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Using the Psychopathic Personality Inventory to identify subtypes of antisocial personality disorder

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ABSTRACT

Purpose: Poythress, Edens, et al. (2010) recently used cluster analysis to identify subtypes of antisocial and psychopathic offenders using a diverse collection of theoretically important clustering variables. Two predicted subtypes, primary and secondary psychopathy, were identified, in addition to non-psychopathic and (unexpectedly) "fearful" psychopathic offenders. The purpose of the present research was to determine whether these clusters could be replicated using a single self-report measure, the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996).
Method: Study 1: We used discriminant function analysis (DFA) to predict cluster membership for the Poythress et al. subtypes based solely on the eight subscales of the PPI.
Results: Study 1: Though overall classification accuracy with the original clusters was poor, PPI-derived subtypes differed from each other in theoretically consistent ways on several criterion measures.
Method: Study 2: We used the PPI-based DFA to classify a separate sample of prison inmates from a prior PPI study (Edens et al., 2008).
Results: Study 2: As predicted, inmates classified into the secondary psychopathy subgroup demonstrated the highest rates of aggressive misconduct whereas non-psychopathic were the least prone to engage in misconduct.
Conclusion: The PPI may serve as a relatively simple method of identifying theoretically meaningful subtypes of psychopathic offenders.

Introduction

Mental health professionals have been interested in the prevention of delinquent and criminal behavior and the rehabilitation of offenders for centuries (e.g., Raphael, Jacoby, Harryman, & Raphael, 1924). The dominant classification system for mental disorders in use in the United States today, the Diagnostic and Statistical Manual of Mental Disorders—4th Edition-Text Revision (DSM-IV-TR; American Psychiatric Association, 2000), categorizes most of those who engage in repetitive criminal conduct to be suffering from Antisocial Personality Disorder (ASPD). Multiple controversies bedevil the validity and utility of the ASPD diagnosis, however, with one frequent criticism being that it comprises a very heterogeneous group of individuals who share little in common other than a propensity to engage in irresponsible behavior, including crime. A considerable amount of recent research suggests that people who meet criteria for ASPD can be meaningfully subtyped into more homogeneous groups (described below) based on psychological characteristics. However, the clinical utility of these subtypes to inform treatment and management decision-making requires further investigation.

Another controversy surrounding the categorization of persons who engage in chronic antisocial behavior is the utility of self-report personality and attitudinal measures. Self-report measures have been criticized as problematic on a number of grounds, even though extant research suggests that many have considerable utility in identifying offenders who are prone toward violence or recidivism (Walters, 2006). Self-report measures offer numerous advantages over more labor-intensive assessment methods such as standardized interviews (Lilienfeld & Fowler, 2006) and a method for identifying subtypes of antisocial offenders based largely on self-report would be a major contribution to the assessment literature.

The present study builds on recent subtyping research by Poythress, Edens, et al. (2010), who cluster analyzed a large sample of individuals

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diagnosed with ASPD into more conceptually meaningful subgroups based on a complex combination of personality measures, including interview data and self-report questionnaires. In this report, we investigate the utility of a single, widely used self-report measure, the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996) to classify the original sample into these subtypes using discriminant function analysis (Study 1). In Study 2, we extend this work by examining the utility of this PPI-based system in a new sample of offenders who had completed the PPI as part of an earlier study (Edens, Poythress, Lilienfeld, Patrick, & Test, 2008). More specifically, we address whether prison inmates classified into subtypes are at differential risk for institutional misconduct.

Before presenting these findings, we provide a more extensive review of controversies concerning ASPD. We begin by highlighting conceptual debates regarding the relationship between ASPD and the related concept of psychopathic personality (psychopathy).

ASPD and psychopathy

Historically, there has been considerable debate concerning the relationship between ASPD and psychopathy (Lilienfeld, 1994). Hervey Cleckley's (1941) conceptualization of psychopathy included such traits as superficial charm, insincerity, low levels of anxiety, and a failure to learn from mistakes. However, a number of authors (Cloniger, 1978; Spitzer, Endicott, & Robins, 1975) argued that this conceptualization placed too much emphasis on inferred and unobservable traits. This perception influenced the core framework of ASPD in the Diagnostic and Statistical Manual-Third Edition (DSM-III; American Psychiatric Association, 1980) which identified criminal, delinquent and irresponsible behaviors as primary characteristics of the disorder.

Hare, Hart, and Harpur (1991) argued that the behavioral criteria of ASPD were overinclusive and encompassed a variety of disordered pathology. Research conducted with offenders supports the differentiation between ASPD and the more personality-based construct of psychopathy. For example, Hart and Hare (1989) administered the Psychopathy Checklist (PCL-R; Hare (1991/2003)) to 80 forensic psychiatric patients who were evaluated and given DSM-III Axis I and Axis II diagnoses. Approximately half of the participants met criteria for ASPD, whereas only 12.5% met the PCL cut-off for a diagnosis of psychopathy. Furthermore, evidence from the DSM-IV field trials suggested that personality features associated with psychopathy added incremental validity over behaviorally based criteria in clinician impressions of psychopathy and ASPD among prison inmates (Widiger et al., 1996).

Variants of psychopathy

Although debate about the differentiation between ASPD and psychopathy continues, a separate area of research has considered whether psychopathy might consist of two or more subtypes. Traditionally psychopathy often was treated as a unitary concept captured by a total score on Hare's (1991/2003) PCL–R and other measures, a growing body of research suggests that there are at least two common variants of psychopathy (for a review, see Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003), generally referred to as "primary" and "secondary" psychopathy. Primary psychopathy closely mirrors Cleckley's conceptualization interpersonally and emotionally. Individuals within this subtype are typically regarded as socially dominant extroverts with low levels of anxiety (Blackburn, 1975, 1987; Karpman, 1948; Lykken, 1995). Conversely, secondary psychopaths are believed to be more impulsive, anxious, socially withdrawn, and reactive to negative emotions (Blackburn, 1975, 1987; Lykken, 1995). In his writings, Karpman (1948) argued that secondary psychopathy often develops in response to an abusive or neglectful caregiver during early childhood. He maintained that, interpersonally, secondary psychopaths are prone to emotional conflict and, particularly in confinement (e.g., prisons, psychiatric hospitals), more likely to experience difficulties adjusting to highly controlled and authoritarian environments.

