



Published in final edited form as:

*Assessment*. 2005 March ; 12(1): 3–18.

## Estimating Facets of Psychopathy From Normal Personality Traits: A Step Toward Community Epidemiological Investigations

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### Abstract

In three samples consisting of community and undergraduate men and women and incarcerated men, we examined the criterion validity of two distinct factors of psychopathy embodied in the Psychopathic Personality Inventory (PPI) as indexed by primary trait scales from the Multidimensional Personality Questionnaire (MPQ). Consistent with the PPI factors themselves, MPQ-estimated PPI-I related negatively with internalizing disorder symptoms and fearfulness and positively with thrill and adventure seeking, sociability, activity, and narcissism. MPQ-estimated PPI-II was associated negatively with socialization and positively with externalizing disorder symptoms, impulsivity, disinhibition and boredom susceptibility, and trait anxiety and negative emotionality. Additionally, PPI-I was selectively related to the interpersonal facet of Factor 1 of the Psychopathy Checklist—Revised (PCL-R), whereas PPI-II was related preferentially to Factor 2 of the PCL-R.

### Keywords

Psychopathic Personality Inventory; Multidimensional Personality Questionnaire; psychopathy; personality; self-report; construct validity

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Psychopathy is a personality disorder characterized by antisocial deviance in the context of interpersonal and emotional detachment. The study of psychopathy in community samples is an area of growing interest, but one that is limited by the fact that most large-scale epidemiological studies, which collect a wealth of data that could further elucidate the phenotypic correlates and etiologic mechanisms in psychopathy, do not typically include direct assessments of psychopathy and its facets. However, if facets of psychopathy could be predicted from other measures, such as broadband inventories of normal personality that are often administered in large-scale investigations, data from community epidemiological studies could be brought to bear on the study of psychopathy. Recently, we investigated the factor structure of the Psychopathic Personality Inventory (PPI; Lilienfeld & Andrews, 1996) and found evidence of two factors that seemed to measure aspects of the emotional-interpersonal and antisocial facets of psychopathy (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003). These two factors were predicted well by primary trait scores from an omnibus inventory of normal personality traits, the Multidimensional Personality Questionnaire (MPQ; Tellegen, in press), even though the PPI and MPQ were administered an average of 5 years apart. Here, we examined the criterion validity of PPI factor scores predicted from the MPQ by examining their relations with various diagnostic and personality measures in three different samples: community adolescent male and female twins, undergraduate men and women, and incarcerated men.

## Assessing Psychopathy in Nonincarcerated Samples: The PPI

The PPI was designed to provide a comprehensive assessment of the personality features of psychopathy (Lilienfeld, 1994; Lilienfeld & Andrews, 1996). Preliminary validation of the PPI subscales in terms of external correlates in undergraduate and incarcerated samples suggests that it assesses both the affective-interpersonal and behavioral dimensions of psychopathy that have dominated empirical research within forensic settings (Lilienfeld, 1994) like other, newer self-report scales of psychopathy (Brinkley, Schmitt, Smith, & Newman, 2001; Levenson, Kiehl, & Fitzpatrick, 1995; Lynam, Whiteside, & Jones, 1999). For example, PPI total scores are positively related to observers' global ratings of psychopathy as defined by Cleckley (1976) and self-report and interview measures of antisocial personality disorder and narcissism, and they are negatively related to self-reported fears and anxiety (Lilienfeld & Andrews, 1996). In offender samples, PPI total scores have been associated with Psychopathy Checklist—Revised (PCL-R) total and factor scores (particularly Factor 1 scores; Poythress, Edens, & Lilienfeld, 1998), self-reported borderline personality features and low empathy (Sandoval, Hancock, Poythress, Edens, & Lilienfeld, 2000), and self-reported antisocial, aggressive, and dominant personality features along with a variety of institutional disciplinary infractions (Edens, Poythress, & Watkins, 2001). This is in contrast to older self-report psychopathy measures such as the Psychopathic Deviate (Pd) scale of the Minnesota Multiphasic Personality Inventory (MMPI; McKinley & Hathaway, 1944) and the Socialization scale from the California Psychological Inventory (CPI; Gough, 1957), which relate primarily to the behavioral deviance facet (Factor 2) of the PCL-R (Hare, 1985; Lilienfeld, 1994).

Recently, we explored the factor structure of the PPI in a large community sample of men (Benning et al., 2003) and found two orthogonal factors. The first factor (PPI-I) was marked by social dominance, stress resiliency, and thrill seeking, and it correlated positively with measures of socioeconomic status (SES) and verbal IQ and was unrelated to child antisocial behavior and substance abuse, although it showed some association with adult antisocial deviance. The second factor (PPI-II) was marked by rebelliousness, impulsivity, aggression, and alienation, and it correlated negatively with SES and verbal IQ and was positively related to child antisocial deviance and substance abuse as well as adult antisociality. These external correlates parallel those previously reported for the interpersonal-emotional and antisocial deviance facets of psychopathy embodied in Hare's (2003) PCL-R (Harpur, Hare, & Hakstian, 1989; Patrick, 1994, 1995; Patrick, Zempolich, & Levenston, 1997; Verona, Patrick, & Joiner, 2001) suggesting the factors of the PPI each index constructs related to psychopathy.

However, the Benning et al. (2003) study was limited in the range of criterion variables that were available to validate the PPI factor scores and by the fact that the sample included only noninstitutionalized men. For example, it would be useful to have data on other personality measures that have been examined in relation to the PCL-R factors (e.g., narcissism, socialization, sensation seeking) as well as scores on the PCL-R factors themselves. Thus, one aim of the current study was to further assess the validity of the constructs underlying the PPI factors within other samples for which additional criterion measures were available.

## Estimating Psychopathy Scores From Normal Personality Traits

Some theorists have postulated that psychopathy can be described as a malevolent configuration of extremes on normal personality traits (Lilienfeld, 1994, 1998; Lykken, 1995; Widiger & Lynam, 1998; Patrick, 1994, 1995). In this view, psychopathy is defined by extensible constructs that are open to (and require) multiple operationalizations to be fully explicated (Cronbach & Meehl, 1955). The validity of these constructs is established through their relations with other constructs in a nomological network (Cronbach & Meehl, 1955). For example, Lykken (1995) emphasized the role of the construct of fearlessness in psychopathy,

thereby suggesting that a willingness to engage in physically risky activities is critical in understanding the deficits that individuals with psychopathy show in passive avoidance and fear-conditioning laboratory tasks. Widiger and Lynam (1998) additionally noted the centrality of low agreeableness in their studies of the disorder, and Miller, Lynam, Widiger, and Leukenfeld (2001) have conducted studies examining psychopathy using a personality profile based on the five-factor model of personality. Furthermore, Harpur et al. (1989) reported evidence that psychopathy was located within the arrogant-calculating octant of the interpersonal circumplex.

Other investigations have indicated that the two facets of psychopathy indexed by the PCL-R have distinct personality correlates. Patrick (1994) reported that the interpersonal-emotional detachment facet of psychopathy was associated with low-trait negative affect and high-trait positive affect, whereas its antisocial deviance factor was characterized by impulsivity and high-trait negative affect. Relatedly, Verona et al. (2001) found that in MPQ terms, interpersonal-emotional detachment was related to high social potency, high achievement, and low stress reaction, whereas antisocial deviance was related to high stress reaction, alienation, and aggression and low well-being, achievement, and control. These results accord well with other studies suggesting that the MPQ has prospective validity in predicting future antisocial disorders (Krueger, 1999a). Benning et al. (2003) reported a similar pattern of MPQ correlates for the two factors of the PPI. PPI-I was significantly predicted by high social potency and low stress reaction and harm avoidance. In contrast, PPI-II was significantly predicted by high alienation and aggression and low social closeness, control, and traditionalism. As noted earlier, multiple correlations for the prediction of PPI factor scores from MPQ trait scores were very high, comparable to the test-retest reliabilities of MPQ scales over a similar time lag (multiple  $R_s \geq .67$ ; test-retest reliabilities of MPQ higher order factor scores over the years range from  $.59-.67$ ; McGue, Bacon, & Lykken, 1993; Roberts, Caspi, & Moffitt, 2001). These results suggest that the subscales of the MPQ, and potentially other broadband personality inventories (e.g., MMPI; NEO-Personality Inventory—Revised [NEO-PI-R], Costa & McCrae, 1995; Temperament Character Inventory [TCI], Cloninger & Svrakic, 1994), might be used to index the constructs underlying the two PPI factors. This would open up exciting opportunities to investigate facets of psychopathy in existing, large-scale, community samples in which broadband personality data are available. In line with this, a second aim of the current study was to examine the criterion validity of the psychopathy factors as estimated from the primary trait scales of the MPQ.

