Published in final edited form as:
Psychol Assess. 2008 June ; 20(2): 169–174. doi:10.1037/1040-3590.20.2.169.

Factor Structure of the Psychopathic Personality Inventory (PPI): Findings from a Large Incarcerated Sample

Craig S. Neumann
University of North Texas

Melanie B. Malterer and **Joseph P. Newman**
University of Wisconsin – Madison

Abstract

Recent exploratory factor analysis (EFA) of the Psychopathic Personality Inventory (PPI; Lilienfeld, 1990) with a community sample suggested that the PPI subscales may be comprised of two higher-order factors (Benning et al., 2003). However, little research has examined the PPI structure in offenders. The current study attempted to replicate the Benning et al. two-factor solution using a large (N=1224) incarcerated male sample. Confirmatory factor analysis (CFA) of this model with the full sample resulted in poor model fit. Next, to identify a factor solution that would summarize the offender data, EFA was conducted using a split-half of the total sample, followed by an attempt to replicate the EFA solution via CFA with the other split-half sample. Using the recommendations of Prooijen and van der Kloot (2001) for recovering EFA solutions, model fit results provided some evidence that the EFA solution could be recovered via CFA. However, this model involved extensive cross-loadings of the subscales across three factors, suggesting item overlap across PPI subscales. In sum, the two-factor solution reported by Benning et al. (2003) was not a viable model for the current sample of offenders, and additional research is needed to elucidate the latent structure of the PPI.

Psychopathy is a personality disorder characterized by a constellation of interpersonal and affective traits (e.g., callousness, remorselessness, and superficial charm) coupled with impulsive and antisocial tendencies (Hare & Neumann, 2005; Patrick 2006). The Psychopathy Checklist - Revised (PCL-R; Hare, 2003) exists as the best-validated instrument for assessing the multifaceted components of psychopathy and a substantial body of evidence supports its reliability and validity across diverse populations (e.g., Alterman, Cacciola, & Rutherford, 1993; Hare, Harpur, Hakstian, Forth, Hart, & Newman, 1990; Hare & Neumann, 2006; Vitale, Smith, Brinkley, & Newman, 2002). The PCL-R was designed for use with incarcerated offenders, and the bulk of empirical research on psychopathy has been conducted in criminal populations. However, Cleckley's seminal conceptualization of the disorder included individuals who possessed the core features of psychopathy and yet managed to avoid incarceration. Related to this early conceptualization, a derivative of the PCL-R—the Psychopathy Checklist: Screening Version (PCL: SV; Hart, Cox, & Hare, 1995)—has been used to assess individuals from the general population, and the findings reveal a similar factor structure to that found in incarcerated and psychiatric populations (Hare & Neumann, 2006).

Although the value of studying individuals with psychopathic traits in the community has been long recognized (Ishikawa, Raine, Lencz, Bihrle, & Lacasse, 2001; Widom, 1977), progress has been hampered by a lack of consensus regarding an appropriate and valid assessment

Correspondence: Craig S. Neumann Psychology PO Box 311280 University of North Texas Denton, TX 76203-1280 PH: 940-565-3788 csn0001@unt.edu.

method. Given the time intensive nature of structured interviews, researchers have developed specialized self-report measures of psychopathy, and have also relied on subscales of popular psychological tests, to assess psychopathy in the general population (for exceptions see DeMatteo et al., 2006; Yang, Raine, et al., 2005; Hare & Neumann, 2006). However, many self-report measures have modest diagnostic concordance with the PCL-R (Brinkley, Schmitt, Smith, & Newman, 2001; Edens, Hart, Johnson, Johnson, & Olver, 2000; Hare, 1985; Hart, Forth, & Hare, 1991; Hart & Hare, 1997) and they have been found to preferentially assess impulsive and antisocial tendencies as opposed to the interpersonal and affective features of psychopathy (e.g., Edens et al., 2000; Hare, 1996; Harpur, Hare, & Hakstian, 1989; Schroeder, Schroeder, & Hare, 1983).

