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Validation of the Psychopathic Personality Inventory on a Female Inmate Sample

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Abstract

This investigation evaluated the construct validity of the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996), a self-report measure designed to assess psychopathy. One hundred and two incarcerated females were administered the Kaufman Brief Intelligence Test (K-BIT), an oral alcohol and drug screening measure, a demographic interview, the Minnesota Multiphasic Personality Inventory-2 (MMPI-2), the Psychopathy Checklist-Revised (PCL-R), and the PPI. There were significant correlations among the PPI, MMPI-2 scales, and the PCL-R. In addition, the correlations between the PPI and the separate PCL-R factors were not significantly different from each other, indicating that the PPI is assessing both facets of the psychopathy construct to some extent. A high correlation between the PPI and the DSM-IV criteria, which assesses adult antisocial behaviors, revealed adequate concurrent validity. Nonsignificant or negligible correlations between the PPI and the MMPI-2 scales provided support for discriminant validity. The results are discussed with respect to the clinical and forensic utility of the PPI, the limitations of the study, and the need for further research.

Validation of the Psychopathic Personality Inventory on a Female Inmate Sample

Psychopathy is a personality construct of great importance, and is often the focus of forensic evaluations and decisions of potentially great impact. More specifically, psychopathy has been related to an increase in violent recidivism and poor treatment response (Hemphill, 1998; Meloy, 1988; Rogers, 2001; Salekin, Rogers, & Sewell, 1996). One particular area of interest is how the expression of psychopathy may differ by gender. Psychopathy research utilizing the Psychopathy Checklist-Revised (PCL-R; Hare, 1991) indicates that levels of psychopathy are lower among female than male samples. According to Hare (1991), differences among PCL-R scores obtained from women average 4 to 6 points less than males. Among prison samples, psychopaths make up approximately 15-25% of the male incarcerated population, but only 6-16% of the incarcerated female population (Meloy, 1988). Hamburger, Lilienfeld, and Hogben (1996) found that the construct of psychopathy for females manifested in the form of histrionic personality symptoms rather than the antisocial personality symptoms often expressed in men. However, this may be due to the gender bias associated with evaluating the features of these constructs (Vitale & Newman, 2001; Widiger, 1998).

The two factor conceptualization of psychopathy (Cleckley, 1976; Hare, 1991, 2003) involves both antisocial behavior (e.g., aggression) and dysfunctional emotional-interpersonal tendencies (e.g., lack of empathy and callousness). The first of the two factors has also been characterized as “aggressive narcissism,” defined by egocentricity, superficiality, deceitfulness, callousness, and a lack of remorse, empathy, or anxiety (Meloy, 1988).

The literature indicates that there may be a gender difference regarding the underlying factor structure of psychopathy. Salekin, Rogers, and Sewell (1997) explored the dimensions of

psychopathy in a sample of females. Their research indicated that the underlying components of psychopathy for female offenders differed from the underlying components in Hare's (1991, 2003) research with male offenders. Three of the PCL-R items (poor behavioral controls, lack of realistic goals, and impulsivity) loaded across both the behavioral and emotional-interpersonal dimensions of psychopathy (Salekin et al., 1997). In addition, individual factor loadings differed for male and female offenders. Two items loaded for male but not female offenders (i.e., failure to accept responsibility and revocation of conditional release); and two items loaded for female but not male offenders (i.e., promiscuous sexual behavior and criminal versatility).

The Psychopathy Checklist-Revised (PCL-R; Hare, 1991, 2003), which utilizes an interview and review of collateral information, is the most well established measure of psychopathy and includes the assessment of both the deviant behavior and emotional-interpersonal components of psychopathy. A drawback of the PCL-R is that it can take up to two hours to complete, necessitates review of case file information, and requires that the examiner have specialized training. These aspects make the PCL-R difficult to use in some settings and contribute to its potential misuse. Also, the PCL-R was originally developed and validated on male criminal prison samples, which makes its use with other non-prison samples less substantiated.

Factor analytic research of the PCL-R and the screening version of the instrument (PCL:SV, 1995) have not always produced results completely consistent with this two-factor model (Forth, Brown, Hart, & Hare, 1996; Kosson, Smith & Newman, 1990; Salekin et al., 1997). Cooke and Michie (2001) re-analyzed PCL-R normative data and argued that psychopathy could be viewed as a superordinate, higher-order construct with three correlated factors. Factor 1 was described as "Arrogant and Deceitful Interpersonal Style", Factor 2 as "Deficient Affective Experience", and Factor 3 as "Impulsive and Irresponsible Behavioral Style." Factors 1 and 2 correspond to

the emotional-interpersonal dimension and Factor 3 corresponds to the deviant behavior dimension. Lee and Hart (personal communication; APA convention, San Francisco) found support for this three-factor model utilizing an adult male offender sample, as did Jackson, Rogers, Neumann, and Lambert (2002) and Salekin et al. (1997). More recently a two-factor, four-facet hierarchical model of the PCL-R was reported in the 2nd edition of the PCL-R manual after conducting a large sample multigroup analysis (Bolt, Hare, Vitale, & Newman, 2004; Hare, 2003). In short, there is some dispute regarding the factor structure of the PCL-R. However, the highly intercorrelated factors displayed in all of the factor-models of the PCL-R indicate a general underlying dimension of psychopathy (Bolt et al., 2004).

There are self-report alternatives to the PCL-R. However, many of these measures tap only the deviant behavior dimension (Harpur, Hare, & Hakstian, 1989; Lilienfeld & Andrews, 1996). Moreover these measures tend to have low intercorrelations with each other, thereby indicating that they are assessing only parts of overlapping constructs of psychopathy (Hare, 1985; Hare & Cox, 1978; Lilienfeld, 1994; Widom & Newman, 1985).