## Current Research Questions

In a previous study employing a large sample of adult men from the community (Benning et al., 2003), we established a two-factor structure to the PPI, provided preliminary evidence of their external validity (which paralleled relations previously reported for the two factors of the PCL-R), and demonstrated that scores on the two PPI factors can be estimated using an omnibus inventory of normal personality—the MPQ. In the current study, we examined the validity of the constructs embodied in the PPI factors in three other samples: a community sample of young adults, an undergraduate sample from a large state university, and a sample of incarcerated men. Although study participants had not completed the PPI, all had completed the MPQ allowing us to predict PPI factor scores from the MPQ trait scales using regression equations derived from Benning et al. (2003). Estimated PPI factor scores were correlated with various criterion measures related to psychopathy, including interview and self-report measures of internalizing and externalizing disorders, and temperament and personality scales. The availability of a prisoner sample in which PCL-R scores were collected allowed us to investigate relations between MPQ-estimated factors of the PPI and factors of the PCL-R.

Our hypotheses were as follows:

- We predicted that MPQ-estimated PPI-I would be positively related to narcissistic personality features and thrill and adventure seeking and negatively related to indices of fears, anxiety, and distress. We also predicted that MPQ-estimated PPI-II would be positively related to antisocial behavior and substance use, boredom susceptibility and disinhibition, and indices of impulsivity and anger and negatively related to socialization.
- We predicted that men would have higher scores on both estimated PPI factors, but that estimated PPI factors would exhibit parallel relations with criterion variables across genders based on previous studies indicating that the structure of externalizing syndromes is similar in men and women, although the prevalence of such syndromes is higher in men than in women (Krueger et al., 2002).
- Based on the personality correlates of the two- and three-factor models (Hall, Benning, & Patrick, 2004; Verona et al., 2001), we hypothesized that estimated scores on PPI-I would be related selectively to Factor 1 of the PCL-R (and, in particular, to its Arrogant and Deceitful Interpersonal Style factor), whereas estimated scores on PPI-II would be associated preferentially with PCL-R Factor 2 (particularly, to its Impulsive and Irresponsible Behavioral Style factor).

## METHOD

The current report employed three participant samples: a representative community sample of young adults, a sample of undergraduates from a large state university, and a sample of male prison inmates. Individuals in all samples completed the MPQ, a broadband inventory of normal personality traits, consisting of 11 primary trait scales that aggregate into three higher order factors of Positive Emotionality, Negative Emotionality, and Behavioral Constraint. Scores on the two factors of the PPI were estimated from primary trait scores on the MPQ using regression equations with beta weights derived from an independent community sample ( $N = 353$  men, aged 30–33; see Benning et al., 2003, for details regarding recruitment and assessment).

It is important to note that the multiple  $R$ s in Benning et al. (2003) for PPI-I (.70) and PPI-II (.67) were likely attenuated substantially by the test-retest unreliability inherent in administering personality instruments several years apart. We used Spearman's (1904) formula ( $R_{\text{disattenuated}} = R_{\text{observed}} / \sqrt{[\text{test-retest reliability}]}$ ) to correct the observed multiple  $R$ s for the unreliability of personality scores across time. Using .63 as the average test-retest reliability for the MPQ over a similar time period (cf. McGue et al., 1993; Roberts et al., 2001), the disattenuated multiple  $R$ s for MPQ regression-estimated PPI-I and PPI-II were .89 and .84, respectively, suggesting that MPQ regression-estimated PPI factor scores represent good proxies for actual PPI factor scores.

### Benning et al. (2003) Regression Equation Double Cross-Validation

Because regression equations that are generated in a single sample may capitalize substantially on chance, it is necessary to cross-validate a regression equation developed in one sample on another sample (Copas, 1983). A cross-validation method that eliminates the pitfalls of using only half a sample to generate a test regression equation (such as instability of the regression weights and an overall lower predictive accuracy; Browne, 2000; Picard & Cook, 1984) is the double cross-validation procedure (Mielke, Berry, Landsea, & Gray, 1997; Mosier, 1951; Osborne, 2000). In this procedure, a sample is divided in half, and regression equations are generated with a certain coefficient of determination (multiple  $R^2$ ) in predicting a criterion variable in each half of the sample (cf. Shao, 1993). For Sample 1 (the first half-sample in Benning et al., 2003), the multiple  $R$ s for predicting PPI-I and PPI-II scores were .71, and .67,

respectively; in Sample 2 (the second half-sample in Benning et al., 2003), the multiple  $R$ s for PPI-I and PPI-II were .72 and .68, respectively.

When the Sample 2 MPQ beta weights for predicting PPI-I and PPI-II were applied to Sample 1, the resulting multiple  $R$ s were .67 and .63, respectively. When the Sample 1 MPQ beta weights for predicting PPI-I and PPI-II were applied to Sample 2, the resulting multiple  $R$ s were .68 and .65, respectively. These coefficients represent validity shrinkage of between 10.2% and 11.2% in the two subsamples. Furthermore, the corresponding factor scores generated by the alternate regression equations in each half-sample correlated between .94 and .95 with each other suggesting they index nearly identical constructs. Because the multiple  $R$ s for predicting each PPI factor were comparable across half-samples with a relatively small amount of shrinkage between half-samples, we used the regression weights from the overall Benning et al. (2003) sample as the basis for estimating PPI-I and PPI-II scores in the analyses that follow. This approach is justified, because these weights are maximally likely to generalize to other, future samples (Kozak & Kozak, 2003; Snee, 1977).

We used these regression weights instead of unit-weighted composites of the significant predictors of PPI-I and PPI-II, as some authors (e.g., Cohen, 1990; Dawes & Corrigan, 1974) have advocated, for a number of reasons. First, the MPQ unit-weighted composites exhibited different patterns of correlations in the Benning et al. (2003) sample than both the PPI factor scores themselves and the MPQ regression-estimated versions of them. The MPQ unit-weighted composites were significantly correlated with each other,  $r = -.26, p < .001$ , although both the original PPI factor scores ( $r = .01, p > .80$ ) and MPQ regression-estimated factor scores ( $r = .06, p > .30$ ) were uncorrelated implying that the unit-weighted composites are excessively interrelated. Also, correlations between the double cross-validated MPQ regression-estimated factor scores and PPI factor scores in each half-sample were numerically larger than the correlations between MPQ unit-weighted composites and PPI factor scores in the entire sample ( $r = .65$  between PPI-I factor scores and MPQ unit-weighted PPI-I;  $r = .62$  between PPI-II factor scores and MPQ unit-weighted PPI-II). Hence, the balance of evidence favored the use of the regression equations in Benning et al. (2003), which double cross-validated well, as noted above.