To address this concern, Lilienfeld (1990; see also Lilienfeld & Andrews, 1996) used a series of college student samples to develop the Psychopathic Personality Inventory (PPI), a comprehensive and theoretically grounded self-report instrument intended to assess the full range of psychopathic traits. The PPI yields a total score indexing global psychopathic traits and eight factor-analytically derived subscales that are theorized to represent distinct components of psychopathy. Studies have generally suggested that the PPI is a reliable and valid instrument for assessing psychopathy in both nonincarcerated and incarcerated samples (Lilienfeld & Andrews, 1996; Poythress, Edens, & Lilienfeld, 1998). However, the majority of studies with the PPI have been conducted with nonincarcerated samples (Lilienfeld & Fowler, 2006).

In addition, problems exist with certain PPI subscales that have not been fully addressed in subsequent research. Lilienfeld (1990) recognized that some PPI subscales (e.g., blame externalization, coldheartedness) contain items in which nearly every item is keyed in the same direction (i.e., all false or true responses being indicative of psychopathic traits), and suggested that this methodological factor may lead to “acquiescence or counteracquiescence response bias.” (p. 160). As such, some of the PPI subscales may covary simply because of shared method variance. Second, some PPI subscales (e.g., stress immunity) contain “relatively few items with salient loadings and may thus not possess adequate reliability” (p. 160). Finally, Lilienfeld (1990) also indicated that many of the PPI items cross-loaded onto other PPI factors, which may influence the latent relations among the PPI subscales.

With respect to the factor structure of the PPI, no factor analytic studies have been conducted at the item-level in an attempt to replicate the initial dissertation findings discussed in Lilienfeld (1990). Rather, the bulk of factor analytic research on the PPI has been done on the PPI subscales. In a recent exploratory factor analytic (EFA) study, using a community sample of 353 individual male twins, Benning, Patrick, Hicks, Blonigen, & Krueger (2003) suggested that the PPI subscales may form two higher-order factors. Specifically, Benning et al. proposed that a PPI-I factor could be represented by the stress immunity, social potency, and fearlessness subscales, whereas a PPI-II factor (which was the first factor to emerge in their EFAs) was represented by the impulsive nonconformity, blame externalization, machiavellian egocentricity, and carefree nonplanfulness subscales. In an attempt to provide evidence of the stability of the two-factor PPI structure, Benning, Patrick, Salekin, and Leistico (2005) factor analyzed the PPI subscales using an undergraduate sample and suggested that, compared to the final factor loadings described in Benning et al. (2003), “the two factor structures are essentially equivalent” (p. 276).

Notably, in both of these previous PPI EFA studies, the fearlessness subscale showed a substantial cross-loading onto the PPI-II factor, limiting confidence in a clean two-factor PPI structure. Similarly, both of these studies found that the stress immunity subscale, to a lesser extent, cross-loaded onto the PPI-II factor. Furthermore, close examination of the PPI EFA subscale results in Lilienfeld’s (1990) dissertation also reveals a two-factor solution in which the fearlessness subscale shows substantial cross-loading onto both PPI factors, as does the impulsive nonconformity subscale (see Table 9 in Lilienfeld, 1990). It is also important to mention that in Lilienfeld's (1990) item-level EFA results, the stress immunity items loaded conjointly with the blame externalization items for males but not females. As such he suggested that "greater covariance among items for males" may tend to occur (Liliendfeld, 1990, p. 132). Taken together, it is reasonable to expect that a stringent confirmatory factor analysis (CFA) of the Benning et al. (2003) two-factor PPI model (i.e., setting the stress immunity, social potency, and fearlessness subscales to load on one factor and the impulsive nonconformity, blame externalization, machiavellian egocentricity, and carefree nonplanfulness subscales to load on a separate factor) would not show good model fit. This expectation is also consistent with an extensive series of factor analyses by van Prooijen and van der Kloot (2001) and their findings highlighting the challenges of confirming exploratively obtained factor solutions.