Although theorists have opined about psychopathy variants or subtypes for decades, only recently have empirical investigations focused on the examination of these subgroups. For example, Skeem, Johansson, Andershed, Kerr, and Eno Louden (2007) examined adult offenders' scores on a number of measures, including the PCL-R[1] (Hare, 1991/2003) and an index of trait anxiety (Karolinska Scales of Personality; KSP; Gustavsson, Weinryb, Goransson, Pedersen, & Asberg, 1997). Participants included 123 male offenders incarcerated in Sweden for a violent offense and obtaining a total PCL-R score equal to or greater than 29. A model-based cluster analysis (Banfield & Raftery, 1993) yielded two distinct clusters with a high (87%) posterior probability that individuals were correctly classified. These clusters largely mirrored theoretical conceptualizations of primary and secondary psychopathy. Specifically, the group labeled secondary psychopathy exhibited higher levels of anxiety and lower levels of psychopathic traits than the group labeled primary psychopathy. Importantly, the clusters also differed on theoretically relevant criterion-related variables: secondary psychopaths exhibited higher levels of irritability (as measured by the KSP), social withdrawal (KSP), borderline traits (as measured by the Diagnostic Interview of Personality Questionnaire; DIP-Q; Ottosson et al., 1995), major mental illness (as measured by the Historical, Clinical, Risk Management-20; HCR-20; Webster, Douglas, Eaves, & Hart, 1997) and lower levels of assertiveness (KSP) and clinical functioning (DIP-Q). Contrary to some theoretical conceptualizations of these subtypes, secondary psychopaths were not less narcissistic (DIP-Q) or more impulsive (KSP) than their primary counterparts.

In a study designed to identify psychopathy subtypes in male offenders, Vassileva, Kosson, Abramowitz, and Conrod (2005) administered the PCL-R and the Interpersonal Measure of Psychopathy (IM-P; Kosson et al., 1997) to 200 adult jail inmates. Analyses revealed four clusters, two of which appeared consistent with primary and secondary subtypes. The "primary psychopath" cluster was comprised of individuals with higher scores on both the PCL-R Factor 1 (13.30 compared with 10.37 for the secondary group) and the IM-P (41.82 vs. 29.17), lower levels of trait anxiety, and less severe substance abuse problems. This group was also distinguished by more violent offenses and more incarcerations and greater criminal versatility than individuals in the non-psychopathic clusters. In contrast, the "secondary psychopath" cluster obtained higher scores on PCL-R Factor 2 (13.84 compared with 13.19 for the primary group), higher levels of trait anxiety, and more severe substance abuse. This group was also characterized by more non-violent offenses and greater criminal versatility than the non-psychopathic groups. A third cluster, labeled "non-psychopathic criminals with alcohol and drug problems," consisted of offenders with lower levels of trait anxiety, lower Factor 1 and 2 scores relative to the other clusters, and lower IM-P scores relative to the psychopathy clusters. In addition, this group demonstrated higher levels of substance use and dependence, as measured by the Structured Clinical Interview for DSM-IV Axis I disorders (First, Gibbon, Spitzer, & Williams, 1995), but also less criminal versatility and fewer charges than both psychopathy clusters. Finally, a fourth group included individuals with higher Factor 1 and 2 scores than the non-psychopathic cluster but lower than both psychopathy clusters. Interestingly, this group was similar to the secondary psychopathy group in the number of charges for violent offenses. However, they exhibited fewer incarcerations and less criminal versatility than the psychopathy cluster.

Swogger and Kosson (2007) attempted to replicate Vassileva et al.'s (2005) findings using a cluster analytic approach developed by Steinley (2003; see Swogger & Kosson, 2007, for complete details). Participants included 258 European American county jail inmates convicted of a felony or misdemeanor. Consistent with the Vassileva et al. (2005) findings, four clusters emerged, with two clusters largely

consistent with primary and secondary conceptualizations. Specifically, the primary subgroup was characterized by higher scores on the IM-P and on the interpersonal and affective dimensions of psychopathy, relative to the other clusters. In contrast, members of the secondary cluster displayed higher scores on PCL-R interpersonal and affective dimensions relative to all other clusters except for the primary subgroup. Additionally, this cluster was characterized by higher levels of anxiety and exhibited severe drug and mild alcohol dependence. External validation analyses revealed that both primary and secondary subtypes exhibited greater criminal versatility and symptoms of ASPD than non-psychopathic clusters. In addition, individuals in the primary psychopathy cluster had more violent criminal charges than all other individuals.

In an effort to distinguish subtypes of psychopathy based on personality traits, Hicks, Markon, Patrick, Krueger, and Newman (2004) administered the Multidimensional Personality Questionnaire-Brief Form (MPQ-BF; Patrick, Curtin, & Tellegen, 2002) to 96 male prisoners who obtained high scores (≥30) on Hare's Psychopathy Checklist-Revised (PCL-R; Hare's (1991/2003)). Model-based cluster analyses identified two clusters. The first cluster, labeled "emotionally stable psychopathy," was consistent with primary psychopathy. Specifically, these individuals demonstrated low stress reaction and high agency, or obtaining satisfaction through dominance. In contrast, the second cluster, labeled "aggressive psychopathy," was marked by high scores on scales designed to measure alienation and aggression along with low scores on social closeness and impulse control.

Comparisons between these two clusters identified a number of noteworthy differences. Specifically, aggressive psychopaths reported more physical fights and younger age at first arrest. Additionally, the emotionally stable cluster reported a higher level of socialization, whereas the aggressive psychopath cluster reported significantly higher levels of anxiety. In addition to providing support for theoretical conceptualizations of primary and secondary subtypes, this study lends support for the use of a self-report measure to differentiate offenders on variables of practical utility.

Although the above studies offer compelling support for the distinction between psychopathy subtypes, few studies have utilized cluster analytic procedures and psychopathy scores to meaningfully differentiate among individuals specifically diagnosed with ASPD. Using a sample of adult male offenders, all of whom were diagnosed with ASPD, Poythress, Edens, et al. (2010) performed a model-based cluster analysis to better understand psychopathy subtypes. This sample consisted of 691 males from either prison or court-ordered inpatient drug treatment programs (see Poythress, Edens, et al., 2010, for complete details).