In the following three studies, MPQ regression-estimated PPI factor scores were correlated with various diagnostic and self-report measures in the three validation samples to examine their convergent and discriminant validity.<sup>1</sup> The community sample of young adults was assessed for relevant disorders (e.g., antisocial personality disorder, substance disorders) according to the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., revised; American Psychiatric Association, 1987) via structured clinical interviews, whereas the undergraduate sample completed various self-report measures pertinent to the construct of psychopathy. Members of the prisoner sample completed parallel sets of self-report diagnostic and personality measures and were assessed for psychopathy via the PCL-R. To control experiment-wise error rate, we adopted a critical  $\alpha$  level of .005 for each correlation. Differences between estimated PPI factors in terms of the magnitudes of their respective correlations with criterion variables were tested using Steiger's (1980)  $t$  test for dependent correlations.

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<sup>1</sup>In all three studies, the interaction of the Multidimensional Personality Questionnaire (MPQ)-estimated Psychopathic Personality Inventory—I (PPI-I) and PPI-II did not correlate significantly with any criterion variables.

## STUDY 1

### Method

**Participants**—Participants were twins from the Minnesota Twin Family Study (MTFS; Iacono, Carlson, Taylor, Elkins, & McGue, 1999). The MTFS is an ongoing, epidemiological, longitudinal study investigating the genetic and environmental factors that contribute to the development of substance abuse and related psychopathology in reared-together, same-sex twins and their parents. Consistent with the demographics of Minnesota when the twins were born, participants were 98% Caucasian. Twin families were identified through public birth records and recruited to participate the year the twins turned 17 years old. Twins were born between the years 1972 and 1977 in the case of male twins and between 1975 and 1979 in the case of female twins. For any given year, the study was able to locate more than 90% of twin families. Of the families located, 17% declined participation. Families were excluded from participation if they lived further than a day's drive from the Minneapolis laboratories or if either twin had a serious mental or physical handicap that would preclude him or her from completing the daylong, in-person intake assessment.

Twins were assessed for lifetime mental disorders via structured clinical interviews. Interviewers had either a bachelor's or master's degree in psychology and underwent extensive training. An interview designed by MTFS staff was used to assess symptoms of conduct disorder (CD) and adult antisocial behavior (AAB; the adult criteria for antisocial personality disorder). The Substance Abuse Module (SAM) of the Composite International Diagnostic Interview (Robins, Babor, & Cottler, 1987) was used to assess symptoms of alcohol, nicotine, and illicit drug dependence. Drug classes assessed included amphetamines, cannabis, cocaine, hallucinogens, inhalants, opioids, PCP, and sedatives. A modified version of the Structured Clinical Interview for *DSM-III-R* (SCID; Spitzer, Williams, Gibbon, & First, 1990) was used to assess major depressive disorder (MDD), social phobia, and simple phobia.

All interview data were reviewed in a case conference by at least two advanced graduate students in the clinical psychology program. All items scored positive or about which there were questions regarding scoring were reviewed by referring to audiotapes of the interview when necessary. Symptoms were assigned based on the consensus of the two diagnosticians. The reliability of the assessment process was estimated by an independent review of more than 600 cases representative of the entire MTFS sample and obtained the following kappa statistics: .95 for AAB, .81 for CD, .91 for all substance dependence disorders, .87 for MDD, .78 for social phobia, and .79 for simple phobia (cf. Iacono et al., 1999).

Participants in this sample completed a 198-item version of the MPQ. As all participants had complete protocols, only participants producing invalid MPQ profiles ( $n = 20$ ) were excluded thereby yielding a final sample of 1,122 participants (502 men, 620 women) from the age-17 intake assessment. For symptoms of mental disorders, however, we also included symptom presence at the age-20 follow-up assessment. This was done for two reasons. First, male twins were not assessed for lifetime anxiety disorders at intake but were at the follow-up assessment. Second, at age 17, participants were still entering the phase of greatest risk for externalizing disorders, and many who reported no or few symptoms at the intake assessment would evidence more symptoms within the next few years. Thus, employing the age-20 assessment provided greater power to detect relations between externalizing disorders and the estimated PPI factors. Because we were interested in lifetime presence of symptoms, a symptom was considered present if reported at either the intake or follow-up assessment. The significance levels of the reported correlations were adjusted using hierarchical linear modeling to account for the dependence of one twin's scores on each measure on the other twin's scores (cf. Liang & Zeger, 1986). Additionally, Fisher's  $Z$  tests were conducted between genders for each correlation of

estimated PPI factors with criterion variables to examine whether the magnitude of associations differed for men and women.

## Results and Discussion

Table 1 lists the correlations between each predicted PPI factor and symptom counts for various diagnoses in the MTFS. As in Benning et al. (2003), the two MPQ-estimated factors of the PPI were uncorrelated for men,  $r = .03$ , and women,  $r = .00$ ,  $ps > .30$ . With regard to predicted PPI factor scores, men scored higher than women on both estimated PPI-I and PPI-II,  $t(1,120) = 7.81$  and  $5.90$ , respectively,  $ps < .001$ . However, none of the  $Z$  tests for gender differences in the correlations between estimated PPI factors and diagnostic criterion variables were significant. Therefore, although men and women differed in the mean levels of the estimated PPI factors, there was no gender difference in the magnitude of associations between estimated PPI factor scores and diagnostic variables.

Estimated PPI-II correlated positively and selectively with all externalizing disorders (i.e., syndromes involving unconstrained behavior and substance use; cf. Krueger, Caspi, Moffitt, & Silva, 1998; Krueger et al., 2002), although within this adolescent community sample, estimated PPI-I was not significantly associated with symptoms of any externalizing disorder including AAB. On the other hand, estimated PPI-I correlated negatively with symptoms of all internalizing disorders (syndromes of depression and anxiety; cf. Krueger, 1999b), whereas estimated PPI-II showed a significant, positive association with symptoms of MDD. Therefore, although PPI-II seems to index a vulnerability to psychological disorders, PPI-I appears to represent a protective factor in relation to internalizing disorders.

## STUDY 2

### Method

**Participants**—Participants were 360 students (mean age = 18.8 years) recruited from introductory psychology classes at Florida State University. The ethnic distribution of this sample followed the demographic characteristics of Florida State University, which was approximately 82% Caucasian, 11% African American, and 5% Hispanic at the time of this study. Individuals participated in a single session in which they completed the MPQ and other personality self-report measures with relevance to the construct of psychopathy. Participants completed the full (300-item) version of the MPQ (Tellegen, in press) from which scores on the brief (155-item) form (MPQ-BF; Patrick, Curtin, & Tellegen, 2002) were extracted. Participants who produced MPQ profiles that were incomplete ( $n = 1$ ) or invalid ( $n = 13$ ) because of acquiescent (extreme True Response Inconsistency scores) or random (high Variable Response Inconsistency scores) response patterns were excluded (Patrick et al., 2002) thereby leaving a final sample of 346 participants (98 men, 248 women). The patterns of correlations observed for PPI factor scores predicted using these alternative versions of the MPQ were nearly identical. Because the MPQ-BF is better suited for future replications of this study involving multiple questionnaire measures and for use in future community epidemiological studies, we report findings for the MPQ-BF in detail here.

### Measures

**Emotionality-Activity-Sociability-Impulsivity Temperament Survey (EASI):** The EASI is a 25-item inventory developed by Buss and Plomin (1975, 1984) to measure their model of temperament traits. Emotionality refers to a person's sensitivity to negative emotions and the intensity of his or her emotional response and is composed of three subscales: Fearfulness, Anger, and Distress. Activity refers to the pace of a person's life, his or her energy level, and the tendency to engage in multiple activities. Sociability refers to the degree that a person enjoys the company and attention of others. Impulsivity refers to the tendency of a person to

think before acting and to withhold behavioral responses. Buss and Plomin provide data regarding the differential correlates of these scales.

**Taylor Manifest Anxiety Scale (TMAS):** The TMAS (Taylor, 1953) is a subset of items from the MMPI that measures various physical and emotional symptoms of anxiety. It is composed of 50 items and yields a total score. Patrick et al. (2002) found that TMAS scores were strongly preferentially related to Stress Reaction scores on the MPQ suggesting it serves as a relatively pure marker of anxiety-related negative affectivity.