Lilienfeld and Andrews (1996) developed the Psychopathic Personality Inventory (PPI) in an attempt to provide a self-report measure of psychopathy that taps both the emotional-interpersonal dimension and the deviant behavioral dimension. The PPI was developed to allow for the measurement of psychopathy in non-criminal populations. The development of the PPI and its preliminary validation studies showed promising convergent and discriminant validity in four undergraduate samples (Lilienfeld & Andrews, 1996). However, the evaluation of the PPI on criminal samples is necessary in order to fully evaluate the psychometric properties of the instrument; responses in criminal samples may be biased by the higher rates of institutionalization and substance use when compared with undergraduate samples (Lilienfeld &

Andrews, 1996). Moreover, evaluation of the PPI in female samples is important given the potential gender differences in the expression of psychopathy.

A review of the literature revealed research exploring PPI's psychometric properties. Poythress, Edens, and Lilienfeld (1998) assessed the validity of the PPI using 50 youthful offenders and found it to be highly correlated with the PCL-R Factor 1 (emotional-interpersonal dimension). Overall, their study found positive evidence for the convergent validity of the PPI. Total PPI scores were positively correlated with the PCL-R interview based measure of psychopathy. In other research, the PPI total scores correlated positively with self-report and observer measures of psychopathy (Lilienfeld & Andrews, 1996). Additional studies revealed support for the construct validity of the PPI in male correctional samples. The PPI, as expected, was negatively correlated with empathy, and positively correlated with aggression and Borderline Personality Disorder (Sandoval, Hancock, Poythress, Edens & Lilienfeld, 2000). In another study, construct validity was examined through the association of the PPI with pertinent scales of the Personality Assessment Inventory (PAI; Morey, 1991). As predicted, PPI correlations with the PAI scales were highest for the Antisocial Features (ANT) and Aggression (AGG) scales ($r_s = .68$ and $.57$, respectively; Edens, Poythress, & Watkins, 2001). A study exploring reliability and construct validity of the PPI using imprisoned females provided support for construct validity of the PPI. However, weaknesses were evidenced with regard to its internal structure (low associations among PPI subscales) and PPI total scores similar to that of undergraduate samples. The findings are potentially indicative of gender differences with regard to the expression of psychopathy (Chapman, Gremore, & Farmer, 2003). Benning, Patrick, Hicks, Blonigen and Krueger (2003) assessed the factor structure of the PPI and reported that the

PPI measures two domains of psychopathy, including emotional-interpersonal and social deviance facets. Their study found preliminary support for use in community samples.

The objective of the present investigation was to evaluate the validity of the PPI using a female inmate population. In the present study the construct validity of the PPI was evaluated by examining its correlation with conceptually similar measures of psychopathy, specifically the PCL-R. As noted above, there is some contention regarding whether a two-factor or three-factor structure is most appropriate for the PCL-R. Accordingly, analyses were conducted using both of these models. Because the PPI has been conceptualized as a broad-based measure of psychopathy, it was expected that PPI scores would be substantially and significantly correlated with overall scores on the PCL-R as well as with scores on the separate PCL-R factors (in both the two- and three-factor models). The PPI was expected to correlate more highly with the emotional-interpersonal aspects of the PCL-R (Factor 1 for the two-factor model, and Factors 1 and 2 for the three-factor model) than with the behavioral aspects of the PCL-R, because the PPI was developed to tap the personality aspect of psychopathy. In addition, it was expected that a positive and significant correlation would be evidenced between the PPI and two MMPI-2 scales (Psychopathic Deviate (Pd) and Antisocial Practices (ASP)). The ASP scale incorporates the attitudinal aspect of psychopathy that the Pd scale 4 does not, and tends to be more highly correlated with measures of psychopathy (Lilienfeld, 1996; Lilienfeld & Andrews, 1996). It was therefore expected that the PPI would be more strongly associated with the ASP scale. This scale has been referred to as an “empathy defect” scale (D. Nichols, personal communication, March, 1997).

Finer-grained analyses were also conducted using the two PPI factors uncovered by Benning et al. (2003). Based on their research, it was expected that the two PPI factors would

demonstrate different patterns of correlation with the criterion measures. More specifically, it was anticipated that the first PPI factor (PPI-I) would correlate more highly with the emotional-interpersonal factors of the PCL-R (Factor 1 for the two-factor model and Factor 1 and 2 for the three-factor model) than with the second PPI factor (PPI-II). Exploratory analyses were also conducted to examine both convergent and discriminant validity. Convergent validity was assessed by examining the associations between the PPI and DSM-IV criteria pertaining to antisocial adult behavior. Discriminant validity was explored by evaluating the correlations between the PPI total and factor scores, and MMPI-2 scales that tap constructs different from psychopathy (e.g., depression).

Method

Participants

Participants were 105 incarcerated females recruited from a women's detention facility in Southern California. The maximum security setting from which participants were recruited included inmates who had been booked and were awaiting trial or permanent placements throughout the jail, as well as those permanently placed in the maximum security unit. Crimes committed ranged from prostitution and petty theft to homicide and multiple homicides. This diversity of offenses by participants helped to assure a wide range of PCL-R scores.

Three participants were excluded from the sample due to having invalid PPI profiles ($n = 2$) or by having greater than 4% of the items missing on the PPI ($n = 1$) resulting in a final sample size of 102 inmates. Because validity cut-off scores for the PPI have not yet been determined, the method recommended by Lilienfeld (personal communication, December, 1998) was employed for examining validity of the scales. Assessment of validity profiles on the PPI

included plotting histograms of the Deviant Response (DR) and Variable Response Inconsistency Scale (VRIN) and removing outliers on the high end. Not all of the 102 cases were used in all of the analyses. Nine MMPI-2 profiles were excluded from statistical analyses that involved this test due to their being invalid, as defined by Greene's (1991) recommended sequential multiple step process for identifying exclusion criteria.¹ The recommended steps included assessing the number of omissions, consistency of item endorsement, accuracy of item endorsement, and traditional codetype interpretation.