Clustering variables included features of psychopathy, anxiety, and potential etiological markers of the disorder. Core psychopathic features were assessed via Facets 1–3 of the PCL-R. Facet 1 assesses specific interpersonal traits (e.g., glibness/superficial charm), whereas Facet 2 measures affective traits (e.g., callousness/lack of empathy) and Facet 3 assesses indicators of an impulsive/irresponsible lifestyle (e.g., need for stimulation). Facet 4, a measure of antisocial behavior (e.g., criminal versatility) was omitted from analyses because of the large overlap with ASPD criteria. Because some authors have argued that anxiety and neuroticism can distinguish primary from secondary psychopathy, trait anxiety was also measured via the Anxiety scale (ANX) of the Personality Assessment Inventory (Morey, 1991/2007).

To assess a tendency to avoid harmful stimuli, participants were administered the Harm Avoidance (HA) scale from the Multidimensional Personality Questionnaire (MPQ; Tellegen, in press). Participants also completed three of Carver and White's (1994) self-report Behavioral Activation System scales designed to assess sensitivity to reward stimuli; specifically, the motivation to pursue rewards (Reward Responsiveness), tenacity with which one pursues rewards (Drive), and tendency with which one seeks out novel and stimulating situations (Fun Seeking). Finally, to identify individuals with prominent psychopathic characteristics that may have emerged as a result of childhood abuse, participants completed the Child Abuse and Trauma Scale (CATS; Sanders & Giolas, 1991).

In terms of the primary results, cluster analyses identified two distinct groups that broadly match primary and secondary psychopathy subtypes. As demonstrated in Fig. 1, the "primary" group ($n=141$) received higher scores on PCL-R Facets 1 and 2 relative to Facet 3, as well as higher scores on measures of reward sensitivity. These findings indicate that the "primary" group endorsed prototypically interpersonal and affective psychopathic traits such as superficial charm and a grandiose sense of self-worth. In contrast, the "secondary" group ($n=153$) endorsed slightly higher scores on PCL-R Facet 3, compared with Facets 1 and 2 (which were both in the moderate range), and high scores on the PAI ANX scale. Given this profile, in addition to elevated scores on the CATS, the authors suggested that this group mirrored Karpman's (1948) secondary psychopath. Compared with individuals in the primary groups, individuals in the secondary group, scored higher on measures of internalizing symptomatology, externalizing symptomatology, and impulsivity. In addition, individuals in the secondary group manifested less disruptive behavior in treatment and were slightly more prone to aggressive misconduct while incarcerated. As expected, a third group, labeled "nonpsychopathic ASPD," ($n=195$) did not score especially highly on either the affective or interpersonal facets of psychopathy and did not exhibit marked elevations on ANX or CATS. Interestingly, an unexpected fourth group, labeled "fearful psychopath" ($n=190$) exhibited psychopathic interpersonal features, while also endorsing high scores on HA, indicating a fearful temperament.[2]

Although the clusters found by Poythress, Edens, et al. (2010) are theoretically and potentially clinically important, they were obtained using an instrument (the PCL-R) that requires trained raters and access to file information. Furthermore, additional scales from various measures were used as clustering variables, making replication of psychopathy subtypes potentially cumbersome. As such, the purpose of this study was to determine whether these clusters could be replicated using a widely researched self-report measure of psychopathy, the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996).[3] If a single self-report measure could function as an effective classification tool for these subtypes, it could simplify the assessment

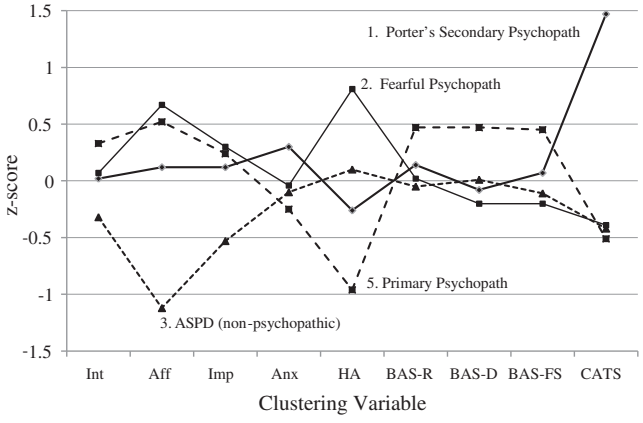

Fig. 1. Poythress, Edens, et al. (2010) ASPD Subtypes Derived via Model-based Cluster Analysis. ASPD = antisocial personality disorder; Int = interpersonal facet from the Psychopathy Checklist–Revised (PCL-R); Aff = affective facet from the PCL-R; Imp = impulsive lifestyle facet from the PCL-R; ANX = Anxiety scale from the Personality Assessment Inventory; HA = Harm Avoidance scale from the Multidimensional Personality Questionnaire; BAS-RR = Reward Responsiveness scale from the behavioral activation system scales; BAS-DR = Drive scale of the BAS scales; BAS-FS = Fun Seeking scale of the BAS scales; CATS = Child Abuse and Trauma Scale.

process and increase the potential clinical and classification utility of the original clusters. Such a finding could also help to clarify the psychological meaning and correlates of the psychopathy subtypes identified in these cluster analyses.

The Psychopathic Personality Inventory

The PPI was designed to assess the major dimensions of psychopathy in non-institutionalized populations. Because the focus of the PPI is on affective and interpersonal traits, it does not contain questions assessing explicitly criminal behaviors. Although there is debate concerning the validity of assessing antisocial and psychopathic traits using self-report (e.g., Edens, Hart, Johnson, Johnson, & Olver, 2000), some (e.g., Lilienfeld & Fowler, 2006) have suggested that self-report measures may permit more accurate assessments of an individual's subjective emotional disposition than observation or observer report, which itself may be contaminated by various forms of rater bias (see Edens, Magyar, & Cox, in press, for a review).