**Fear Survey Schedule III (FSS-III):** The FSS-III (Arrindell, Emmelkamp, & van der Ende, 1984) asks participants to rate the extent to which 52 specific things, places, or activities evoke fear or similar unpleasant feelings on a 1 (*not at all*) to 5 (*very much*) scale. The FSS-III yields a total score and five subscale scores: Social Fears; Agoraphobia Fears; Fears of Bodily Injury, Death, and Illness; Fears of Sexual and Aggression Scenes; and Fears of Harmless Animals. Individuals with high FSS-III scores tend to have more pronounced fear-potentiated startle blink reflexes and higher trait anxiety (Cook, Hawk, Davis, & Stevenson, 1991).

**Emotional Empathy Scale (EES):** The EES (Mehrabian & Epstein, 1972) was designed to measure a person's reaction and ability to vicariously experience the emotional states of others. The scale is composed of 33 items and yields a total score. Mehrabian and Epstein (1972) reported that those with high scores on the EES were less willing to act aggressively in both self-report and laboratory measures of aggression.

**Narcissistic Personality Inventory (NPI):** The NPI (Raskin & Terry, 1988) consists of 40 items designed to measure the construct of narcissistic personality disorder (American Psychiatric Association, 1987). The NPI yields a total score and seven subscale scores: Authority, Exhibitionism, Superiority, Entitlement, Exploitativeness, Self-Sufficiency, and Vanity. Raskin and Terry (1988) provided data suggesting that NPI scores are related strongly to measures of interpersonal dominance, the narcissistic and competitive area of the interpersonal circumplex, and observer ratings of narcissism, self-confidence, and self-centeredness.

**Sensation Seeking Scale (SSS):** The SSS (Zuckerman, 1979) is a 40-item measure of a person's level of behavioral disinhibition and the tendency to engage in thrilling, novel, or dangerous activities. The SSS yields a total score and four subscale scores: Disinhibition, Boredom Susceptibility, Thrill and Adventure Seeking, and Experience Seeking. The Thrill and Adventure Seeking subscale is preferentially related to MPQ Stress Reaction and Harm Avoidance scores, whereas the Disinhibition and Boredom Susceptibility subscales are preferentially associated with antisocial acts (Levenson et al., 1995).

**Socialization Scale (So):** The So Scale (Gough, 1957, 1960) is a subscale of the California Psychological Inventory (CPI) containing 54 items. It was constructed using an empirical, contrasted-groups strategy, and it consists of items that differentiated delinquents and nondelinquents. Higher scores are associated with lower antisocial tendencies. Gough (1960) provided evidence that the So Scale can discriminate in a stepwise fashion among groups arranged in socialization from model citizens to incarcerated individuals.

**Questionnaire Upon Mental Imagery (QMI):** The QMI (Sheehan, 1967) has 35 items and was designed to measure a person's ability to mentally reconstruct various sensory experiences across the five sense modalities. The QMI yields a total score from items that ask participants to rate the vividness of their mental image on a scale from 0 (*perfectly clear and as vivid as the actual experience*) to 6 (*no image present at all, you only "know" you are thinking of the object*). Thus, *lower* scores on the QMI are indicative of better imagery ability. In phobic



individuals, lower QMI scores (and hence better imagery ability) have been related to greater heart rate accelerations during phobia-related imagery (McNeil, Vrana, Melamed, Cuthbert, & Lang, 1993).

## Results and Discussion

Table 2 presents the correlations between each predicted PPI factor and self-report measures for the entire undergraduate sample. Again, scores on the two MPQ-estimated PPI factors were not significantly correlated for men,  $r = .09$ ,  $p > .30$ , or women,  $r = .10$ ,  $p > .10$ . Furthermore, although men scored higher on both estimated PPI-I and PPI-II than women,  $t(344) = 4.18$  and  $4.78$ , respectively,  $ps < .001$ , none of the  $Z$ -test comparisons of correlations for men versus women was significant—again indicating that gender did not moderate associations between estimated PPI factors and criterion variables. In light of this, data were collapsed across genders to maximize statistical power.

Estimated PPI-I correlated positively with temperamental activity and sociability and narcissistic personality features and preferentially with the thrill and adventure-seeking component of sensation seeking. Estimated PPI-I was also negatively related to the fearfulness and distress components of temperamental emotionality, as well as to trait anxiety, emotional empathy, and self-reported fear in a range of contexts. Together, these results indicate that PPI-I indexes a relative absence of fear and anxiety (cf. Lykken, 1957; Schmitt & Newman, 1999) and a capacity to enjoy exciting but physically dangerous activities. However, individuals high on this construct also tend to be self-centered and may have difficulties in considering the effects of their actions on others.

In contrast, estimated PPI-II was related to temperamental anger and impulsivity, trait anxiety, and preferentially to the boredom susceptibility facet of sensation seeking. Furthermore, it correlated negatively with temperamental sociability, socialization, and emotional empathy. Therefore, in line with their scores on other personality instruments, people scoring high on PPI-II could be described as impulsive, disagreeable, undersocialized, and prone to negative affect. This personality profile accords well with that of people with high levels of externalizing psychopathology (cf. Krueger, Caspi, & Moffitt, 2000; Krueger et al., 2002).

## STUDY 3

### Method

**Participants**—Participants were 240 male inmate volunteers (47% Caucasian, 40% African American, 13% Hispanic; mean age = 32.8 years) recruited from the population of the Federal Correctional Institution in Tallahassee, Florida. Volunteers were recruited randomly from a master prison roster and included if they met the following criteria: no current major mental disorder on file, no imminent release date, conversational competency in English, and the ability to read aloud. Participants completed the full MPQ from which scores on the MPQ-BF were derived. Again, results using either the MPQ-300 or MPQ-BF to predict PPI factors were essentially identical; to facilitate independent replication of our findings with a minimum of test items, results are reported for PPI factor scores predicted using the MPQ-BF trait scales. Protocols were excluded if they were incomplete ( $n = 1$ ) or invalid according to inconsistency criteria ( $n = 21$ ) thereby yielding a final sample of 218 inmates.

**Measures**—All inmates were assessed for psychopathy using the PCL-R (Hare, 2003) and for antisocial personality disorder using *DSM-III-R* criteria. Data from a structured clinical interview were supplemented by data from the inmate's prison file. Interviews were videotaped for the purpose of an independent secondary assessment. All interviewers and raters had either a bachelor's or master's degree in psychology and underwent specialized training for

administering and rating the PCL-R. Weekly meetings were held to maintain adherence to diagnostic criteria, and reliability checks were periodically performed by the supervisor (C.J.P.) to mitigate against observer drift. Scores for the two raters were averaged to optimize stability. The intraclass correlation for the mean of the two raters' PCL-R total, Factor 1, and Factor 2 scores were .91, .82, and .88, respectively.

The number of participants assessed with the self-report measures in this study varied because different self-report measures were administered between the two phases of the study. However, Little's (1988) test revealed that the data were missing completely at random,  $\chi^2 = 307$ ,  $df = 288$ ,  $p > .20$ , meaning that high or low scores on any variables in this study did not predict whether data for any other variables were missing. Hence, there were no discernable selection biases in this data set. Inmates were assessed for substance use and abuse using self-report questionnaires. The Alcohol Dependence Scale (ADS; Skinner & Allen, 1982) consists of 29 items regarding symptoms and occurrences associated with alcohol dependence; scores on this inventory are correlated with acknowledged alcohol use problems (Maisto, Chung, Cornelius, & Martin, 2003; Ross, Gavin, & Skinner, 1990). The Survey of Alcohol and Drug Use (SADU; Backman, Johnston, & O'Malley, 1987) assesses the frequency with which the participant uses cigarettes, alcohol, and various other drugs. The Short Drug Abuse Screening Test (SDAST; Skinner, 1982) is a 20-item measure of problems experienced by the participant in connection with abuse of drugs and distinguishes those who have symptoms of drug use from those who do not (Gavin, Ross, & Skinner, 1989).

