differences on Disinhibition

between Secondary and Primary variant groups suggests a strong Behavioral Activation

System (BAS+) for both groups. A strong BAS+ for both variants is consistent with RST

theory, as Secondary groups are hypothesized to have an overactive BAS, and Primary

groups to have a nonexistent Behavioral Inhibitions System (BIS). In this study, the

Primary group did have near mean levels of anxiety, negative emotionality, and

indicators of trait anxiety or fear arousal (e.g., phobias) consistent with a weak fight-

flight-freeze system, (FFFS). A weak FFFS coincides with an insufficient response from

the BIS and a complete lack of inhibitory control in the face of rewards, resulting in an

overactive BAS response. However, the Primary and Secondary Trait groups did not

differ on levels of Boldness in the current study, which is theorized to correlate strongly with FFFS. It is difficult to integrate these findings within the RST framework without reliable and valid measures of the BIS, BAS, and FFFS systems.

The current study sought to explore the dimensions and heterogeneity of psychopathy within an ecologically valid context. However, there were several limitations to the current work. Since the study utilized archival data, there was a small percentage of missing data. However, robust estimation and multiple imputation methods were utilized to handle the missing data and to minimize the impact of missing information on the results. In addition, the current study is cross sectional and the observed relationships in the path analysis are suggestive not prescriptive. Although disinhibition has predicted aggression through impulsivity in previous research (Babcock, Tharp, Sharp, Heppner, & Stanford, 2014), longitudinal analyses are needed to determine whether anxiety is a mechanism that partially mediates that relationship for individuals who display Secondary psychopathic traits or extreme dysregulation. In spite of these limitations, the current findings have important implications for forensic psychologists, clinical psychologists, and psychopathy researchers.

Forensic psychologists should be aware of a pattern of elevated personality traits, namely antisocial, borderline, anxiety, paranoia, and a lack of warmth that consistently emerges across populations of individuals. Althoff, Rettew, Ayer, and Hudziak (2010) labeled this pattern the dysregulation profile. This profile, no matter the name, is associated with elevated risk for negative outcomes including aggression (De Caluwé, Decuyper, & De Clercq, 2013; Holtmann et al., 2011; Kimonis, Skeem, Cauffman, & Dmitrieva, 2011). The current study suggests anxiety may be a mediator of the

relationship between disinhibition and aggression. It follows that evaluators should recommend forms of evidence based treatment to target this anxiety and emotional regulation strategies. Given elevated levels of borderline traits, dialectical behavioral therapy should be considered to address the emotional dysregulation (Linehan, Comtois, Murray, & et al., 2006; Stickle, et al., 2012). However, previous studies have also found elevated levels of self-reported trauma histories by individuals high in Secondary psychopathic traits (Kimonis et al., 2012). Therefore, trauma-focused therapeutic techniques such as trauma-focused cognitive behavior or cognitive processing therapies should be considered with an emphasis on managing emotional arousal (Mannarino, Cohen, & Deblinger, 2014; Resick, Nishith, Weaver, Astin, & Feuer, 2002). Finally, in the current sample there were significant elevations for both psychopathic variant groups on thought disordered related scales. Treatment, therefore, should additionally include evaluating and addressing cognitive biases and other offense related cognitions (Bandura, 1990; Maruna & Mann, 2006) through adaptive coping treatments that are future focused, such as the Good Lives Model (Ward, Mann, & Gannon, 2007).

Interestingly a group of individuals emerged in the current sample who consistently reported an absence of even mild elevations of depression or anxiety related symptoms. Forensic psychologists are trained to monitor for positive impression management. Further, some impression management, in either direction, is expected in incentivized evaluations (Melton et al., 2007), such as the assessments of the current sample. However, the current research highlights the importance of researchers to consider the impact that this response style could have on the psychometric functioning of measurement instruments (Cote & Buckley, 1987; Paiva-Salisbury et al., 2017). For

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example, response styles could negatively affect the fit of the factor model of the PPI-R in incarcerated populations.