Recently, Patrick, Poythress, Edens, Lilienfeld, and Benning (2006) mentioned in a footnote that the factor structure of the PPI with an offender sample also consists of two dominant factors, consistent with the results of Benning et al. (2003). Because it was not a primary focus of the paper, Patrick et al. (2006) did not report subscale factor loadings, though in a personal communication (Personal Communication, 8/31/2006), Dr. Patrick shared some (but not the entire set) of the subscale factor loadings which generally conformed to the pattern of loadings reported in the two Benning et al. (2003, 2005) PPI studies. Nonetheless, to date little research exists that can provide a deeper understanding of the PPI factor structure with offender populations. Moreover, broader questions remain about the PPI subscales.

To the extent that psychopathy reflects a construct that is continuously distributed, it is reasonable to expect some uniformity of PPI factor solutions across nonincarcerated and incarcerated populations. For instance, recent taxometric studies of the PCL-R (Edens, Marcus, Lilienfeld, & Poythress, 2006; Guay, Rusico, Hare, & Knight, 2005) and the PPI (Marcus, Johns, & Edens, 2004) suggest that they posses dimensional latent structures and thus the psychopathic traits they assess should be continuously distributed. Similarly, studies by Neumann and colleagues indicate that the PCL-R and its derivatives (PCL: SV, PCL: YV) have very similar factor structures across male and female offenders (Hare & Neumann, 2006), forensic and civil psychiatric patients (Neumann, Hare & Newman, in press; Vitacco, Neumann, & Jackson, 2005), youth offenders (Neumann, Kosson, Forth, & Hare, 2006), as well as individuals from the general community (Hare & Neumann, 2006). Currently, there is limited support for such uniformity of the PPI structure across diverse samples of individuals.

Although the PPI factor structure has yet to be fleshed out, especially with offender populations, investigators have begun to view the PPI as structurally and empirically compatible with the PCL instruments. For instance, based on the findings of parallel associations between the factor analytically derived factors of the PPI and several criterion variables used to validate the factors of the PCL-R (Harpur et al., 1989; Patrick, 1994, 1995; cf. Poythress et al., 1998), Benning et al. (2003) concluded that the pattern of results was "suggestive of convergence between the two instruments" (p. 348). Other research (Benning, Patrick, Blonigen, Hicks, & Iacono, 2005; Benning, Patrick, Salekin, Leistico, 2005; Patrick et al., 2006) has also suggested parallel relations between the external correlates of the PPI and PCL-R factors (Hare, 2003). Nonetheless, the evidence regarding the equivalence of PPI and PCL-R external correlates remains limited, and moreover, conclusions regarding their structural equivalence are pending further investigation.

Another strategy for evaluating equivalence involves assessing the degree of association between the PPI and the PCL instruments. Malterer, Lilienfeld, and Newman (2006) did just that and found low correlations between PPI-I and PCL-R/SV Factor 1 scores across three samples (two incarcerated, one undergraduate; *rs* ranged from .16 to .19). It is important to note that these low correlations stand in contrast to the moderately high correlations between PPI-II and PCL-R/SV Factor 2 scores found in these same samples (*rs* ranged from .42 to .45). Moreover, replicating Kruh et al. (2005), the association between PPI and PCL-R/SV total scores in their incarcerated samples was mediated entirely by Factor 2.

The low correlations found by Malterer et al. (2006) between PPI-I and PCL-R/SV Factor 1 suggest that the PPI may not adequately assess the interpersonal/affective features of psychopathy tapped by the PCL-R/SV, although the PPI appears to validly assess the impulsive antisocial tendencies associated with psychopathy. To the extent that the PPI fails to capture Factor 1 of the PCL-R (or PCL:SV), it raises concerns about the structure of the PPI and how well it parallels the PCL-R structure. Given that little research exists on the factor structure of the PPI in offender samples, our understanding of PPI factors remains an open area of investigation. It is possible that the factor structure identified by Benning et al., (2003), based on a community sample, may not be similar to the structure of the PPI in incarcerated samples. Also, the two-factor PPI model may not show good model fit, given that certain PPI subscales show considerable cross-loadings among the PPI-I and PPI-II factors.