The PPI yields scores on eight lower-order dimensions (see Table 1), seven of which load onto one of two higher-order factor scores (i.e., PPI-I and PPI-II). Coldheartedness does not load onto either higher-order factor (see Benning, Patrick, Hicks, Blonigen, & Krueger, 2003, for a detailed analysis). (For a dissenting opinion and evidence of a three factor model, see Neumann, Malterer, & Newman, 2008). High scores on PPI-I, labeled "Fearless Dominance" reflect low levels of tension and anxiety and high levels of physical risk-taking and interpersonal dominance. Contrastingly, high scores on PPI-II, or "Impulsive Antisociality," indicate high levels of impulsivity, blame externalization, and self-centeredness (Lilienfeld & Widows, 2005). Although originally developed with non-offending populations (Lilienfeld & Andrews, 1996), the reliability and construct validity of the PPI have been examined in numerous samples of adult offenders (e.g., Edens & McDermott, 2010; Edens, Poythress, Lilienfeld, Patrick, & Test, 2008; Falkenbach, Poythress, Falki, & Manchak, 2007).

Lilienfeld and Andrews (1996) found that PPI total scores correlated positively and moderately to highly with peer-rated Cleckley psychopathy traits, as well as ASPD and Narcissistic Personality Disorder, as measured by the Structured Clinical Interview for DSM-III-R (Spitzer, Williams, & Gibbon, 1987). In addition, PPI total scores correlate negatively with the Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Karmmer, 1989) Fears and Social Discomfort content subscales and with fearfulness as assessed by Lykken's (1957) Activity Preference Questionnaire (Lilienfeld & Andrews, 1996). Given that specific PPI subscales are probably driving these correlations, it is reasonable to hypothesize these subscales differentiate among traits associated with primary and secondary psychopathy.

Table 1
Subscales of the Psychopathic Personality Inventory

Subscale Name	Description
Machiavellian Egocentricity (30 items)	Aggressive and self-centered in interactions with others
Social Potency (24 items)	Able to manipulate and influence others
Fearlessness (19 items)	Willing to take risks; lacks concern for harmful consequences
Coldheartedness (21 items)	Unsentimental; lacks imaginative capacity; unreactive to others' distress
Impulsive Nonconformity (17 items)	Reckless, rebellious
Blame Externalization (18 items)	Blames others and rationalizes own transgressions
Carefree Nonplanfulness (20 items)	Present-oriented; lacks forethought and planning
Stress Immunity (11 items)	Experiences minimal anxiety

A handful of studies have examined the ability of the PPI to identify psychopathic subtypes. Ray, Poythress, Weir, and Rickelm (2009) administered the PPI Fearless Dominance and Impulsive Antisociality[4] scales to 92 offenders. These factors differentiated between these two groups in the expected theoretical directions. In addition, Lee and Salekin (2010) administered the Psychopathic Personality Inventory – Short Form (Lilienfeld, 1990 as cited in Lilienfeld & Hess, 2001) to male and female undergraduates. Two distinct groups mirroring primary and secondary conceptualizations emerged. Given these findings, we expected that the PPI would distinguish between theoretically relevant psychopathy subtypes among individuals diagnosed with ASPD.

The current study

Our goals for the present research were to examine (a) the utility of the PPI subscales in classifying offenders from the Poythress, Edens, et al. (2010) study into the four subtypes identified in their cluster analysis and (b) whether a PPI-based classification system would be useful in classifying other offenders, particularly offenders at risk for adjustment difficulties in correctional settings. In regards to (a), in Study 1 we hypothesized that discriminant function analysis (DFA) could classify PPI subscale scores into four subgroups that correspond closely to the clusters found by Poythress and colleagues (see Fig. 1). In addition, we compared these PPI-derived subgroups to examine how they differ on an array of criterion variables. In regards to (b), in Study 2 we applied the PPI-based DFA predictive algorithm to a new sample of 131 prison inmates (described by Edens et al., 2008) to investigate the extent to which those groups differ in institutional adjustment. Based on the theoretical and empirical literature, we predicted that those identified as secondary psychopaths would experience the greatest difficulty adjusting to confinement and be most likely to behave aggressively, whereas non-psychopathic offenders would be the least likely to exhibit disciplinary problems while incarcerated.

Method: Study 1

Participants

Male participants ($N = 1{,}413$) were recruited from multiple state prison systems and court mandated drug treatment facilities across the United States as part of a larger study of psychopathy and criminality (see Poythress, Edens, et al., 2010, for complete methodological details). Participants were eligible for participation if they were men of Caucasian or African American descent, not currently taking psychotropic medications, either newly incarcerated or nearing release, and obtained an IQ above 70 on a standardized intelligence assessment (Ammons & Ammons, 1962). Only participants meeting DSM-IV-TR criteria for ASPD ($n = 691$) were included in the cluster analyses reported by Poythress, Edens, et al. (2010). A small subset of the participants they included in their results failed to complete the PPI in its entirety, yielding a final sample of 679 for the present analyses. The average age of the sample was 30.87 years ($SD = 6.63$) and approximately 27% of individuals self-identified as African American.

Measures

Classification variables

Psychopathic Personality Inventory. The PPI (Lilienfeld & Andrews, 1996) was described earlier in the Introduction. Extensive research on its psychometric properties has been reported in the literature since its initial publication (see Lilienfeld & Widows, 2005; Marcus, Fulton, & Edens, 2012; Poythress, Lilienfeld, Skeem, Douglas, Edens, Epstein, & Patrick, 2010).

Criterion measures/external validation variables

Poythress, Edens, et al. (2010) examined cluster differences on an array of criterion measures (see Introduction), focusing primarily on predicted differences between their hypothesized primary and secondary subtypes. We report similar analyses[5] focused on primary and secondary subgroup differences, although for ease of comparison and brevity we restrict our selection of criterion measures to those of greatest practical importance and relevance to forensic and criminal justice professionals.

Personality Assessment Inventory. The Personality Assessment Inventory (PAI; Morey, 1991/2007) is a multi-scale, self-report instrument designed to assess clinically relevant personality and psychopathology constructs. Given that research has demonstrated significant associations between psychopathy and internalizing and externalizing psychopathology (Blonigen et al., 2010; Kimonis et al., 2010), the broadband dimensions of Internalization and Externalization were calculated using the PAI (see Ruiz & Edens, 2008). These dimensions were used in criterion-related analyses. Poythress, Edens, et al. (2010) hypothesized that secondary psychopaths would be more likely to exhibit internalizing symptoms than primary psychopaths, given the former group's tendencies towards irritability, dissatisfaction, and other indicators of negative affect. Similarly, Poythress et al. predicted that, although individuals meeting ASPD criteria would (by definition) be expected to manifest some externalizing behavior, externalizing problems would be more pronounced in the secondary psychopathic subgroup. Both of these predictions were born out in their analyses. We investigated these hypothesized subtype differences using our PPI-defined groups in the present study.