As the field of psychopathy expands, it has become clearer that the dimensions contributing to the larger construct of psychopathy are still unclear. This is not dramatically different from the study of psychology in general, as complex frameworks emerge (e.g., epigenetics) our understanding of the relevant dimensions of human behavior and internal experience are evolving (Lilienfeld, 2017). Measuring the relevant dimensions in a self-report format has not yet yielded consistent factor structures across self-report inventories of psychopathy and callous-unemotional traits (Neumann et al., 2008; Paiva-Salisbury et al., 2017). While extensive research has shown the PCL-R to be a useful and consistent indicator of the construct of psychopathy, the PCL-R is lengthy and tedious to administer for researchers and evaluators. Further, the PCL-R underlying factor structure has been criticized as drifting from the Cleckley's original conceptualization by relying heavily on antisocial behaviors (Cooke, Michie, Hart, & Clark, 2005; Skeem & Cooke, 2010). In response to this criticism, Hare and Nuemann (2008) suggest a focus and integration of empirical evidence on the associated trait dimensions to advance the construct of psychopathy. Furthering these ideas, the field of psychopathic research should continue to develop tools to efficiently measure the trait dimensions relevant to psychopathy. Anxiety and negative emotionality are relevant to the construct of psychopathy, and should be included in future assessment measures. The development of increasingly reliable and valid measures should iteratively inform the refinement of relevant trait dimensions, thus progressing theories of psychopathy.

Consistent with past research, the current study found a group of individuals who have report elevated levels of antisocial behaviors and emotional dysregulation (Cox et al., 2013; Gill & Stickle, 2016; Skeem, et al., 2003). In addition, anxiety partially accounted for the variance associated with disinhibition and aggression for all groups in the current study. Since anxiety sensitivity and fearlessness are hypothesized to vary on a continuum (Vaidyanathan, Patrick, & Cuthbert, 2009), including a measure of this dimension is necessary to understand the construct of psychopathy. Given the difficulty of self-report described here, a fruitful way forward may be to utilize a multimethod multitrait approach to psychopathy (Poythress et al., 2010). Fearlessness and anxiety have known physiological correlates including heart rate (acute threat) and startle potentiation (potential threat; Blair, 2015; Casey, Oliveri, & Insel, 2014). To advance theories and inform treatments of psychopathy and persistent antisocial behaviors, we will need to disentangle the complex role anxiety plays in increasing aggressive behaviors. Future research should include self-report and physiological measures of hypothesized trait dimensions to further an integrated physiological and personality based model of psychopathy. Finally, the Triarchic Model holds promise as a base personality model of psychopathy. The current study, in line with previous research, strongly argues for the addition of a dimension to the Triarchic Model to capture anxiety sensitivity.

Table 1

Fit statistics of 1-5 classes of the latent profile analysis

Fit Statistics (N = 377)	1 Class	2 Class	3 Class	4 Class	5 Class
Log-likelihood (number of replications)	-33589.2 (38)	-31431.21 (22)	-30802.38 (3)	-30331.13 (27)	-29976.34 (1)
AIC	67430.4	63248.41	62124.75	61316.26	60740.68
BIC	67925.86	64007.34	63147.13	62602.11	62289.98
SSA-BIC	67526.1	63394.99	62322.22	61564.62	61039.92
Entropy	-	0.974	0.985	0.973	0.969
LMR test	-	4305.15	1254.51	1066.87	707.8
LMR, *p*-value	-	0.006	0.174	0.538	0.818
BLRT	-	4315.98	1257.66	942.49	709.59
BLRT *p*-value for	-	$<.001$	$<.001$	$<.001$	$<.001$
Two-class model					
1. *n* = 257, 68.2%	0.994	0.006			
2. *n* = 120, 31.8%	0.009	0.991			
Three-class model					
1. *n* = 58, 15.4%	0.996	0.003	0.001		
2. *n* = 74, 19.6%	0.004	0.981	0.015		
3. *n* = 245, 65%	0.002	0.002	0.995		
Four-class model					
1. *n* = 104, 27.6%	0.982	0.014	0	0.003	
2. *n* = 180, 47.7%	0.016	0.984	0	0	
3. *n* = 49, 13%	0.001	0	0.994	0.005	
4. *n* = 44, 11.7%	0.011	0	0.002	0.987	
Five-class model					
1. *n* = 164, 43.5 %	0.978	0.021	0.001	0	0
2. *n* = 94, 24.93%	0.025	0.966	0.003	0.006	0
3. *n* = 41, 10.88%	0.002	0.001	0.996	0.001	0
4. *n* = 54, 14.32%	0	0.007	0.002	0.99	0
5. *n* = 24, 6.37%	0	0	(No	0	1