Participants' ages ranged from 18 to 46 years, with a mean age of 31.28 years, $SD = 7.23$. Approximately 40.2% of the sample was Caucasian, 33.3% African-American, 13.7% Hispanic, 2% Asian, and the remaining 10.8% included either combinations of the above categories or categories not listed. Number of years of education ranged from 0 to 16, with a mean of 11.5 years, $SD = 2.3$. The mean IQ for the sample was 88.6, $SD = 12.9$ and ranged from 53 to 126. The participant with an IQ of 53 was later removed because this individual had an invalid MMPI-2 protocol. Participants had a mean of 2.3 children, ranging from 0 to 7, $SD = 1.83$.

Measures

Psychopathic Personality Inventory

The PPI was created and preliminarily validated on non-criminal samples (Lilienfeld & Andrews, 1996). Lilienfeld and Andrews (1996) stated that most self-report measures of psychopathy are only weakly related to the conceptualizations of psychopathy presented by Cleckley (1976) and Hare (1991). Since its development, the PPI has been the focus of validation studies utilizing male offenders (Edens et al., 2001; Poythress et al., 1998; and Sandoval et al., 2000), non-offenders (Benning et al., 2003), and one female incarcerated sample

(Chapman et al., 2003). The PPI has shown promise with regard to assessing psychopathy as a construct.

The Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996) is a 187-item self-report measure that purports to assess psychopathy as a personality construct. Items are rated on a 4-point scale (1 = false, 2 = mostly false, 3 = mostly true, 4 = true) and total scores are obtained by summing across items after reversing specified items. The test consists of eight factors or subscales. Factor 1, termed Machiavellian Egocentricity, is characterized by “looking out for one’s own interests before others” (Lilienfeld & Andrews, 1996, p. 500). Factor 2 is termed Social Potency, or the “ability to be charming and influence others” (p. 501). Factor 3, Coldheartedness, is the “propensity towards callousness, guiltlessness, and unsentimentality” (p. 501). Factor 4, Carefree Nonplanfulness, is the “nonplanning component of impulsivity” (p. 502). Factor 5, termed Fearlessness, is the “absence of anxiety and harm concerning eagerness to take risks” (p. 502). Factor 6, Blame Externalization, is the “tendency to view others as source of problems” (p. 502). Factor 7, Impulsive Nonconformity, is the “reckless lack of concern for social mores” (p. 502). Factor 8, Stress Immunity, is the “absence of marked reactions to otherwise anxiety provoking events” (p. 502).

Good internal consistency for the PPI was obtained in the development studies for the PPI (Lilienfeld & Andrews, 1996). Values of .90-.93 were reported in all four of the construct validation studies for the PPI’s total score. With regard to the individual subscales, internal consistency ranged from .70-.90 with 75% in the .80-.90 range. Good internal consistency has been replicated in some of the validation research with the PPI. Poythress et al. (1998) reported that internal consistency (Cronbach’s alpha) of the PPI total score to be .91, and the PPI subscales ranged from .91-.72. Similarly, internal consistency was good in two female samples.

Chapman et al. (2003) reported internal consistency to be .94, and in the current study .89 (Cronbach's alpha).

Minnesota Multiphasic Personality Inventory-2

The Pd clinical scale (Scale 4) and the 22-item Antisocial Practices Content Scale (ASP) from the Minnesota Multiphasic Personality Inventory-2 (Friedman, Lewak, Nichols & Webb, 2001) were used as the criterion measures of interest. Three items on the ASP are also contained on the Pd scale. Exploratory analyses were conducted with all of the scales on the MMPI-2 in order to evaluate discriminant validity of the psychopathy measures.

Psychopathy Checklist-Revised

The Psychopathy Checklist-Revised (PCL-R; Hare, 1991) contains 20 items and is scored on a 3-point scale. Interview data are always confirmed through historical case file information. Scores of 0 (does not apply), 1 (item does apply in some respects, but not sufficient to warrant a 2), and 2 (does apply), are assigned for the 20 items following the interview session (Hare, 1991). Total scores range from 0 to 40 and are viewed on a continuum; the higher the score, the more psychopathic. For research purposes, persons with scores of 30 or greater are considered psychopathic (Salekin et al., 1997).

In this research the PCL-R was analyzed using both a two- and three-factor model. For the two-factor model, Factor 1 consisted of eight items (nos. 1, 2, 4-8, 16) and Factor 2 consisted of 9 items (nos. 3, 9, 10, 12-15, 18, 19). Three items did not load on either Factors 1 or 2: Item 11, Promiscuous Sexual Behavior; Item 17, Many Short Term Marital Relationships; and Item 20, Criminal Versatility. These three items were used, however, for computing the total PCL-R score. For the three-factor model, Factor 1 consisted of four items (nos. 1, 2, 4, 5), as did Factor 2 (nos. 6, 7, 8, and 16) and Factor 3 consisted of five items (nos. 3, 9, 13, 14 and 15).

DSM-IV Antisocial Personality Disorder Criteria

For exploratory analyses, a list of the seven *Diagnostic and Statistical Manual (DSM-IV;* American Psychiatric Association, 1994) criteria for diagnosis of Antisocial Personality Disorder was created specifically for use in the current investigation. The seven criteria were viewed as an ordinal continuum, numbered from 1 to 7. The principal researcher scored each criterion as either 0 if not present, or 1 if present. Total scores ranged from 0 to 7. The presence or absence of criteria was based on information obtained from interview and case file data. The presence or absence of conduct disorder prior to age 15 was not studied. The authors were primarily interested in the adult antisocial behavior criteria for exploratory purposes. Benning et al. (2003) assessed both the child and adult aspects of antisocial behavior in their analyses. They constructed a structured telephone interview in which items were derived from the DSM-IV.