Inmates also completed the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990), a 16-item scale that measures the amount of subjective worry that people generally experience and that correlates well with other self-report measures of anxiety (Hopko et al., 2003). Finally, inmates completed several personality questionnaires also available in the Florida State University undergraduate sample: the EASI, FSS-III, EES, NPI, SSS, So scale, and QMI.

## RESULTS AND DISCUSSION

### Diagnostic Variables

Table 3 lists the correlations between the predicted PPI factors and available diagnostic variables. Once again, the MPQ-estimated factors of the PPI were uncorrelated,  $r = .06$ ,  $p > .40$ .<sup>2</sup> Paralleling the results obtained in the MTFs sample, estimated PPI-I was negatively related to all internalizing disorders, especially social phobia, and was unrelated to all externalizing disorders. Estimated PPI-II was positively related to all externalizing criterion variables except nicotine use. However, in this sample, only the general frequency of nicotine use was measured, whereas in the MTFs sample, nicotine dependence was assessed. Therefore, the lack of association between estimated PPI-II and nicotine use in this sample could reflect the difference in the severity of nicotine use assessed.

### Personality Variables

Table 4 displays, for the current offender sample, correlations between the estimated PPI factors and the same personality measures included in Study 2. The patterns of correlations with personality measures obtained for estimated PPI-I and PPI-II corresponded closely with those obtained in the undergraduate sample. Estimated PPI-I was related positively to the activity component of temperament, narcissistic personality features, and thrill and adventure

<sup>2</sup>White inmates ( $n = 109$ ) had a higher mean score on estimated PPI-I than Black inmates ( $n = 77$ ),  $t(184) = 3.31$ ,  $p < .005$ , but these groups did not differ significantly in their mean scores on estimated PPI-II,  $t(184) = 0.44$ ,  $p > .65$ . Additionally,  $Z$  tests revealed no significant differences between Black and White inmates in the magnitude of correlations between predicted PPI factors and criterion variables (cf. Cooke, Kosson, & Michie, 2001; Kosson, Smith, & Newman, 1990).

seeking. It correlated negatively with temperamental fearfulness and distress; overall phobic fear and, in particular, social fear; and tendencies toward worry. Conversely, estimated PPI-II correlated positively with temperamental anger, distress, impulsivity, worry, and the boredom susceptibility and disinhibition facets of sensation seeking. Furthermore, it was related inversely and substantially to socialization. Other relations between personality variables and the estimated PPI factors, although not statistically significant, were in the same direction (and, in many cases, of similar magnitude) in this incarcerated sample of men as in the mixed-gender undergraduate sample.

### PCL-R Factors

Table 5 depicts correlations between the estimated PPI factors and PCL-R scores available for this offender sample. With respect to the original two factors of the PCL-R (Hare et al., 1990; Harpur et al., 1989), Factor 2 correlated with estimated PPI-II scores but not with estimated PPI-I scores. In contrast, although PCL-R Factor 1 correlated preferentially with estimated PPI-I, it also correlated significantly with estimated PPI-II. To further elucidate this pattern of results, we examined the correlations of the two estimated PPI factors with the three PCL-R factors proposed by Cooke and Michie (2001).

In Cooke and Michie's (2001) alternative PCL-R structural model, the items in Factor 1 are subdivided into a factor indexing an Arrogant and Deceitful Interpersonal Style, composed of items indexing glibness/superficial charm, grandiosity, pathological lying, and conning/manipulativeness, and a factor reflecting Deficient Affective Experience, composed of lack of remorse, shallow affect, lack of empathy, and failure to accept responsibility for one's own actions. Additionally, PCL-R Factor 2 was replaced by a 5-item factor that they labeled Impulsive and Irresponsible Behavioral Style, reflecting more trait-oriented aspects of antisocial deviance (i.e., boredom susceptibility, impulsiveness, irresponsibility, absence of goals, and parasitism). In the current study, the Arrogant and Deceitful Interpersonal Style factor of the PCL-R correlated solely with estimated PPI-I, whereas the 5-item Impulsive and Irresponsible Behavioral Style factor correlated exclusively with estimated PPI-II (see Table 5). The Deficient Affective Experience factor of the PCL-R correlated significantly with estimated PPI-II, albeit to a modest degree, but not with estimated PPI-I.<sup>3, 4</sup>

Because the factors of the PCL-R are significantly intercorrelated, we also examined partial correlations between the predicted PPI factors and each PCL-R factor within the two- and three-factor models controlling for the influence of other PCL-R factors within each model. Results of these partial correlations are also displayed in Table 5. Controlling for the variance it shared with Factor 2, PCL-R Factor 1 was still significantly related to estimated PPI-I but not to

<sup>3</sup>In light of Hare's (2003) newly published four-factor model of the Psychopathy Checklist—Revised (PCL-R), we also examined the correlations of estimated PPI-I and estimated PPI-II with a fourth (antisocial) facet of the PCL-R, which encompasses items related to aggression, delinquency, release violations, and criminal versatility. Like the Impulsive-Irresponsible factor in Cooke and Michie's (2001) model, this antisocial facet showed a significant correlation with estimated PPI-II,  $r = .24, p < .001$ , but was uncorrelated with estimated PPI-I scores,  $r = -.04, p > .60$ .

<sup>4</sup>Although correlations between predicted PPI factors and PCL-R factors were significant, they were modest in magnitude. However, because scores on these two instruments were derived from different assessment domains (i.e., self-reports and interviews, respectively), it seems likely that unique method variance associated with each domain operated to attenuate correlations between the two (Campbell & Fiske, 1959). To examine how the zero-order correlations between PPI factors and Cooke and Michie (2001) PCL-R facets might have looked if both had been assessed in the same domain, we used the primary trait scales of the MPQ to estimate scores on the three PCL-R factors using multiple regressions.

MPQ-estimated scores on the PCL-R Arrogant and Deceitful Interpersonal Style factor ( $R = .41, p < .001$ ) were correlated very highly with MPQ-estimated scores on PPI-I,  $r = .82, p < .001$ , whereas MPQ-estimated scores on the Impulsive and Irresponsible Behavioral Style factor of the PCL-R ( $R = .49, p < .001$ ) correlated very highly with MPQ-estimated scores on PPI-II,  $r = .82, p < .001$ . The MPQ-estimated Deficient Affective Experience factor ( $R = .35, p < .005$ ) correlated with both predicted PPI-I,  $r = .25, p < .001$ , and predicted PPI-II,  $r = .52, p < .001$ . The *relative* magnitudes of these correlations were similar to those obtained between the actual PCL-R and predicted PPI factors. However, their *absolute* magnitudes far exceeded those obtained between predicted PPI scores and actual PCL-R scores, consistent with the possibility that method variance substantially attenuated the association between these measures of psychopathy.

estimated PPI-II. Controlling for its covariance with Factor 1, PCL-R Factor 2 was still correlated with estimated PPI-II but not with estimated PPI-I. Parallel results were obtained for two of Cooke and Michie's (2001) three factors: The Impulsive and Irresponsible Behavioral Style factor remained positively correlated with PPI-II after controlling for the other two factors, and the correlation between the PCL-R Arrogant and Deceitful Interpersonal Style factor and estimated PPI-I remained significant after controlling for its association with the other PCL-R factors, whereas its relationship with estimated PPI-II was rendered nonsignificant. Partial correlations between the Deficient Affective Experience factor and estimated PPI-I and PPI-II were both non-significant thereby suggesting that the unique variance in this factor of the PCL-R was not indexed well by either PPI construct.