Table 2
Descriptive comparisons of the latent class groups on PAI scales in the LPA analysis

| PAI Scale | Latent Class $M(SD)$ | | | | ANOVA (3, 367) | |
	Primary Trait ($n = 44$)	Secondary Trait ($n = 49$)	Normative Trait ($n = 104$)	Low-Anxious ($n = 180$)	F	p
Anxiety	29.91 (7.61)[a]	52.33 (7.07)[b]	29.51 (6.68)[a]	12.59 (5.28)[c]	569.74	<.001
Antisocial	36.6 (8.53)[a]	26.68 (11.8)[b]	15.87 (5.99)[c]	13.59 (7.01)[c]	125.92	<.001
Warmth	19.61 (6.05)[a]	18.63 (6.75)[a]	20.78 (6.45)[a]	24.63 (5.14)[b]	21.09	<.001

Note. Personality Assessment Inventory (PAI). Differing superscripts denote significant differences at the $p < .017$ level using the Holm method, ($N = 377$).

Table 3

Descriptives of Personality Assessment Inventory scales used in the criterion-related validity comparisons

	Mean	SD	Minimum	Maximum	Valid N
ICN	6	3	0	12	373
INF	3	2	0	8	375
NIM	4	4	0	22	377
PIM	14	5	1	24	377
SOM	17.42	13.11	0	62	376
ANX	24.47	14.75	0	69	376
ARD	26.04	12.08	3	63	377
DEP	24.78	14.02	0	68	377
MAN	23.29	10.8	3	68	377
PAR	24.81	11.32	3	60	377
SCZ	17.64	10.51	0	55	376
BOR	27.40	14.41	2	68	377
ANT	18.65	11.08	0	55	377
AGG	15.64	10.25	0	48	377

Note. Inconsistency (ICN), Infrequency (INF), Negative impression management (NIM), Positive impression management (PIM), Somatic complaints (SOM), Anxiety total (ANX), Anxiety related disorders (ARD), Depression (DEP), Mania (MAN), Paranoia (PAR), Schizophrenia (SCZ), Borderline traits (BOR), Antisocial traits (ANT), Aggression (AGG).

Table 4

Correlations of Personality Assessment Inventory scales used in the criterion related comparisons

	ICN	INF	NIM	PIM	SOM	ANX	ARD	DEP	MAN	PAR	SCZ	BOR	ANT	AGG
ICN	-													
INF	0.09	-												
NIM	.16**	0.01	-											
PIM	-.11*	.12*	-.57**	-										
SOM	.17**	-0.02	.62**	-.43**	-									
ANX	.17**	-0.02	.67**	-.7**	.67**	-								
ARD	.12*	-0.06	.66**	-.6**	.54**	.79**	-							
DEP	.25**	-0.002	.75**	-.66**	.68**	.83**	.73**	-						
MAN	-0.01	-0.04	.41**	-.51**	.3**	.41**	.46**	.26**	-					
PAR	.16**	0.08	.7**	-.55**	.53**	.67**	.65**	.69**	.42**	-				
SCZ	.17**	-0.01	.74**	-.6**	.59**	.74**	.69**	.79**	.39**	.71**	-			
BOR	.21**	0.03	.72**	-.78**	.57**	.79**	.75**	.81**	.52**	.72**	.73**	-		
ANT	.13**	0.04	.52**	-.59**	.27**	.41**	.43**	.43**	.56**	.48**	.47**	.70**	-	
AGG	.13*	.12*	.46**	-.58**	.28**	.46**	.38**	.40**	.53**	.5**	.42**	.66**	.66**	-

Note. Inconsistency (ICN), Infrequency (INF), Negative impression management (NIM), Positive impression management (PIM), Somatic complaints (SOM), Anxiety total (ANX), Anxiety related disorders (ARD), Depression (DEP), Mania (MAN), Paranoia (PAR), Schizophrenia (SCZ), Borderline traits (BOR), Antisocial traits (ANT), Aggression (AGG) *p < .05, **p < .01, (*N* = 377).