Other Measures

A brief demographics and drug and alcohol screening was administered orally by the research assistant. The interviewer assessed drug and alcohol use beginning with the most benign (i.e., caffeine, cigarettes) followed by alcohol and illicit substances. The interviewer obtained information such as age at first use, length of use, and ingestion route. The Kaufman Brief Intelligence Test (K-BIT; Kaufman & Kaufman, 1990) was given in order to obtain an estimate of intelligence. This is a quick measure of intelligence appropriate for people 4 to 90 years old, and has been shown to correlate well with scores earned on other intelligence tests (Kaufman & Kaufman, 1990). The K-BIT includes verbal and nonverbal subtests (similar to the Verbal/Performance components of the Wechsler tests) and renders an IQ Composite Score that covers the two areas of intelligence assessment (Kaufman & Kaufman, 1990).

Procedure

The Institutional Review Board at Alliant International University as well as the Committee for Research within the San Diego County Mental Health System approved research procedures. Participants were volunteers solicited by announcement over the intercom system within the jail. Participation criteria were explained to the volunteers by the principal researcher at the deputies' window or otherwise designated area. At that time, it was made clear that participation was voluntary, confidential, and void of any repercussions based on participation. Inmates were informed that they could obtain results by having them either made available through the jail or by mailing them to their home address.

After reading and signing consent forms regarding permission to participate in the study and have their files reviewed at the jail, participants were seated on a bench outside the psychiatric interview room. All written measures were clipped in the same order in a packet. Participants were administered the oral demographic questionnaire, followed by the Kaufman Brief Intelligence Test, and the paper and pencil PPI and MMPI-2 by a research assistant. At the same time, another participant was administered the PCL-R in a separate interview room. A research assistant was present and provided the second set of ratings for 41 of the interviews. Inmates were not allowed to converse with each other during the administration. On average, it took each inmate approximately 3 hours to complete the measures. Inmates then were escorted back to their detention areas and deputies returned with other inmates who were interested in participating in the study.

Exclusion criteria included inability to read or write English, inability to read at the 8th grade level, or experiencing withdrawal symptoms from illegal substances. Three participants were excluded based on these criteria. Reading adequacy was judged when participants

practiced reading MMPI-2 items aloud as well as by acceptable cognitive functioning (K-BIT) scores. For the purposes of this research, generally participants who scored 70 or above on the K-BIT, were able to read the MMPI-2 items aloud, and produced valid MMPI-2 profiles, were included in the analyses. However, the researchers included four participants who scored below the IQ cutoff in the analyses because they produced valid profiles on all of the measures, appeared to read at an adequate level, and participated at a level deemed acceptable by the researchers. Those participants who did not meet the above criteria, but who wanted to continue were allowed to do so but their data were not used. Withdrawal from illegal substances was assessed first by notification from the deputies before signing consents, as well as by physical signs of extreme fatigue or communication by the participant about detoxification. Inmates were given a candy bar at the completion of participation. Inmates were not informed of this prior to participation in order to avoid the potential for coercion.

The principal researcher received formal training in the administration and scoring of the PCL-R offered by Stephen Hart, Ph.D. Prior to this study, the principal researcher had participated as a PCL-R rater in other research.

Results

Reliability and Construct Validity of the Psychopathy Measures

Descriptive statistics, including reliability coefficients (Cronbach's alpha) are presented in Table 1. Internal consistency was good, considering scale length, and varied between $\alpha = .89$ (for the total PPI) and $\alpha = .57$ (for the nine-item PCL-R Factor 2). For the PCL-R (two factor model), intraclass coefficients were computed for all of the cases, $n = 41$, for which scores from a second coder were available. Intraclass correlation coefficients (agreement model) were

substantial for the overall scale, intraclass $r = .95$, and for the two factors separately; Factor 1, intraclass $r = .79$; Factor 2, intraclass $r = .86$.

Insert Table 1 about here

Construct Validity of the PPI

The construct validity of the PPI was examined by calculating Pearson correlations between the overall PPI and PCL-R scores, and between the overall PPI score and scores on the separate PCL-R factors in the two- and three-factor models. As expected, there was a large and significant correlation between the total PPI and the total PCL-R, $r = .58, p < .001$. In addition, as can be seen in Table 2, there were substantial and reliable correlations between the PPI and each of the PCL-R factors. The correlation between the PPI and separate PCL-R factors were relatively similar, $r_s = .48$ and $.56$, for the two-factor model and $r_s = .40, .42$, and $.46$, for the three-factor model. Hottelling's t for dependent samples was computed to test for the significance of the differences between these correlations and all other comparisons of correlations in this study (Rosenthal & Rosnow, 1991). For both the 2-factor and the 3-factor models, none of the correlations were significantly different from each other, all $p_s > .10$. This suggests that the PPI is measuring both the deviant behavior dimension and the emotional-interpersonal dimensions.

Insert Table 2 about here

The PCL-R factors were highly correlated, $r = .53$ for the two-factor model, and $r_s = .40 - .46$, for the three-factor model, indicating a considerable amount of overlapping variance. This raises the issue of the extent to which the similar correlations between the PPI and the separate PCL-R factors are due to this common variance among the PCL-R factors. To explore this issue total PPI scores were simultaneously regressed on the PCL-R factors (separately for the two- and three-factor models). In the two factor model the two PCL-R factors explained 37% of the variance in PPI total scores, $F(2, 99) = 28.19, p < .0001$. Inspection of the squared semi-partial correlation coefficients for each factor indicated that Factor 1 uniquely explained approximately 5% of the variance in the PPI total score, $p < .01$, and that Factor 2 uniquely explained 13% of the variance, $p < .0001$. The common variance resulted in partial correlations that were substantially smaller than the zero-order correlations, $r_s = .27$ and $.42$, for Factors 1 and 2 respectively. Although the Factor 1 correlation was reduced more than the Factor 2 correlation, the difference between these two partial correlations was not significant, $t(99) = 1.35, p > .10$.