In terms of other theoretically important constructs assessed by the PAI, Poythress, Edens, et al. (2010) also examined the Dominance (DOM) scale, which measures interpersonal forcefulness and assertion. Primary psychopaths are typically presumed to be more interpersonally dominant than secondary psychopaths—although this hypothesis was not born out in the analyses reported by Poythress et al. Nevertheless, we investigated whether PPI-defined primary and secondary psychopaths would differ on this interpersonal dimension.

Barratt Impulsiveness Scale – version 11. Participants were administered the Barratt Impulsiveness Scale – version 11 (BIS-11; Stanford & Barratt, 1995), which is a widely researched self-report measure of impulsivity. The construct validity of the BIS-11 has been supported in numerous studies (e.g., Ruiz, Skeem, Poythress, Douglas, & Lilienfeld, 2010). Poythress, Edens, et al. (2010) predicted that secondary psychopaths would be particularly impulsive relative to primary psychopaths, with the latter group generally being considered more planful and deliberate. Modest support for this hypothesis emerged in their results, with a statistically significant albeit small (Cohen's $d = .22$) difference detected across secondary and primary groups.

Treatment outcome. Subjective ratings of treatment behavior, treatment motivation, and treatment progress were collected for a subset of participants involved in court-mandated drug treatment. Sources of information included a review of the participant's current treatment records as well as a post-discharge interview with his primary counselor. Using a Likert-scale format, counselors rated the frequency with which a participant obtained unexcused absences from treatment sessions and/or displayed disruptive behaviors during treatment sessions. Counselors also dichotomously rated participant motivation, progress, and end of treatment status. Finally, the PAI Treatment Rejection scale (RXR, $\alpha = .69$) was utilized to provide a less subjective measure of participant motivation; higher scores on the RXR reflect less motivation for change.

Poythress, Edens, et al. (2010) hypothesized that secondary psychopaths might perform better in treatment, based primarily on theories (e.g., Karpman, 1948) positing that adverse environmental experiences (as opposed to largely stable and perhaps unmalleable constitutional deficits) lie at the root of their pathology. Only modest support was found for this prediction, with the secondary cluster demonstrating fewer unexcused absences and higher treatment motivation. They did not differ from primary psychopaths on treatment outcome ratings or recidivism rates post-treatment.

Criminal recidivism and institutional infractions. Indices of institutional infractions and criminal recidivism were used as measures of criterion-related validity for subsets of participants. Institutional infractions were collected using prison disciplinary reports for a one-year period following admission for newly incarcerated inmates. Consistent with procedures used by Edens, Poythress, and Lilienfeld (1999), infractions were coded into one of three categories: Physical Aggression (e.g. "Assault or battery with a deadly weapon," "Fighting"), Verbal Aggression/Acts of Defiance (e.g., "Spoken or written threats," "Disobeying an order"), or Non-aggressive acts (e.g., "Possession of contraband," "Unauthorized"). Because, the base rate of physical aggression was exceedingly low, this variable was combined with verbal aggression/acts of defiance into a single category.

In addition, arrest records for one year post study completion were obtained for prison inmates who were released into the community following completion of the study as well as for participants completing the drug-treatment program ($n = 477$). This variable was coded dichotomously to indicate if participants were arrested for any kind of offense or for any type of violent offense—although violent recidivism was rare in this sample.

Poythress, Edens, et al. (2010) hypothesized that secondary psychopaths would be more prone to engage in institutional misconduct and community recidivism than primary psychopaths. There was some support for this prediction, with secondary psychopaths being somewhat more likely to engage in general and aggressive infractions than primary psychopaths. The groups did not differ in regards to community recidivism rates, however.

Results: Study 1

Classification accuracy

To examine the ability of the PPI to determine ASPD/psychopathic subtype group membership, a step-wise DFA was conducted with the eight PPI subscales as predictor variables. All analyses were conducted using SPSS version 20.00. Six of the eight PPI subscales significantly discriminated between clusters (χ^2 ($df = 18$) $= 192.80$, $p < .001$, Wilks' $\lambda = .75$, $N = 679$), with Social Potency and Coldheartedness failing to contribute independently to the discriminant function. Although the six remaining scales contributed to the DFA, in total they correctly classified only 43.7% of the participants across the four original clusters. Given concerns that step-wise models are associated with high Type I error rates, we employed the "leave-one-out" cross-validation method (also known as the U method), in which each case in the analysis is classified by the functions derived from all cases other than that case. This resulted in a very modest decrement in predictive accuracy overall (42.1%). The "non-psychopathic ASPD" group achieved the highest overall classification accuracy, whereas the "secondary psychopathy" cluster achieved the lowest overall accuracy (see Table 2). Fig. 2 displays mean group differences on all the PPI subscales across the four predicted groups based on the cross-validation classifications. As can be seen, the greatest degree of subgroup discrimination was evident on the Fearlessness, Blame Externalization and Impulsive Nonconformity subscales.

Table 2
Cross-Validated classification accuracy of the PPI DFA algorithm to predict subgroup membership from the original Poythress, Edens, et al. (2010) cluster analytic findings

Original Cluster		Predicted Group Membership			
		Secondary	Fearful	ASPD	Primary
	n	99	251	203	126
Secondary	153	*26.8%*	25.5%	28.1%	19.6%
Fearful	190	14.2%	*44.7%*	31.1%	10.0%
Non-psychopathic ASPD	195	6.2%	26.2%	*54.4%*	13.3%
Primary	141	12.8%	19.1%	29.1%	*39.0%*

Criterion-related validity

Even though our DFA results did not lead to a particularly high level of classification accuracy, examining whether the PPI-based subgroups differed from each other in theoretically and practically important ways is worthy of further investigation. Poythress, Edens, et al. (2010) compared their clusters on a number of criterion measures, focusing on predicted differences between the primary and secondary subtypes. We report similar analyses focused primarily on PPI-based primary and secondary subgroup differences. If these subtypes differ on non-PPI variables in theoretically meaningful ways, it would suggest that these subgroups might have some degree of practical significance and warrant further investigation.