Table 5

Descriptive comparisons of the latent class groups on the negative emotionality family of outcomes

| PAI Scale | **Latent Class *M*(*SD*)** | | | | **ANOVA (3, 367)** | |
	Primary Trait (*n* = 44)	Secondary Trait (*n* = 49)	Normative Trait (*n* = 104)	Low-Anxious (*n* = 180)	*F*	*P*
Somatic Complaints	20.56 (9.42)[a]	33.15 (13.45)[b]	21.09 (11.94)[a]	10.28 (9.02)[c]	67.95	<.001
Anxiety Related Disorders	31.55 (8.97)[a]	44.24 (8.51)[b]	27.91 (8.89)[a]	18.42 (7.83)[c]	133.21	<.001
Depression	33.56 (10.62)[a]	44.04 (11.11)[b]	29.56 (10.25)[a]	14.63 (7.51)[c]	164.33	<.001
Mania	32.64 (9.36)[a]	32.65 (12.14)[a]	21.76 (9.74)[b]	19.29 (7.84)[b]	43.83	<.001
Paranoia	30.94 (8.67)[a]	39.97 (9.86)[b]	26.38 (10.08)[a]	8.5 (7.75)[c]	79.61	<.001
Schizophrenia	25 (7.88)[a]	32.15 (9.88)[b]	18.9 (8.21)[c]	11.15 (5.89)[d]	122.32	<.001
Borderline Traits	43.45 (9.03)[a]	46.50 (11.08)[a]	30.13 (8.79)[b]	16.67 (7.14)[c]	235.42	<.001

Note. Personality Assessment Inventory (PAI). Differing superscripts denote significant differences at the $p < .007$ level using the Holm method, ($N = 377$).

Table 6

Descriptive comparisons of the latent class groups on the impression management family of outcomes

PAI Scale	Latent Class *M*(*SD*)				ANOVA (3, 367)	
	Primary Trait (*n* = 44)	Secondary Trait (*n* = 49)	Normative Trait (*n* = 104)	Low-Anxious (*n* = 180)	*F*	*p*
Inconsistency	7.2 (2.08)[a]	6.23 (2.98)[ab]	6.77 (2.67)[a]	5.43 (2.69)[b]	8.48	<.001
Infrequency	3.55 (2.36)	3 (2.15)	3.61 (2.1)	3.41 (2.08)	0.95	0.415
Negative Impression Management	6.2 (3.68)[a]	8.69 (4.79)[b]	3.57 (3.05)[c]	1.39 (1.7)[d]	94.76	<.001
Positive Impression Management	9.89 (3.77)[a]	7.67 (3.56)[a]	13.86 (3.25)[b]	17.24 (3.34)[c]	130.77	<.001

Note. Personality Assessment Inventory (PAI). Differing superscripts denote significant differences at the *p* < .013 level using the Holm method, (*N* = 377).

Table 7

Standardized factor loadings of the two-factor confirmatory factor analysis of the PPI-R

PPI-R Subscales	PPI-R Factors	
	Self-Centered Impulsivity	Fearless Dominance
Machiavellian Egocentricity	.684**	
Rebellious Nonconformity	.987**	
Blame Externalization	.310**	
Careless Nonconformity	.268**	
Stress Immunity		.089
Fearlessness		1.083**
Social Influence		.261

Note. Psychopathic Personality Inventory- Revised (PPI-R), **$p < .01$, $n = 119$.

Table 8

Correlations and descriptive statistics of variables used in the path analysis

	PAI Aggression	PAI Anxiety	PPI-R Boldness	PPI-R Disinhibition	PPI-R Meanness
Means (SD)	17.83 (10.26)	26.79 (15.59)	108.82 (15.1)	142.46 (24.6)	35.79 (9.62)
PAI Aggression	-				
PAI Anxiety	0.443	-			
PPI-R Boldness	0.125	-0.204	-		
PPI-R Disinhibition	0.444	0.412	0.000	-	
PPI-R Meanness	-0.048	-0.04	0.11	0.453	-

Note. Personality Assessment Inventory (PAI), Psychopathic Personality Inventory- Revised (PPI-R), $n =$ 119.