The results were similar for the three-factor model. Together, the three factors explained 32.1% of the variance in PPI total scores, $F(3, 98) = 15.47, p < .0001$. Inspection of the squared semi-partial correlation coefficients for each factor indicated that Factor 1 uniquely explained approximately 3.5% of the variance in the PPI total score, $p < .05$, Factor 2 uniquely explained 3.1% of the variance, $p < .05$, and Factor 3 explained 9.2% of the variance, $p < .01$. As with the two-factor model, the partial correlation between each factor (Factor 1: $r = .22$; Factor 2, $r = .21$; Factor 3; $r = .35$) and the PPI was reduced when controlling for the other two factors. As with the two-factor model this reduction was less extreme for the third (deviant behavior) factor. However, the differences among the three partial correlations were not significant, all $ps > .10$.

Construct validity was also examined by examining the correlation between the PPI and the MMPI-2 Pd and ASP scales. As expected, in these analyses the PPI was significantly positively correlated with both the MMPI-2 Pd and ASP scales, $r = .23, p < .01$, and $r = .58, p < .0001$, respectively. The difference between these correlations was significant $t(99) = -2.63, p < .02$.

To explore the construct validity of the PPI in more detail, two PPI factors were computed and correlated with PCL-R scores (both the two- and three-factor models). Following Benning et al. (2003), two PPI factor scores were created by standardizing scores on the eight PPI subscales and then averaging scores for the PPI subscales that had loaded preferentially on each of their two orthogonal factors. Factor 1 (termed here Dominant Fearlessness) consisted of the Stress Immunity, Fearlessness, and Social Potency subscales; Factor 2 (termed here Impulsive Aggressiveness) consisted of the Machiavellian Egocentricity, Carefree Nonplanfulness, Impulsive Nonconformity, and Blame Externalization subscales. (The coldheartedness subscale did not load on either factor).

As expected and noted in Table 2, the PPI-I correlated more highly with the emotional-interpersonal PCL-R Factors (Factor 1 in the two-factor model and 1 and 2 in the three-factor model) than did PPI-II. In contrast, PPI-II correlated more highly with the deviant behavior factor (Factor 2 in the two-factor and Factor 3 in the three-factor model) than did PPI-I. However, the differences among these correlations were not significant, all $t_s < 1.75$. The correlation between the PPI factors I and II was not significant, $r = .21, p > .10$.

Most noteworthy are the differential correlations of the two PPI factors with the MMPI-2 scales. PPI-II correlated highly with both the Pd and ASP scales, $r_s = .37$ and $.60$; whereas the PPI-I correlations were non-significant, $r_s = -.05$ and $.19$. The difference between the

correlations was significant for both the Pd scale, $t(99) = 3.37, p < .0001$ and the ASP scale, $t(99) = 3.92, p < .0001$. Similarly, PPI-II correlated more strongly with the seven point DSM-IV criterion than did PPI-I (.48 vs. .32), although this difference was not significant, $t(99) = 1.44, p > .10$.

Convergent Validity of the PPI

Convergent validity was examined in two ways. First, for exploratory purposes, a Pearson correlation was calculated between PPI scores and the total number of DSM-IV criteria met. This coefficient was statistically significant, $r = .57, p < .0001$. In order to assess the validity of the PPI relative to other measures of psychopathy, correlations between the DSM-IV criteria and the PCL-R and MMPI-2 scales were also calculated. The correlations between the DSM-IV criteria and the MMPI-2 Pd, $r = .26$, and MMPI-2 ASP, $r = .39$, scales were significantly smaller than the PPI-DSM-IV correlation, $t(88) = 3.61, p < .001$ and $t(88) = 2.33, p < .05$, respectively. In contrast, the correlation between the DSM-IV criteria and total PCL-R score, $r = .76$, was significantly larger than the correlation between the DSM-IV criteria and PPI scores, $t(97) = 3.47, p < .001$. Using the DSM-IV as a criterion, the PCL-R correlated more highly with the DSM-IV criteria assessing adult antisocial behavior, than did the PPI.

Additionally, the presence or absence of meeting each criterion was correlated with the PPI using point-biserial correlations (see Table 3). To reduce the probability that the statistical significance of any one of these correlations was a function of cumulative Type I error, each correlation was evaluated for significance using an alpha of .01. These coefficients revealed statistically significant positive correlations between the PPI total score and the Deceitfulness, $r = .49$, Lack of Remorse, $r = .30$, Aggressiveness, $r = .33$, and Recklessness, $r = .28$, criteria.

Insert Table 3 about here

Convergent validity for the two PPI factors was examined. Similar to the Benning et al (2003) study, the PPI-I in this study correlated more highly with PCL-R Factor 1, $r = .38, p < .05$, than PCL-R Factor 2, and the PPI-II correlated more highly with PCL-R Factor 2, $r = .49, p < .05$, than PCL-R Factor 1. The differences between the correlations were not significant, but were in a direction consistent with convergent validity. The higher correlations for the PPI-II, $r = .37, .60, .48; ps < .05$, than PPI-I, with the Pd, ASP, and DSM-IV criteria provide some evidence for discriminant validity of the two PPI factors respectively.