In regards to subgroup differences on self-report measures of psychopathology and personality, a series of *t*-tests revealed significant differences between primary and secondary subtypes on PAI internalizing symptoms, $t(223) = 8.02$, $p < .001$, PAI externalizing symptoms, $t(223) = 2.03$, $p < .05$, BIS-11 impulsivity scores, $t(223) = 4.16$, $p < .001$, and PAI dominance scores, $t(223) = -7.81$, $p < .001$. Subgroup differences were mostly in accordance with predictions, with the secondary group scoring higher than the primary group for PAI internalizing symptoms and BIS-11 impulsivity scores, and lower than the primary group on and PAI Dominance scores (see Fig. 3). On PAI externalizing symptoms, however, the differences were unexpectedly in the opposite direction (i.e., the primary group scoring higher) from what was reported in the original cluster comparisons (Poythress, Edens, et al., 2010). The PAI Dominance score

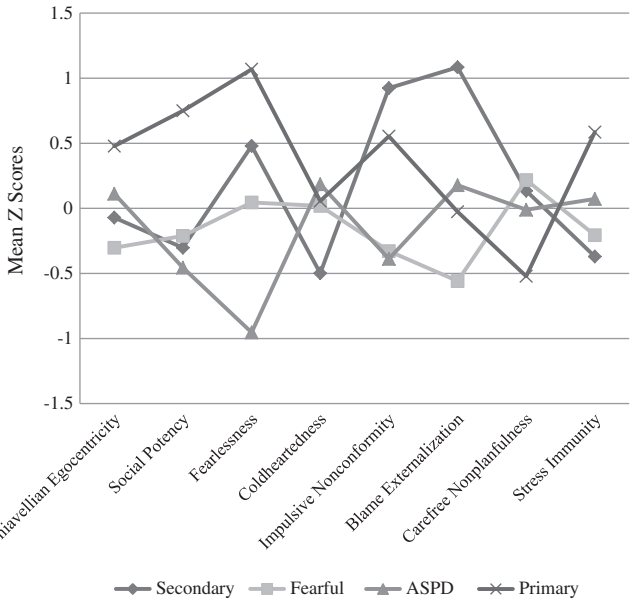

Fig. 2. Subgroup Z Score Differences on Psychopathic Personality Inventory Subscales.

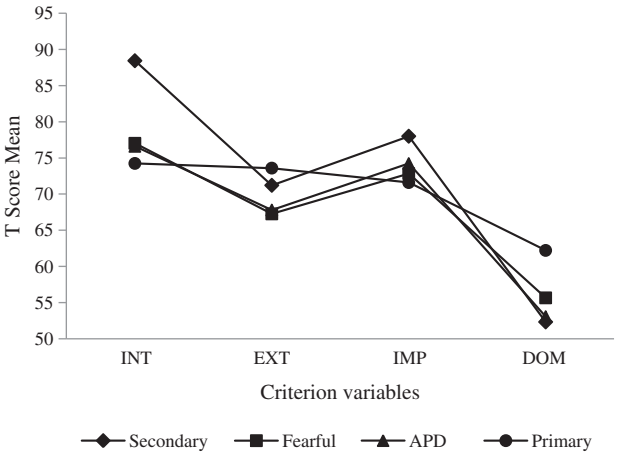

Fig. 3. Group differences on PAI Internalizing, Externalizing, and Dominance *T* scores and the BIS-II Impulsivity scale. INT = internalizing disorders; EXT = externalizing disorders; IMP = BIS-11 impulsivity score; DOM = PAI Dominance scale score.

group differences observed in this study also differ from those reported by Poythress et al. in that—unlike our PPI-based classifications—primary and secondary clusters did *not* differ significantly on interpersonal dominance in their analyses.

In relation to treatment variables, none of the planned comparisons across the primary and secondary subgroups for clinician ratings of treatment involvement (i.e., unexcused absences, disruptive in group) was statistically significant. In regards to self-reported motivation, however, the secondary subgroup reported significantly lower PAI RXR *T* scores than did the primary subtype (34.24 [$sd = 8.28$] vs. 38.02 [$sd = 8.03$]), $t(223) = -3.78$, $p < .01$, indicating they reported greater motivation to change, which is in accord with expectations. In terms of treatment outcome variables, neither subgroup significantly differed on subjective (clinician rating) or objective (program steps completed) indicators. Despite these negative findings, there was a difference in one-year recidivism rates among those in treatment: counter to our hypotheses, the primary subgroup was significantly *more* likely to reoffend (67.7%) than the secondary subtype (30.0%), $\chi^2(n = 61) = 8.69$, $p < .01$.

Regarding institutional adjustment variables, subgroup comparisons for all infraction categories were non-significant. As noted earlier, these analyses were based on much smaller subsets of participants due to the original sampling procedure employed by Poythress, Edens, et al. (2010), which included numerous prisoners who were near their release dates. Analyses of recidivism results for any subsequent arrest over a one-year follow-up indicated higher rates for primary (52.3%) than secondary (37.1%) subgroups, with this difference of marginal significance: $\chi^2(n = 156) = 3.59$, $p = .06$. Note, however, that this difference runs counter to prediction in that the primary group was at greater risk for general recidivism. Subgroup differences in violent recidivism were not significant, though the base rate was low overall (i.e., 5.7% for primary psychopaths vs. 5.8% for secondary psychopaths).

Method: Study 2

The purpose of Study 1 was to replicate subtypes of offenders identified by Poythress, Edens, et al. (2010) with a self-report measure not used in the derivation of the original clusters. In Study 2, we used an independent dataset to evaluate the utility of this classification system for identifying offenders at heightened risk for institutional misconduct.

This new sample consisted of 131 male prison inmates who had completed the PPI as part of an earlier validation study (see Edens,

Poythress, Lilienfeld, Patrick, & Test, 2008, for complete details). Participants were derived from three samples of male offenders incarcerated within the Florida Department of Corrections (FDOC). Two of these samples came from two earlier concurrent/postdictive validity studies on the PPI (Edens, Poythress, & Lilienfeld, 1998; Sandoval, Hancock, Poythress, Edens, & Lilienfeld, 2000). The participants included in the current report were from the original studies who subsequently received prison sentences and were incarcerated in FDOC ($n = 47$). The third sample was composed of 84 prison inmates described in Study 2 of Patrick et al. (2006), which examined the relationship between PPI factor scores and infractions committed during the first year of incarceration (i.e., postdictive analyses of criterion-related validity). In terms of the demographics of the combined three samples, ($N = 131$), the mean age was 33.70 ($SD = 8.50$) and self-reported ethnicity was primarily African American (54%) and Caucasian (36%). There were no significant site differences on demographic variables.