To address some of the existing gaps in the literature, the current study was conducted to determine whether the final two-factor PPI model reported by Benning et al. (2003) could be confirmed with a large offender sample. As discussed by many experts (MacCallum & Austin, 2000; Bentler, 1995; Bollen, 2002; Tomarken & Waller, 2005) confirmatory factor analysis (CFA) is an optimal procedure to use for statistically testing specific models while also controlling for measurement error. Additionally, using the same exploratory factor analysis (EFA) procedures described in Benning et al. (2003), we conducted a series of EFAs with the offender data to see if we could obtain similar exploratory PPI results. It is important to note that we did not rely on congruence coefficients to compare our EFA results with Benning et al. given that, (a) exclusive use of this method has been criticized (Cooke & Michie, 2001; Floyd & Widaman, 1995), and more importantly, (b) when large samples are employed, CFA performs just as well as the older method of computing congruence coefficients (see Aluja, Garcia, Garcia, & Seisdedos, 2005 for a comparison of congruence coefficients and CFA, as well as a discussion of the limitations of McCrae, Zonderman, Costa, Bond, & Paunonem, 1996). Also, using the procedures discussed by van Prooijen and van der Kloot (2001), we attempted to recover the EFA solution that accounts? for the most common variance of the PPI subscales via CFA.

Method

Participants

The sample consisted of 1224 adult males (54% Caucasian, 43% African American, 3% Other) ranging in age from 18 to 45 (*M* = 29.14 years, *SD* = 7.424) who were incarcerated in one of three Wisconsin state prisons. The data that was pooled included individuals from minimum-security (n = 388), maximum-security (n = 496), and a maximum-security prison reception center (n = 304).

Researchers identified participants from a comprehensive roster and screened files to eliminate individuals who were older than 45, had diagnoses of bipolar disorder or schizophrenia, or were currently using psychotropic medication. Participants received both oral and written consent procedures and were informed that participating or refusing to participate would have no impact on their correctional status.

Measures

Psychopathic Personality Inventory (PPI)—The PPI (Lilienfeld, 1990; Lilienfeld & Andrews, 1996) is a 187-item self-report instrument designed to “provide a relatively pure measure of the personality-based approach to psychopathy” (p. 492), devoid of any items indexing antisocial behaviors. Respondents answer questions using a 4-point Likert scale (1 = *false*, 2 = *mostly false*, 3 = *mostly true*, 4 = *true*). The PPI yields a total psychopathy score and eight lower-order subscales that reflect personality dimensions associated with psychopathy. The PPI total score has demonstrated adequate internal consistency and test-retest reliability in undergraduate and prison samples. In addition, PPI total scores exhibit convergent validity with self-report and interview-based measures of psychopathy and potentially related conditions (e.g., narcissistic personality disorder) and discriminant validity from self-report measures of depression, schizotypy, and other conditions largely unrelated to psychopathy (Lilienfeld & Andrews, 1996; see Lilienfeld & Fowler, 2006, for a review). In the present study, internal consistency, as measured by Cronbach’s alpha, was .91 for PPI total score, and the PPI subscales ranged from .73 (stress immunity) to .87 (machiavellian egocentricity). The majority of the subscales were at or above .80.

Data Analytic Plan

First, using the total sample of offenders, the EFA solution reported by Benning et al. (2003) was tested via CFA by setting the respective PPI subscales to load onto one of two PPI factors. Specifically, the stress immunity, social potency, and fearlessness subscales were set to load on a PPI-I factor, whereas the impulsive nonconformity, blame externalization, machiavellian egocentricity, and carefree nonplanfulness subscales were set to load on a separate PPI-II factor. The PPI factors were initially allowed to freely correlate, but an orthogonal association between factors was also tested. The robust maximum likelihood procedure provided by EQS (v. 5.6, Bentler, 1995) was used to estimate model parameters and cope with any departure for multivariate normality. Model fit was gauged through use of conventional model fit indices provided by EQS--i.e., robust comparative fit index-RCFI, Tucker-Lewis Index-TLI, Root Mean Square Error of Approximation-RMSEA, and the Standardized Root Mean Square-SRMR. To help in identifying specific features of the model that performed poorly (e.g., PPI subscale-to-factor relations) we examined the largest residuals as recommended by Bentler (1995). Finally, as demonstrated by van Prooijen and van der Kloot (2001), a viable strategy to employ when trying to recover an EFA solution via CFA is to fix the variable-to-factor loadings to the exact values obtained in the original EFA. Thus, we used all of the factor loading values (both low and high) reported for the final two-factor model by Benning et al. (2003)—i.e., the two-factor solution without coldheartedness.