## GENERAL DISCUSSION

In this study, we examined how PPI factor scores estimated using the trait scales of the MPQ primary scales related to various external criterion variables. We did this with the aim of replicating and extending findings for the actual PPI factors detailed in Benning et al. (2003) across independent samples representing different genders, ages, and settings. Consistent with predictions, in Studies 1 and 3, estimated PPI-I scores correlated minimally with externalizing symptoms, whereas estimated PPI-II scores exhibited strong and consistent relations with all externalizing and depressive symptoms across samples. Conversely, in line with its being strongly defined by stress immunity in Benning et al. (2003), estimated PPI-I was associated reliably and negatively with anxiety symptoms and with indices of depression. Likewise, consistent with predictions, in Studies 2 and 3, estimated PPI-I was related positively to narcissistic personality features, the thrill and adventure-seeking component of sensation seeking, and activity and sociability, whereas it correlated negatively with various indices of fear and anxiety. Conversely, estimated PPI-II was positively correlated with the boredom susceptibility and disinhibition facets of sensation seeking, temperamental anger and impulsivity, and trait anxiety, whereas it exhibited negative relations with socialization and temperamental sociability.

Although men scored higher than women on both estimated PPI-I and estimated PPI-II, the psychological structure of the two estimated PPI factors appeared similar across genders as evidenced by the null findings of the gender tests in Studies 1 and 2. Within the domain of PCL-R psychopathy, which was assessed in Study 3, estimated PPI-I was most strongly related to the arrogant and deceitful interpersonal style indexed by the PCL-R, whereas estimated PPI-II was most strongly associated with its impulsive and irresponsible behavioral style factor. Notably, the deficient affective experience factor of the PCL-R was not well represented by estimated PPI-I or PPI-II. However, this result accords with other data indicating that this facet of the PCL-R is not measured well through existing self-report instruments (Hall et al., 2004).

### Divergences Between PCL-R and Estimated PPI Factors: Toward a Better Understanding of Psychopathy and Related Constructs

Indeed, consistent with previous work on self-report measures of psychopathy (Brinkley et al., 2001), the modest correlations between the factors of the PCL-R and the MPQ-estimated PPI factors imply that the constructs assessed by these different instruments are not isomorphic or synonymous. This is almost certainly due in part to method variance (cf. Campbell & Fiske, 1959): Estimated scores on the PPI were assessed using a self-report instrument (the MPQ), and thus, it is expected that associations between these factors would be higher for self-report criterion variables than for the PCL-R, which is assessed via interview and collateral file information (see Note 4). Therefore, noting where these two measures of psychopathy differ in the quality or strength of their relations with external criteria may allow researchers to better

understand the underlying constructs in psychopathy. One such difference is the stronger correlation between estimated PPI-I and the thrill and adventure component of sensation seeking than between PCL-R Factor 1 and this facet of sensation seeking. Although preferential relationships have been noted between thrill and adventure seeking and the interpersonal facet (Hall et al., 2004) and Factor 1 (Harpur et al., 1989) of the PCL-R, these relations have tended to be small in magnitude. Nevertheless, these relations have been noted in spite of the fact that all aspects of sensation seeking enter into the scoring of item 3 on PCL-R Factor 2, implying that different parts of the sensation-seeking construct may be related to different facets of psychopathy.

Further support for this notion arises from recent confirmatory analyses of the Sensation Seeking Scale (Zuckerman, 1979) in which the Boredom Susceptibility and Disinhibition subscales formed a factor separate from the Thrill and Adventure Seeking and Experience Seeking subscales, which formed their own factor (Finn, Sharkansky, Brandt, & Turcotte, 2000). Only the Boredom Susceptibility/Disinhibition factor is related to excessive alcohol use (Finn et al., 2000), consistent with the selective association of substance use with Factor 2 of the PCL-R (Smith & Newman, 1990) and the selective associations of Boredom Susceptibility, Disinhibition, and substance use with PPI-II. Hence, it may be the case that the thrill and adventure-seeking component of sensation seeking may not be strongly related to the antisocial features of psychopathy. Furthermore, its relations to the interpersonal-affective features of psychopathy may be understated in Factor 1 of the PCL-R, although they may be overstated in PPI-I because of overlap in the item content of certain PPI scales (particularly, the Harm Avoidance and Fearlessness scales) and the item content of the Thrill and Adventure Seeking scale.

Similarly, the lack of empathy that is central to psychopathy is present only to a limited extent in these estimated PPI factors. Perhaps a large reason for this is the absence of a relationship with either PPI factor and the deficient affective experience facet of the PCL-R, which is defined partially by items marking a lack of empathy. Nevertheless, in the Cooke and Michie (2001) structure of psychopathy, lack of empathy is closely related to lack of remorse, one of the diagnostic criteria for antisocial personality disorder (American Psychiatric Association, 1987), which is a syndrome with selective relations to the antisocial features of psychopathy (Hart & Hare, 1989; Patrick et al., 1997). To understand the construct of empathy better, further work should investigate whether lack of empathy and associated deficient affective experience features fit more with the core personality traits of psychopathy (Harpur et al., 1989) or whether they instead form a vector intermediate between the interpersonal and behavioral features of psychopathy (Cooke & Michie, 2001) that are present to a limited extent in the MPQ-estimated PPI factors. It should be noted that the Coldheartedness sub-scale of the PPI, which was designed to index a lack of empathy, defined a separate factor that was unrelated to either PPI-I or PPI-II (Benning et al., 2003). It may be the case that Coldheartedness and additional scales would be able to index the lack of empathy and remorse that have been viewed as central to psychopathy.

### **Fearless Dominance and Impulsive Antisociality as Distinct Facets of Psychopathy**

There has been considerable debate about whether the psychological structure of psychopathy is the same across men and women and whether two distinct factors of psychopathy exist in community and incarcerated samples (Forth, Brown, Hart, & Hare, 1996; Salekin, Rogers, & Sewell, 1997; Vitale & Newman, 2001). In the current study, the two facets of PPI psychopathy as indexed by MPQ self-reports behaved similarly across genders according to both formal and informal statistical evaluations of patterns of correlations with criterion variables. As noted above, the two estimated PPI factors also exhibited a similar lack of association and divergent patterns of relations with criterion variables in each study sample, thereby suggesting that they

index two distinct constructs related to psychopathy. Hence, the psychological makeup of these constructs appears similar whether they are assessed using the PPI or the MPQ implying that other personality inventories that include content relevant to psychopathy (e.g., other broadband personality inventories such as the MMPI, NEO-PI-R, or TCI) might also be used to assess these same psychopathy facets.

To facilitate reference to these constructs, it seems useful to assign them descriptive names. PPI-I is associated with high social potency, narcissistic personality features, and the interpersonal features of psychopathy (i.e., glibness, grandiosity, deceitfulness, and manipulativeness) along with traits of low stress reaction, low harm avoidance, and reduced fears and anxiety. This pattern of relations suggests the name “Fearless Dominance” for this factor. Conversely, PPI-II is selectively associated with traits of alienation and aggression, anger, antisocial behavior and substance abuse, low socialization, and high PCL-R Factor 2 along with impulsivity, low control, and low traditionalism. Thus, the factor label “Impulsive Antisociality” summarizes this pattern of relations well. These constructs reflect criteria delineated in Cleckley’s (1976) original work and may allow the assessment of theoretical constructs extant in the psychopathy literature. For example, the components of fearless dominance have been associated theoretically with the construct of primary psychopathy (Blackburn, 1975; Lykken, 1995), whereas the components of impulsive antisociality have been associated with the construct of secondary psychopathy (Blackburn, 1975; Lykken, 1995) and with the latent externalizing vulnerability to psychopathology (Krueger et al., 2002; Patrick, Hicks, Krueger, & Lang, 2004).