The next set of post-hoc analyses examined the ability of the PPI to discriminate between distinct groups. In this investigation, participants were divided into two groups: psychopaths, $n = 14$, and non-psychopaths, $n = 88$. Classification into these two groups was accomplished using established cut-off scores on the PCL-R in which scores greater than 30 indicate the presence of psychopathy (Hare, 1991, 2003). In a logistic regression analysis using the PPI total as the predictor and group classification as the binary outcome, 87.25% of the cases were classified correctly, $\chi^2(1, N = 102) = 21.50, p < .0001$. Classification was more accurate for non-psychopaths (97% classified correctly) than psychopaths (29% classified correctly). However, because the distribution of the binary outcome was extremely unbalanced (i.e., > 80:20 split), the logistic model may not be very accurate. As an alternative, an ROC analysis was conducted. This analysis plots the cumulative hit rate (sensitivity) as a function of a cumulative correct rejection rate (specificity). The area under the curve was large, $.85, SE = .05, p < .00001$ and

significantly greater than .50 (chance identification). As a means of comparison, an identical analysis was carried out using the MMPI-2 Pd scale as a predictor. In this analysis the area under the curve, .63, $SE = .09$, $p > .16$ was not significantly different from chance identification.

Discriminant Validity

Correlations between the measures of psychopathy (PPI, PCL-R) and the MMPI-2 scales (see Table 4) were examined for exploratory purposes. The PPI and PCL-R total scores were not significantly correlated with Hypochondriasis (Hs), $rs = -.04, .06$; Hysteria (Hy), $rs = -.09, -.03$; Paranoia (Pa), $rs = .16, .04$; Psychasthenia (Pt), $rs = .07, .07$; and the Social Introversion (Si), $rs = -.18, .04$ scales, respectively. The PPI Total score correlated positively and significantly with the Masculinity-Femininity (Mf), $r = .38, p < .001$; the Schizophrenia (Sc), $r = .24, p < .05$; and the Hypomania (Ma), $r = .57, p < .01$ scales on the MMPI-2. The PCL-R also correlated positively and significantly with the following MMPI-2 scales: Masculinity-Femininity (Mf), $r = .27, p < .01$; Schizophrenia (Sc), $r = .26, p < .05$; and Hypomania (Ma), $r = .26, p < .05$. These data provide some evidence for the discriminant validity of the PPI.

 Insert Table 4 about here

The correlations between the two PPI factors and the MMPI-2 subscales were also examined. The Dominant Fearlessness Factor (PPI-I) correlated negligibly with the Hypochondriasis (Hs), Hysteria (Hy), and the Psychopathic Deviate (Pd), $rs = -.14, -.06, -.05$, scales, respectively. The PPI-I correlated significantly and negligibly with the Depression (D), Paranoia (Pa), Psychasthenia (Pt), Social Isolation scales (Si), $rs = -.54, -.28, -.42, -.60$; $ps < .01$,

and with the Schizophrenia (Sc) scale, $r = -.23, p < .05$. The PPI-I correlated positively and significantly with the Masculinity-Femininity, $r = .25, p < .05$, and the Mania (Ma), $r = .31, p < .01$, MMPI-2 scales. The Impulsive Aggressiveness Factor (PPI-II) did not correlate significantly with the Hypochondriasis (Hs), $r = .06$, Depression (D), $r = .09$, Hysteria (Hy), $r = -.08$, and the Social Introversion (Si), $r = .19$, scales on the MMPI. The PPI-II correlated significantly and positively with the Masculinity-Femininity (Mf), $r = .23, p < .05$, Paranoia (Pa), Psychasthenia (Pt), Schizophrenia (Sc), Mania (Ma), and the Social Isolation (Si), $r_s = .42, .39, .47, .52, p_s < .01$, scales of the MMPI-2.

PPI and Demographic Variables

A total of 60 correlations were calculated between the PPI Total Scores and demographic variables. Only a few correlations reached statistical significance. Age was negatively related to PPI scores; the younger the participant, the higher the PPI scores, $r(100) = -.22, p < .05$. Other statistically significant relationships were found between the PPI Total score and duration of alcohol use, $r(100) = .22, p < .05$; amount of alcohol use, $r(100) = .24, p < .05$; nicotine use, $r(100) = .20, p < .05$; and duration of PCP use, $r(100) = .30, p < .01$. The higher the PPI Total score, the longer the individual used alcohol and PCP, the more alcohol they drank, and the more cigarettes they smoked. Additionally, no statistically significant differences were found among the PPI scores of ethnic groups, $F(4, 97) = .33, ns$.

Discussion

The purpose of this research was to explore the validity of the PPI with a sample of incarcerated women. It is important for measures of psychopathy to be studied in both male and female samples, as psychopathy may be expressed differently depending on gender (Hamburger et al., 1996; Vitale & Newman, 2001). To date, most investigations of the psychometric properties of the PPI have been limited to males (Benning et al., 2003; Edens et al., 2001; Poythress et al., 1998; and Sandoval et al., 2000) with the exception of Chapman et al. (2003), which did use a female inmate sample.

Psychopathy is theoretically presumed to consist of a deviant, antisocial behavioral dimension and a dysfunctional, emotional-interpersonal dimension: components that are assessed with the PCL-R. One problem with self-report measures of psychopathy has been their tendency to tap the deviant behavioral dimension at the expense of the interpersonal-emotional dimension. In the present research the PPI correlated highly with both the behavioral and interpersonal dimensions as assessed by the PCL-R, although the former correlation was not significantly smaller than the latter.

Poythress et al. (1998), however, found a significant difference between PPI – PCL-R dimension correlations. Their results suggest that the variability in PPI total scores was mainly explained by the interpersonal dimension (i.e., PCL-R Factor 1 scores). When PCL-R Factor 1 scores were controlled, the correlation between the PPI total scores and PCL-R Factor 2 were nonsignificant. After controlling for Factor 2, the relationship between the PPI and PCL-R Factor 1 remained significant and was moderate in magnitude. It is important to note that the Poythress (1998) study included a smaller sample size, $N = 50$, of males, and was limited to adolescent or young adult offenders. Thus, these findings may not be relevant to the sample used in the current study.