Given that we expected the CFA test of the Benning et al. (2003) EFA solution would not fit well for the current sample of offenders, the sample was then randomly split and the first split-half sample was used to conduct an EFA of the PPI subscales, consistent with the procedures employed by Benning et al. (2003). As recommended by van Prooijen and van der Kloot (2001) we also attempted to recover the EFA solution we obtained via CFA with the same first-split half sample, but in this case, we used the EFA loadings from the factor solution obtained with the current data to fix the loadings for subscale-to-factor relations. To the extent that a viable EFA solution could be identified (and recovered), the second split-half sample was then used to confirm the EFA solution via CFA.

Results

Descriptive statistics, including skew and kurtosis, are provided in Table 1. As can be seen in this table, several of the PPI subscales evidenced significant skew (e.g., Impulsive nonconformity, .353/.070 = 5.04) and kurtosis (e.g., Fearlessness, −.527/.140 = −3.76).

Moreover, the PPI subscales evidenced a pattern of differential skew and kurtosis across scales (e.g. some having positive and others negative skew and/or kurtosis). One particular pattern that stands out pertains to the nonplanfulness and coldheartedness subscales--both have substantial positive skew and kurtosis. Notably, both of these subscales are composed of primarily reverse-scored items. In contrast, the blame externalization and fearlessness subscales only have a small minority of items that are reverse-scored and it is interesting to note that both have similar negative kurtosis.

It is important to highlight that it is unlikely that the distributional characteristics of the PPI subscales are simply due to the nature of the sample. First, significant skew and kurtosis are evident in other independent samples (Kruh et al., 2005, Personal Communication, August 23, 2006; Patrick et al., 2006, Personal Communication, September, 26, 2006). Second, in the current study, the same general distribution patterns of the PPI subscales persisted even when cases with significant elevations on any of the three PPI validity subscales (~10%) were eliminated. Finally, the pattern of skew and/or kurtosis is consistent with the nature of the items which make up a given subscale (e.g., nearly all reversed items for some scales).

Table 2 presents the zero-order correlations between the PPI subscales. The pattern of these observed (manifest) correlations may assist in identifying the underlying or latent structure of the PPI subscales. The pattern of manifest variable (MV) correlations is not what one would expect if the Benning et al. (2003) two-factor model is correct. For instance, the carefree nonplanfulness subscale is rather weakly associated with the other subscales that form the PPI-II factor, and the subscales that make up the PPI-I factor do not display strong inter-correlations. Also, the fearlessness subscale, which Benning et al. suggested represents the PPI-I factor, shows substantial associations with two of the subscales that represent the PPI-II factor (impulsive nonconformity, machiavellian egocentricity). These latter results are consistent with the cross-loading that the fearlessness subscale showed on the PPI-II factor in both Benning et al. (2003,2005) EFA studies, as well as Lilienfeld's (1990) dissertation results. Similarly, the current MV correlation between the carefree nonplanfulness and coldheartedness subscales is consistent with the initial three-factor EFA results reported by Benning et al. (2003).