The total number of recorded infractions during the follow-up period was used as one outcome index. The total number of physically and verbally aggressive infractions committed during this period was tallied as well, using a classification scheme developed by Edens et al. (1999) in consultation with FDOC staff that was identical to the procedure employed in Study 1. For all outcome measures, the modal number of institutional infractions committed was zero, so these values were dichotomized as zero ("no infractions") or one ("one or more infractions"). The base rate in the general or *any* infraction category was 44%. Base rates for *aggressive* and *non-aggressive* infractions were both 34%. The mean length of follow-up was 2.26 years ($SD =$ 1.64; range = 2.5 months to 5.49 years).

Results: Study 2

The PPI-based DFA developed in Study 1 was applied to the PPI subscale scores for the 131 prison inmates from the Edens et al. (2008) study. This procedure resulted in the following rates of classification for these inmates: Secondary = 27%, Fearful = 35%, ASPD only = 23% and Primary = 15%.

Next, we compared these subgroups on prospective disciplinary records. The groups differed significantly on whether participants received any disciplinary infractions, $\chi^2(3, n = 131) = 9.94$, $p < .05$. As expected, individuals in the non-psychopathic ASPD cluster were the least likely to receive a disciplinary report (see Table 3), with a rate well below both the secondary and primary psychopathy subgroups. Individuals in the secondary psychopathy cluster were the most likely to receive a disciplinary infraction, although their overall rate was similar to, and did not significantly differ from, the primary group.

We next examined group differences in relation to aggressive infractions. This comparison was also significant, $\chi^2(3, n = 131) = 9.67$, $p < .05$. Again, individuals in the secondary psychopathy group were most likely to commit an aggressive infraction whereas individuals in the non-psychopathy ASPD group were least likely to do so (Table 3). As can be seen, although overall rates of any form of misconduct were similar for the primary and secondary subgroups, the secondary subgroup was more likely to engage in aggressive behavior.

Table 3
Predictive accuracy of subgroup classifications in identifying inmates who engaged in disciplinary infractions

Group Classification	*N*	Infraction Type	
		Any	Aggressive
		%	%
Secondary	35	60.0	54.3
Fearful	46	41.3	28.3
Non-psychopathic ASPD	30	23.3	20.0
Primary	20	55.0	34.4

General discussion

One common criticism of the DSM-IV-TR (American Psychiatric Association, 2000) conceptualization of ASPD is that it captures a heterogeneous group of individuals who share few characteristics apart from a history of deviant behavior. Given the breadth of chronically antisocial offenders, it is not surprising that a considerable amount of research has identified subtypes of such individuals who differ in theoretically and practically important ways. The purpose of this study was to extend previous subtyping research by Poythress, Edens, et al. (2010) by examining whether the subtypes they identified using cluster analyses of multiple interview and self-report scales could be replicated using a single self-report questionnaire, the PPI.

The present results suggest that six of the eight PPI subscales could be used to classify individuals into subgroups similar to the Poythress, Edens, et al. (2010) clusters with better than chance accuracy. What exactly do the PPI-based subgroups look like in regards to their relative subscale elevations? Beginning with the 'primary' subtype (Fig. 2), they are particularly egocentric and interpersonally forceful and fearless, relative to the other subtypes. They also obtained the lowest scores on the Carefree Nonplanfulness subscale, reflecting the most deliberate and calculating approach to life. The secondary subgroup, in contrast, appears disproportionately prone to blame externalization relative to the other clusters and relatively less egocentric and fearless relative to the primary subgroup in particular. Non-psychopathic ASPD participants tended to report lower scores on most PPI subscales, including those assessing egocentricity, nonconformity, and blame externalization. "Fearful" psychopaths, not surprisingly, scored lower on the Fearlessness subscale than did the primary and secondary subtypes, but otherwise produced profiles that were not notably different from the secondary subgroup.

To address the external validity of our PPI-defined subtypes, we examined whether our identified subgroups differed in relation to several criterion measures. Several of our findings (e.g., on internalizing psychopathology and on impulsivity) (a) are consistent with extant theory and (b) correspond to subgroup differences identified in the Poythress et al. clusters. These findings suggest that, despite the relatively unimpressive rate of classification accuracy for the PPI-based approach relative to the original cluster analysis, the PPI-defined primary and secondary patterns show some of the same personality and behavioral characteristics evident in the Poythress et al. results, as well as in earlier cluster analyses (e.g., Hicks et al., 2004; Skeem et al., 2007).

Further supporting the utility of the PPI-based classification, our primary/secondary subgroup comparisons detected hypothesized group differences that were *not* evident in the Poythress, Edens, et al. (2010) findings, such as the primary subgroup demonstrating significantly higher scores on the interpersonal dominance dimension (DOM) tapped by the PAI. This subgroup difference is not surprising, given that the PPI subscales (Fearlessness and Social Potency) that differentiated between these subgroups correlate highly with DOM (e.g., Patrick et al., 2006).

There were other subgroup differences in our data that were not evident in the Poythress et al. subgroup analyses. Specifically, the trend for primary psychopaths to be *more* prone to recidivism in the community post-release than were members of the secondary subgroup. Additionally, primary psychopaths demonstrated higher scores on self-report measures of externalizing psychopathology than did participants in the secondary subgroup—a finding that was the opposite of what Poythress et al. reported. Collectively, it appears that the PPI-defined primary subtype is more prone to problematic, externalizing behaviors than the PPI-defined secondary subtype—although there was some evidence (Study 2) that the more reactive,

impulsive secondary subgroup may be more prone to misconduct while under institutional control (as predicted).

One of the more curious findings across our two studies was that our PPI-defined subtypes differed in predicted ways in their relative rates of institutional misconduct in Study 2 but not in Study 1. These findings are difficult to interpret; although our coding scheme for disciplinary infractions was similar across the different prison systems, it is possible, if not likely, that various jurisdictions employ different definitions and standards for reporting offender behavior. That is, the norms for what constitutes behavior worthy of being 'written up' for an infraction such as "lying to staff" or "assault on an inmate" may not be consistent across, for example, Oregon and Utah (two of the state prison systems participating in this research).[6] In contrast, the infraction data for Study 2 was derived from one prison system (Florida), which may have resulted in (relatively) greater uniformity in documenting inmate misconduct. These potential differences across Study 1 prison systems *may* have played a role in the nonsignificant differences between subgroups, although Poythress, Edens, et al. (2010) did detect modest differences in subgroup misconduct rates using the original cluster-analytic subtypes that were not evident in our PPI-defined subgroups.