### Limitations and Future Directions

These two facets of PPI psychopathy exhibited similar patterns of relations with external criterion variables whether they were operationalized directly with the PPI, as in Benning et al. (2003), or estimated with the MPQ, as in the current study.<sup>5</sup> However, it would be useful to fully cross-validate in a new sample the regression weights used to predict PPI factor scores with the MPQ to ensure their generalizability. These results also raise doubts as to whether a key facet of the psychopathy construct, namely the deficient affective experience component, is tapped by the PPI. To address this issue, it will be useful to examine whether any of the subscales of the PPI itself—such as Coldheartedness, which as noted above formed its own factor in Benning et al. (2003) and was designed to measure low empathy—show an association with the unique variance in the deficient affective experience factor of the PCL-R. If not, it will be valuable to conduct additional research to examine whether a self-report item set can be developed that effectively taps this facet of psychopathy. Additionally, none of the current studies correlated the estimated PPI factors with other self-report inventories designed explicitly to measure psychopathy (e.g., Hare, 1985; Levenson et al., 1995). It will be useful in future research to examine the relations of the fearless dominance and impulsive antisociality constructs with other self-report measures in the psychopathy nomological network. Finally, because self-report measures are necessarily limited in terms of their validity (as are any single methods of measuring a complex construct like psychopathy), future studies should endeavor to combine multiple measures of psychopathy from multiple assessment domains into latent psychopathy variables. In this way, researchers can ensure that the latent psychopathy constructs result from shared construct variance rather than shared method variance (Hare, 1985).

These limitations notwithstanding, our findings suggest that the MPQ, a broadband measure of normal personality, can be used effectively to predict facets of psychopathy that are

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<sup>5</sup>It is notable that the patterns of correlations between PPI factors and criterion variables in the Benning et al. (2003) sample were essentially identical whether actual or MPQ-estimated PPI factors were used.

represented in the PPI. By using MPQ-estimated factors of the PPI, large-scale screenings for psychopathy may be conducted in samples in which only a measure of normal personality is administered. Studies that collect the MPQ (or its brief form; Patrick et al., 2002) along with a large database of other personality, diagnostic, and physiological data (such as the MTFSS, the longitudinal study from which the participants from Study 1 were drawn) may be used to study the fearless dominance and impulsive antisociality facets of psychopathy in relation to additional criterion variables involving both psychopathology and adaptive life functioning. Furthermore, the structural similarities evident across different omnibus personality measures (Church, 1994; Tellegen, in press; Waller, Lilienfeld, Tellegen, & Lykken, 1991) make it likely that other broadband personality inventories could be used to index the facets of psychopathy embodied in the PPI. The estimation of psychopathy facet scores in existing longitudinal data sets in which broadband personality measures are available may provide a valuable means of tracing developmental antecedents, trajectories, and consequences of these distinct aspects of psychopathy. Furthermore, this approach may prove useful for investigating the genetic and environmental underpinnings of these two facets of psychopathy assessed in the PPI in behavioral genetic studies that employ large, epidemiological samples—a topic that has been largely neglected in the psychopathy literature (but see Blonigen, Carlson, Krueger, & Patrick, 2003).

In future research, it will also be useful to investigate physiological correlates of the two factors of the PPI. For example, based on the selective relationship of Factor 1 of the PCL-R to deficits in fear-potentiated startle (Patrick, Bradley, & Lang, 1993; Vanman, Mejia, Dawson, Schell, & Raine, 2003) and posterior hippocampal volume (Laakso et al., 2001), scores on fearless dominance might be expected to show selective negative relations with fear-potentiated startle and hippocampal volume. On the other hand, in view of evidence linking chronic antisocial deviance with reduced prefrontal cortex volume (Raine, Lencz, Bihrlé, LaCasse, & Coletti, 2000) and reduced skin conductance responses (Raine, 1997; Raine et al., 2000), scores on impulsive antisociality might be predicted to show negative associations with these physiological indices.

Our results also provide additional evidence that psychological disorders can be described within the framework of normal personality (Hart & Hare, 1994; Krueger, 1999a, 1999b; Tellegen, 1985; Trull, Widiger, & Burr, 2001; Widiger, Trull, Clarkin, Sanderson, & Costa, 2001). The multifaceted, hierarchical structure of the MPQ provides for a richly layered description of personality that appears to predict the disordered personality construct of psychopathy represented by the PPI in our various samples and in Benning et al. (2003). It will be useful to conduct further studies using other omnibus personality inventories, such as the NEO-PI-R (Costa & McCrae, 1995) or the MMPI-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989), which may allow the study of psychopathy and other personality disorders from both the facet level and higher order dimensions of personality. Such studies would allow for investigations of the facets of psychopathy indexed by the PPI in other large-scale community epidemiological samples in which only omnibus personality data are available.

#### Acknowledgements

This work was supported by grants MH17069, MH48657, MH52384, and MH65137 from the National Institutes of Mental Health and by funds from the Starke R. Hathaway endowment at the University of Minnesota. Portions of this work were presented at the Developmental and Neuroscience Perspectives on Psychopathy conference in Madison, Wisconsin, July 17–19, 2003.

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Diagnostic Symptom Count Correlates of Multidimensional Personality Questionnaire-Estimated Psychopathic Personality Inventory (PPI) Factors in the Study 1 Community Sample

**TABLE 1**

Symptom Counts	Men		Women		Z Tests for Sex Differences	
	PPI-I	PPI-II	PPI-I	PPI-II	PPI-I	PPI-II
Social phobia	-.20** <sup>a</sup>	-.02 <sup>d</sup>	-.26** <sup>a</sup>	.04 <sup>d</sup>	0.72	0.68
Simple phobia	-.13	-.02	-.16** <sup>a</sup>	.03 <sup>d</sup>	0.35	0.56
Major depression	-.11 <sup>a</sup>	.16** <sup>a</sup>	-.11 <sup>a</sup>	.25** <sup>a</sup>	0.00	1.06
Conduct disorder	.14	.28**	.03 <sup>d</sup>	.33** <sup>a</sup>	1.32	0.66
Adult antisocial behavior	.10 <sup>d</sup>	.38** <sup>a</sup>	.06 <sup>d</sup>	.41** <sup>a</sup>	0.84	0.42
Alcohol dependence	.08	.23**	-.01 <sup>d</sup>	.33** <sup>a</sup>	1.08	1.30
Nicotine dependence	.07 <sup>d</sup>	.32** <sup>a</sup>	-.06 <sup>d</sup>	.41** <sup>a</sup>	1.55	1.24
Drug dependence	.01	.26**	.07 <sup>d</sup>	.33** <sup>a</sup>	0.72	0.92

NOTE: Data were available from between 431 men and 618 women (social and simple phobia symptoms) and 502 men and 620 women (conduct disorder and all substance dependence symptoms) participants. All significance levels were adjusted for the dependence of the twin observations. For each symptom count variable, a *t* test for the difference between dependent correlations (Steiger, 1980) was used to evaluate whether correlations differed significantly for PPI-I versus PPI-II in either men or women.

<sup>a</sup> Coefficients that differed significantly from one another ( $p < .005$ ).

\*  $p < .005$ .

\*\*  $p < .001$ .

**TABLE 2**  
 Correlations of Multidimensional Personality Questionnaire-Estimated Psychopathic Personality Inventory (PPI) Factors With Self-Report Measures Related to Psychopathy in the Overall Study 2 Undergraduate Sample