The possibility of potential gender differences in the measurement of psychopathy is an important issue. In the present study the reliabilities of PCL-R's Factor 1 and Factor 2, .78 and .57, respectively, were lower than what is usually found among men, .84, .77, respectively (Hare, 1991). In a construct validation study of psychopathy in females (Salekin et al., 1997), the two-factor PCL-R model for psychopathy differed for women. In fact, some of the items that lowered the reliability did not load as part of the factor structure in the review of the two-factor structure (Salekin et al., 1997). This overall pattern found within the current study provides further evidence that, among women, the psychometric properties of measures of psychopathy may not replicate those obtained with men. Calculated correlations between PPI Total scores and demographic variables suggest that PPI scores are relatively independent of sociodemographic and ethnic differences. However, age had a small negative association with PPI scores: the higher the PPI score, the younger the participant. Those with higher scores on the PPI used alcohol for a longer period of time, used significantly more alcohol, smoked cigarettes, and used PCP for significantly longer periods of time.

Recent research by Benning et al. (2003) suggests that the PPI measures two relatively orthogonal factors. There was some support for that conceptualization in the present research as the two PPI factors did not correlate significantly with each other. However, the results also suggest that the two PCL-R factors are not identical to the two PPI factors identified by Benning et al. (2003). PPI-II, for example, does tap the deviant antisocial behavior that is the core of the second PCL-R factor. Moreover, PPI-II also includes an interpersonal component (Machiavellian egocentricity) that would tend to be picked up by the first PCL-R factor. In part, this illustrates the difficulty in cleanly separating the behavioral and emotional/interpersonal facets of psychopathy; (i.e., there are behavioral manifestations of the interpersonal/affective

component of psychopathy). The most striking difference between the two PPI factors occurred with the MMPI-2 measures. The MMPI-2 Pd and ASP scales correlated substantially with the PPI-II (impulsive aggressiveness) scale, but not at all with PPI-I, providing some evidence for discriminant validity between the measures, and incremental validity of the PPI beyond the data gathered by the MMPI-2.

Discriminant validity for the psychopathy measures (PPI and PCL-R) was explored by examining their relationship with the MMPI-2 scales. Nonsignificant or negligible correlations were evidenced for both psychopathy measures with MMPI-2 scales that tap theoretically different constructs (i.e., Hypochondriasis, Depression, Hysteria, Paranoia, Psychasthenia, and Social Introversion). Both measures of psychopathy rendered similar patterns of correlations with these different constructs, providing evidence for discriminant validity. Edens et al. (2001) also found support for discriminant validity of the PPI. Similarly, they found negligible correlations with scales on the PAI (Morey, 1991) including one that measures depression.

Both measures of psychopathy in this study correlated positively and significantly with the scales measuring Masculinity-Feminity, Schizophrenia, and Hypomania. This is of particular interest with regard to the potential gender differences and the expression of psychopathy. High scoring females on these three MMPI-2 scales are seen as aggressive, competitive, dominating, adventurous, cold, apathetic; as having difficulties with thinking and communication, expansive and unstable mood, flight of ideas, and psychomotor excitement (Greene, 1991). In addition, both of the PPI factors correlated positively with the scales measuring Masculinity-Femininity and Hypomania. The results suggest that females in this sample are either expressing the traits tapped by these MMPI-2 scales, or that there may be a gender bias with regard to the assessment of psychopathy in females (Widiger, 1998).

Exploratory analyses provided evidence for the convergent validity of the PPI. The PPI was positively associated with the total number of DSM-IV criteria assessing adult antisocial behaviors indicating that the higher the PPI scores, the more individuals in the sample met DSM-IV criteria. In particular, the higher their PPI scores, the more likely the female inmates met the criteria for deceitfulness, aggressiveness, lack of remorse, recklessness, irresponsibility, and impulsivity. Interestingly, the correlation between the PPI and DSM-IV criteria was significantly larger than the correlation between the DSM-IV criteria and either MMPI-2 scales. These measures of comparison are not measures of psychopathy, but rather, adult antisocial behavior. Due to the overlap between the constructs, interpretation of the findings may reflect positively on the PPI's convergent validity rather than poorly on PPI's discriminant validity. However, the results may be explained in either direction. In this study, the results indicate that the PPI is tapping the traits defined for adult antisocial behavior more so than those assessed by the Pd and ASP scales. Moreover, the PCL-R total score was more highly correlated with the DSM-IV criteria for adult antisocial behavior than the PPI. However, because both the DSM-IV and the PCL-R in part utilize similar methods, method covariance may have artificially inflated the relationship.

Evidence for the utility of the PPI was also obtained. The PPI was effective in discriminating between psychopaths and non-psychopaths; approximately 87% of the sample of female inmates was correctly classified. Moreover, an ROC analysis which is independent of base rates indicated that this identification rate was significantly better than chance. Similar classification results were reported by Poythress et al. (1998) in their study of 50 young adult incarcerated males. Using discriminant function analysis they reported an overall classification accuracy rate of 86%. Hence, there is some evidence for the diagnostic utility of the PPI.

However, in the present study the sensitivity or detection rate for psychopathy (28.6%) was smaller than the specificity rate (96.6%), or ability to correctly classify as non-psychopathic. A similar trend was reported by Poythress et al. (1998). Although both these studies can be criticized for using a small sample of psychopaths, such small samples are common in this type of research. To cite a recent example, Salekin et al. (1997) had only a 16% prevalence rate of psychopathy in a sample of 103 females, and that was when these authors used a lower PCL-R cutoff score ≥ 29 than was used in this study. The rate is also consistent with what appears to be the case in real world incarceration settings. Thus, given the findings from the Poythress et al. study and the current study, the PPI appears to be better at ruling out rather than detecting psychopathy.