Although three of the four clusters originally identified by Poythress, Edens, et al. (2010) have a clear basis in extant theory and research, the "Fearful" cluster was unanticipated. Post-hoc analyses by Poythress et al. suggested that this cluster may reflect a secondary variant of psychopathy proposed by Mealey (1995). It is possible that this subgroup is a statistical or methodological anomaly that is unlikely to replicate in independent samples. However, it is also possible that this cluster represents a conceptually meaningful subtype that differs from primary and secondary psychopathy in clinically important ways. Our current results do not inform this issue because DFA simply classifies data into pre-existing categories, and does not create new groups. As such, the present DFA analyses *assume* the existence of fearful psychopaths as a distinct category and attempts to identify them based on their PPI scores. That being said, it is intriguing that the fearful subgroup was the largest subgroup resulting from our DFA model, perhaps due to the fact that the Harm Avoidance scale—which best differentiated this subtype from the others in the original cluster analysis—is strongly related to the PPI Fearlessness subscale. Regardless of the reason for its identification, this relatively large subgroup clearly warrants replication and further investigation.

Although the PPI profiles in Fig. 2 make conceptual sense, it is worth reiterating that the overall rate of classification was modest at best (Table 2), with many individuals classified by the PPI subscales as falling into a different subtype than in the original cluster analysis. The clusters identified by Poythress, Edens, et al. (2010) were the best statistical fit for those data, but care should be taken not to reify group membership based on the previous cluster analysis (particularly for the fearful subtype), given that those groups almost certainly reflect fuzzy categories that are lacking in sharp boundaries. Although it may be a useful heuristic to think in terms of discrete groups or clusters of offenders (and some individuals exemplify the prototypical group member), there are also many 'close call' cases who are near or even on the boundaries of the continuous dimensions that separate the subgroups. As such, given that we used a different statistical technique (DFA) and, perhaps more important, a different assessment tool (the PPI) to classify participants, it is not entirely surprising that classification accuracy was not overwhelmingly consistent across these two subtyping approaches.

Related to the issue of classification accuracy is whether it ultimately makes sense conceptually to attempt to identify specific subtypes of offenders at all. The bulk of research conducted on the PPI, for example, has focused on dimensional (rather than categorical) analyses of the total score, subscale scores, and higher order factor scores (see, e.g., Marcus et al., 2012). It is noteworthy that our primary subtype in these data elevated the three PPI subscales (Social Potency, Fearlessness, and Stress Immunity) that load directly onto the Fearless Dominance dimension identified in earlier research studies (see Lilienfeld & Widows, 2005, for a review). The secondary subtype, in contrast to the primary subgroup, scored higher on three of the four subscales (Blame Externalization, Impulsive Nonconformity, and Carefree Nonplanfulness) that load onto the Impulsive Antisociality dimension. One could interpret this finding as suggesting that the group-level approach may simply serve as a means of forcing underlying dimensional variables into discrete categorical data. This then frames the issue as a focus on between-offender variability, whereas a dimensional approach would focus more so on within-offender variability. Over the years the field of psychiatry mostly has been dominated by the group-level approach (such as the DSM categorical models) whereas psychologists mostly have framed the study of personality, even dysfunctional personality, in dimensional terms (e.g., Walters, 2009). In the criminology field one sees similar approaches, such as Moffitt's (1993) developmental taxonomy representing a categorical approach and Gottfredson and Hirschi's (1990) low self-control model representing a dimensional perspective. Whether it is better to focus on between- or within-offender variability is a debate that goes well beyond the focus of this particular research, but in general we would suggest that these approaches are not mutually exclusive and both may have utility in different contexts to address certain issues. For example, categorical systems may be more user-friendly for non-mental health professionals (e.g., correctional staff) who tend to construe people as "types" more so than in dimensional terms.

In sum, the data from our study inform ongoing debates concerning the heterogeneity of the ASPD diagnosis and the classification of offenders into more conceptually and practically meaningful subgroups. Specifically, these results provide further evidence of distinguishable subgroups of ASPD, two of which seem to mirror historical conceptualizations of primary and secondary psychopathy. Our findings contribute to the theoretical literature concerning antisocial and psychopathic personality types and suggest that these subtypes differ in behavioral outcomes (e.g., institutional misconduct, recidivism) that are important to the criminal justice system. We believe these findings require considerable replication and extension before it would be appropriate to use this subtyping model to inform clinical and forensic decision-making, however, and we encourage other researchers to further investigate the utility of these PPI-defined subgroups in new and diverse samples.

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Notes

1. A number of structural models for the PCL-R have been proposed. Hare et al.'s (1991/2003) two-factor model outlines an affective/interpersonal dimension and antisocial behavior factor. Vitacco, Rogers, Neumann, Harrison, and Vincent's (2005) four-factor model retains the previous factors and also includes a criminality factor. Cooke and Michie's (2001) three-factor model outlines interpersonal, affective and lifestyle components of psychopathy and omits criminality as a core component. For the purposes of their cluster analysis Skeem et al. (2007) utilized the three-factor model.

2. Poythress et al. actually identified five clusters in their initial analyses, with one very small cluster (group 4) appearing to represent statistical outliers ($n = 14$). This cluster was not examined in later analyses.

3. Similarly, separate research has sought to replicate Poythress, Edens, et al. (2010) clusters using subscales from the Personality Assessment Inventory (see Magyar et al., in preparation, for complete findings).

4. Originally, the PPI-II was labeled "Impulsive Antisociality," however, this term was modified with the PPI-Revised and relabeled "Self-centered Impulsivity." Poythress, Edens, et al. (2010) used the PPI and, for this reason, we retain the original terminology.

5. Similar to Poythress et al., we did not correct for family-wise error rates because we were testing a priori predictions for certain subgroups where there was clear theoretical support for our hypotheses.

6. A similar argument could be made in relation to our treatment variables, which combined data from multiple treatment programs.

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