Table 9

Regression weights for the Triarchic dimensions in the prediction of anxiety and aggression

Independent Variables	PAI Anxiety				PAI Aggression Total			
	B	*SE*	β	*p*	*B*	*SE*	β	*p*
Boldness	-.31	.14	-.17	= .027	.36	.13	.21	= .005
Meanness	-.26	.09	.54	= .003	-.25	.08	-.26	= .003
Disinhibition	.89	.15	-.27	< .001	.71	.15	.44	< .001
Anxiety	-	-	-	-	.28	.08	.29	= .001
Constant	.61				-1.08			
R^2	.27			< .001	.36			< .001

Note. Personality Assessment Inventory (PAI), $n = 119$.

Table 10
Total, direct, and indirect of effects of the Triarchic domains on aggression

Pathway	B	SE	β	p
DIS → ANX → AGG				
Total effect	.96		.6	
Direct effect	.71	.15	.44	< .001
Indirect effect	.25	.08	.16	= .003
BOLD → ANX → AGG				
Total effect	.27		.16	
Direct effect	.36	.13	.21	= .005
Indirect effect	-.09	.05	-.05	= .06
MEAN → ANX → AGG				
Total effect	-.31		-.34	
Direct effect	-.25	.08	-.26	= .003
Indirect effect	-.07	.03	-.08	= .02

Note. Disinhibition (DIS), anxiety (ANX), aggression (AGG), boldness (BOLD), and meanness (MEAN).
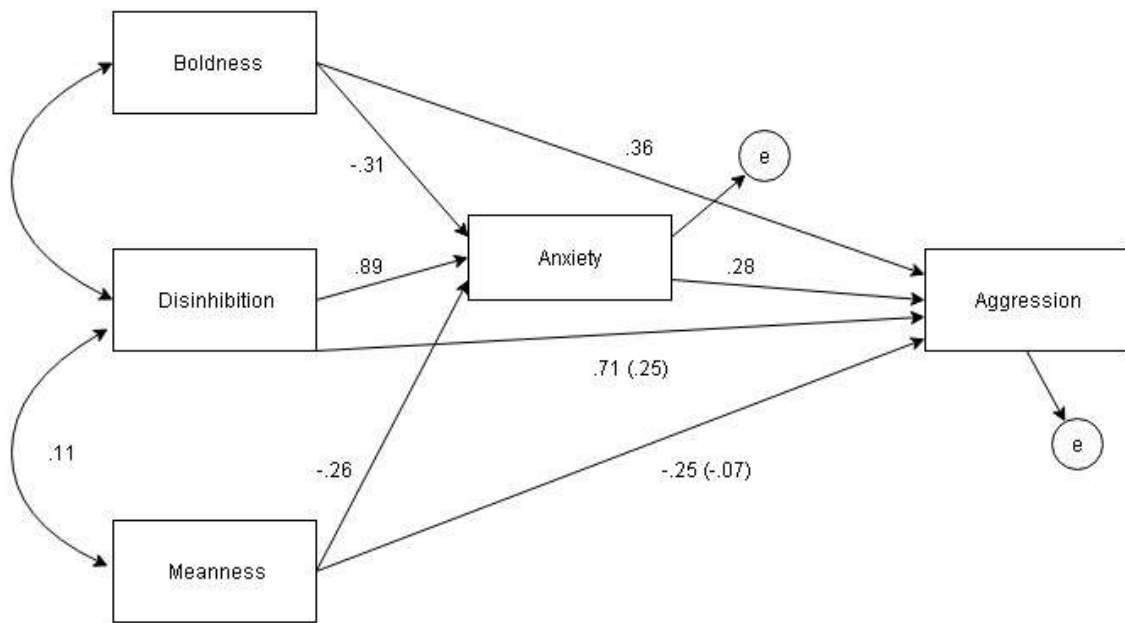
Figure 1. Path model for the associations of the Triarchic domains and aggressive behaviors.
Note. Only significant associations are shown. Standardized coefficients are displayed. Significant indirect effects through anxiety are listed parenthetically after direct effects.

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