Inventory	PPI-I	PPI-II
EASI Temperament Inventory		
Emotionality: Fearfulness	-.44 <sup>**a</sup>	-.03 <sup>a</sup>
Emotionality: Anger	-.10 <sup>a</sup>	.33 <sup>**a</sup>
Emotionality: Distress	-.47 <sup>**a</sup>	.03 <sup>a</sup>
Activity	.30 <sup>**a</sup>	-.08 <sup>a</sup>
Sociability	.31 <sup>**a</sup>	-.26 <sup>**a</sup>
Impulsivity	.12 <sup>a</sup>	.50 <sup>**a</sup>
Sensation Seeking Scale		
Total	.37 <sup>**</sup>	.45 <sup>**</sup>
Thrill and Adventure Seeking	.42 <sup>**a</sup>	.16 <sup>a</sup>
Experience Seeking	.23 <sup>**</sup>	.30 <sup>**</sup>
Boredom Susceptibility	.09 <sup>a</sup>	.43 <sup>**a</sup>
Disinhibition	.20 <sup>**</sup>	.33 <sup>**</sup>
Narcissistic Personality Inventory		
Total	.62 <sup>**a</sup>	.19 <sup>**a</sup>
Authority	.61 <sup>**a</sup>	.05 <sup>a</sup>
Exhibitionism	.44 <sup>**a</sup>	.23 <sup>**a</sup>
Superiority	.42 <sup>**a</sup>	-.01 <sup>a</sup>
Entitlement	.23 <sup>**</sup>	.28 <sup>**</sup>
Exploitativeness	.39 <sup>**</sup>	.24 <sup>**</sup>
Self-Sufficiency	.44 <sup>**a</sup>	.00 <sup>a</sup>
Vanity	.25 <sup>**</sup>	.10
Fear Survey Schedule		
Total	-.32 <sup>**a</sup>	-.06 <sup>a</sup>
Social Fears	-.36 <sup>**a</sup>	.03 <sup>a</sup>
Agoraphobia Fears	-.27 <sup>**a</sup>	-.06 <sup>a</sup>
Fears of Bodily Injury, Death, and Illness	-.21 <sup>**</sup>	-.04
Fears of Sexual and Aggression Scenes	-.07	-.12
Fears of Harmless Animals	-.23 <sup>**</sup>	-.09
Taylor Manifest Anxiety Scale	-.50 <sup>**a</sup>	.24 <sup>**a</sup>
CPI Socialization scale	-.01 <sup>a</sup>	-.60 <sup>**a</sup>
Emotional Empathy Scale	-.18 <sup>*</sup>	-.24 <sup>**</sup>
Questionnaire Upon Mental Imagery	-.22 <sup>**a</sup>	.04 <sup>a</sup>

NOTE:  $n = 346$  for all correlations. For each variable, a  $t$  test for the difference between dependent correlations (Steiger, 1980) was used to evaluate whether correlations differed significantly for PPI-I versus PPI-II. EASI = Emotionality-Activity-Sociability-Impulsivity Temperament Survey.

<sup>a</sup> Coefficients that differed significantly from one another ( $p < .005$ ).

\*  $p < .005$ .

\*\*  $p < .001$ .

**TABLE 3**

Diagnostic Correlates of Multidimensional Personality Questionnaire-Estimated Psychopathic Personality Inventory (PPI) Factors in the Study 3 Sample of Incarcerated Men

Symptoms	PPI-I	PPI-II	n
Social Phobia	-.44 <sup>**a</sup>	.18 <sup>a</sup>	90
Total Phobias	-.37 <sup>**</sup>	.03	87
Beck Depression Inventory	-.35 <sup>**a</sup>	.35 <sup>**a</sup>	87
Conduct Disorder	.00 <sup>a</sup>	.28 <sup>**a</sup>	218
Adult Antisocial Behavior	.00	.22 <sup>*</sup>	218
Alcohol Dependence Scale	-.22 <sup>a</sup>	.28 <sup>**a</sup>	103
Lifetime Nicotine Use	.01	.05	215
Short Drug Abuse Screening Test	-.03 <sup>a</sup>	.32 <sup>**a</sup>	210

NOTE: For each variable, a *t* test for the difference between dependent correlations (Steiger, 1980) was used to evaluate whether correlations differed significantly for PPI-I versus PPI-II.

<sup>a</sup>Coefficients that differed significantly from one another ( $p < .005$ ).

\*  $p < .005$ .

\*\*  $p < .001$ .

**TABLE 4**  
 Correlations of Multidimensional Personality Questionnaire-Estimated Psychopathic Personality Inventory (PPI) Factors With Self-Report Measures Related to Psychopathy in the Study 3 Sample of Incarcerated Men

Inventory	PPI-I	PPI-II	n
EASI Temperament Inventory			152
Emotionality: Fearfulness	-.53 <sup>**a</sup>	.18 <sup>a</sup>	
Emotionality: Anger	-.10 <sup>a</sup>	.35 <sup>**a</sup>	
Emotionality: Distress	-.47 <sup>**a</sup>	.41 <sup>**a</sup>	
Activity	.32 <sup>**</sup>	.17	
Sociability	.22 <sup>a</sup>	-.20 <sup>a</sup>	
Impulsivity	.06 <sup>a</sup>	.48 <sup>**a</sup>	
Sensation Seeking Scale			157
Total	.33 <sup>**</sup>	.33 <sup>**</sup>	
Thrill and Adventure Seeking	.38 <sup>**a</sup>	.08 <sup>a</sup>	
Experience Seeking	.33 <sup>**</sup>	.23 <sup>*</sup>	
Boredom Susceptibility	.15 <sup>a</sup>	.46 <sup>**a</sup>	
Disinhibition	.20	.47 <sup>**</sup>	
Narcissistic Personality Inventory			69
Total	.57 <sup>**a</sup>	.04 <sup>a</sup>	
Authority	.64 <sup>**a</sup>	-.04 <sup>a</sup>	
Exhibitionism	.48 <sup>**</sup>	.28	
Superiority	.39 <sup>**a</sup>	-.09 <sup>a</sup>	
Entitlement	.23	.03	
Exploitativeness	.10	.26	
Self-Sufficiency	.22	-.09	
Vanity	.38 <sup>*a</sup>	-.23 <sup>a</sup>	
Fear Survey Schedule			156
Total	-.33 <sup>**a</sup>	.10 <sup>a</sup>	
Social Fears	-.38 <sup>**a</sup>	.13 <sup>a</sup>	
Agoraphobia Fears	-.28 <sup>**a</sup>	.10 <sup>a</sup>	
Fears of Bodily Injury, Death, and Illness	-.17	.09	
Fears of Sexual and Aggression Scenes	-.18	.04	
Fears of Harmless Animals	-.20	-.02	
Anxiety Experiences Questionnaire: Worry	-.41 <sup>**a</sup>	.28 <sup>a</sup>	87
CPI Socialization Scale	.26 <sup>*a</sup>	-.56 <sup>**a</sup>	156
Emotional Empathy Scale	-.01	-.06	69
Questionnaire Upon Mental Imagery	-.14	.09	155

NOTE:  $n = 346$  for all correlations. For each variable, a  $t$  test for the difference between dependent correlations (Steiger, 1980) was used to evaluate whether correlations differed significantly for PPI-I versus PPI-II. EASI = Emotionality-Activity-Sociability-Impulsivity Temperament Survey.

<sup>a</sup> Coefficients that differed significantly from one another ( $p < .005$ ).

\*  $p < .005$ .

\*\*  $p < .001$ .



**TABLE 5**

Correlations of Multidimensional Personality Questionnaire-Estimated Psychopathic Personality Inventory (PPI) Factors With Psychopathy Checklist—Revised (PCL-R) Factors in the Study 3 Sample of Incarcerated Men

PCL-R Factor	Zero Order		Partial	
	PPI-I	PPI-II	PPI-I	PPI-II
Factor 1	.23**	.20*	.28** <sup>a</sup>	.02 <sup>a</sup>
Factor 2	-.02 <sup>a</sup>	.36** <sup>a</sup>	-.16 <sup>a</sup>	.31** <sup>a</sup>
Arrogant and Deceitful Interpersonal Style	.30**	.15	.32** <sup>a</sup>	-.06 <sup>a</sup>
Deficient Affective Experience	.09	.20*	-.05	.07
Impulsive and Irresponsible Behavioral Style	.01 <sup>a</sup>	.41** <sup>a</sup>	-.13 <sup>a</sup>	.37** <sup>a</sup>

NOTE:  $n = 218$  for all correlations. For each PCL-R factor variable, differences in correlations between PPI-I versus PPI-II were tested using Steiger's (1980)  $t$  test.

<sup>a</sup>Zero-order or partial correlations that differed significantly from one another ( $p < .005$ ).

\*  
 $p < .005$ .

\*\*  
 $p < .001$ .