The findings from the current study do indicate that the PPI may be a useful measure of psychopathy, particularly if used in concert with other indices. This is consistent with the authors' intent that a self-report measure of psychopathy should be used with other measures, such as life history or interview data (Lilienfeld & Andrews, 1996). One of the test developers' bases for developing a personality-based instrument was to measure psychopathy in non-incarcerated samples due to the fact that psychopathic traits are known to exist in noncriminal populations. However, those who possess psychopathic traits and do not exhibit the antisocial behavioral component are not likely to meet the criteria for psychopathy using established measures such as the PCL-R. A self-report measure that includes non-behavioral components of psychopathy may still prove useful in non-criminal populations. The potential usefulness of the PPI is that, according to the data collected in the current study, it is the first self-report measure that correlates moderately with the PCL-R's Factor 1, and is therefore tapping into more of the same aspects of the construct than any other available measure (e.g., MMPI-2 Pd scale).

Pending further research, the PPI would be useful in settings that require rapid assessment or diagnosis, such as receiving units in correctional facilities. The PPI would also be useful if the clinician wanted a glimpse into whether psychopathic traits or further measurement of psychopathy (i.e., PCL-R) are indicated. The current study suggests that high scores among females on the PPI are associated with the person being self-centered and narcissistic, lacking concern for others, and being more willing to engage in risky behaviors. However, important diagnostic or treatment decisions should not be based on a measure that has not been adequately validated.

This study has its limitations. Although the level of intelligence in the present examination is representative of incarcerated samples, it is a potentially limiting factor. Also, additional validation research on the PPI should attempt to use larger samples in which there are more identifiable psychopaths (to allow for a more accurate assessment of the PPI's classification capabilities). A larger sample size would also assist in exploring the factorial validity of the PPI, which has not yet been examined in a forensic population. Future research in order to further assess the construct and incremental validity of the PPI would prove useful for examining further the PPI's clinical and forensic utility. In addition, a detailed item analysis of the PPI would warrant investigation. In sum, the PPI holds promise as a measure of psychopathy, but only additional research on this measure will help to clarify exactly how this measure should best be conceptualized and used.

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Footnotes

¹All analyses reported in this paper were also conducted with samples that included these nine participants. All results reported as significant in this paper remained significant in these analyses.

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Table 1

Descriptive Statistics on the Research Variables for 102 Incarcerated Females

Variable	Mean	<u>SD</u>	Min	Max	Alpha
PPI Total	381.59	40.29	266	495	.89
PCL-R Total	21.85	7.04	2	39.50	.77
PCL-R 2 factor model:					
PCL-R Factor 1	6.71	3.63	0	14	.78
PCL-R Factor 2	11.95	2.87	3.50	16.90	.57
PCL-R 3 factor model:					
PCL-R Factor 1	3.02	1.98	0	8	.67
PCL-R Factor 2	3.73	2.23	0	8	.78
PCL-R Factor 3	7.4	1.86	2	10	.62
MMPI-2 Pd	69.78	11.96	39	100	.64
MMPI-2 ASP	66.39	9.14	42	85	.67

Note. PPI = Psychopathic Personality Inventory. PCL-R = Psychopathy Checklist-Revised.

MMPI-2 = Minnesota Multiphasic Personality Inventory-2. Pd = Psychopathic Deviate clinical scale. ASP = Antisocial Practices content scale.

Table 2

PPI Factor and Total Correlations

	PPI Factor and Total		
	Factor 1	Factor 2	Total
	Dominant Fearlessness	Impulsive Aggressiveness	
PCL-R (two-factor model)			
Factor 1	.38*	.31*	.45**
Factor 2	.32*	.49*	.50**
PCL-R (three factor model)			
Factor 1	.36*	.22*	.40**
Factor 2	.28*	.30*	.42**
Factor 3	.19*	.46*	.46**
PCL-R Total	.41**	.43**	.58**
MMPI			
Pd	-.05	.37*	.23*
ASP	.19	.60*	.58**
DSM-IV	.32*	.48*	.57**

* $p < .05$. ** $p < .01$.

Table 3

Correlations between Psychopathic Personality Inventory (PPI) Total Scores and DSM-IV Diagnostic Criteria for Antisocial Personality Disorder

Variable	PPI Total
Total Number of Criteria Met	.57***
Failure to Conform ^a	.17
Deceitfulness ^a	.49***
Impulsivity ^a	.24*
Aggressiveness ^a	.33**
Recklessness ^a	.28**
Irresponsibility ^a	.24*
Lack of Remorse ^a	.30**

Note. N = 102. ^aThe presence of the criterion was scored as 1 and the absence of the criteria

was scored as 0. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4

Correlations between PPI Total, PCL-R Total Scores and the MMPI-2 Scales

	PPI-I	PPI-II	PPI Total	PCL-R Total
MMPI-2 Scales				
Hypochondriasis (Hs)	-.14	.06	-.04	.06
Depression (D)	-.54**	.09	-.25*	-.13
Hysteria (Hy)	-.06	-.08	-.09	-.03
Psychopathic Deviate (Pd)	-.05	.37**	.23*	.37**
Masculinity-Femininity (Mf)	.25*	.23*	.38**	.27**
Paranoia (Pa)	-.28**	.42**	.16	.04
Psychasthenia (Pt)	-.42**	.39**	.07	.07
Schizophrenia (Sc)	-.23*	.47**	.24*	.26*
Hypomania (Ma)	.31**	.52**	.57**	.26*
Social Introversion (Si)	-.60**	.19	-.18	.04

* $p < .05$. ** $p < .01$.