Latent Structure of the PPI: CFA on Full Sample (N = 1224)

Table 3 displays that standardized loadings for the CFA of the Benning et al. (2003) two-factor PPI model. As can be seen in this table, several PPI subscales had sub-optimal factor loadings, indicating that each PPI factor could only account for a modest percentage of certain PPI subscales variance (e.g., Fearlessness, .237*.237 correct?= 5.6%). Also, the statistical test of the Benning et al. model resulted in a mis-specified model—i.e., a lower bound error for the social potency PPI subscale error term. In other words, EQS was estimating this error variance as a negative parameter, and since there is no such thing as negative variance, the program by default simply set this parameter to zero value to allow convergence on a solution. This sort of problem could be due to a number of things such as linear dependencies in the data (e.g., redundancy across PPI items) or over-factoring. Although this problem is not specific to the Benning et al. model (see the zero error terms in Figures 1 and 2 of Cooke & Michie, 2001, or a factor loading greater than 1.0 in Figure 1 from Weaver et al., 2006), it nevertheless complicates model testing of the PPI subscales. Finally, model fit indices for the Benning et al. CFA model were poor, robust-Satorra-Bentler $X^2(13, 1224) = 1033.44$, CFI = .526, TLI = .216, RMSEA = .275, SRMR = .205. The correlation between the PPI latent factors was r = .26, (p < .01). Note that there was no evidence of outliers which could corrupt model fit, and Mardia's multivariate kurtosis coefficient was not unduly large (5.50).

Consistent with standard recommendations (Bentler, 1995; Hoyle, 1995), our initial CFA was based on analysis of the PPI subscales covariance matrix, and the covariance matrix was very uniform. However, since the PPI subscales differ in terms of scale length, it is worth noting that there were no substantial differences in model fit when the CFA model was tested using the correlation matrix of PPI subscale scores. Also note that the same pattern of results was obtained when cases with elevations on any of the PPI validity subscales were eliminated from the analyses (and similarly for the results presented below).

Our goals for the current study did not include searching for post hoc model modifications (via the multivariate recommendations provided by EQS) to help the Benning et al. model fit better. However, the two separate Benning et al. (2003,2005) PPI studies have reported that the fearlessness and stress immunity subscales, which are proposed to represent the PPI-I factor, also showed meaningful covariation with the PPI-II factor. Thus, we can note that there was a significant improvement in fit when the fearlessness and stress immunity scales were allowed to cross-load onto the PPI-II factor ($X^2_{diff}(2, 1224) = 566.60$), but nonetheless, these modifications resulted in a model that continued to show poor fit, robust-$X^2(11, 1224) = 482.55$, CFI = .780, TLI = .572, RMSEA = .203, SRMR = .098.

Finally, using the procedures recommended by Prooijen and van der Kloot (2001) we attempted to recover the Benning et al. (2003) EFA solution with the current offender sample. That is, we used? the exact EFA loadings reported by Benning et al (2003) in their final two-factor model to fix the factor loadings in our final CFA of the two-factor PPI model. Model fit for this fixed-loading model was poor, $X^2(18, 1224) = 546.90$, CFI = .779, TLI = .742, RMSEA = .158, SRMR = .101, though somewhat better than the previous CFA results.

Clearly, the final two-factor PPI solution presented by Benning et al. (2003) does not appear to be a viable model for the current large sample of offenders, despite the fact that we tried to modify the model in accordance with previous findings and also used the exact pattern of factor loadings reported by Benning et al. (2003). An examination of the model residuals—which EQS computes by essentially subtracting the model generated covariance matrix from the observed covariance matrix—can be helpful for understanding model specifications (e.g., variable-to-factor relations) that adversely affected model fit (Bentler, 1995). Positive residuals indicate that the model specifications result in under-estimation of specific covariances among the PPI subscales and negative residuals indicate that the model is over-estimating particular covariances among the PPI subscales. Examination of Table 4 reveals that our initial CFA model of the Benning et al. (2003) two-factor EFA solution results in over-estimation of the covariance social potency and stress immunity have with other PPI-II subscales. In contrast, the CFA model results in under-estimation of the strong observed covariance that the fearlessness subscale has with the other PPI-II scales. These latter findings are consistent with the Benning et al. (2003, 2005) EFA results. Thus, despite the fact that the model specified correlated PPI-I and PPI-II factors, it still did not estimate as much covariance between the fearlessness subscale and other PPI-II subscales, compared to the observed data. Note that the same pattern of residuals occurred when the CFA model specified an orthogonal relation between the PPI factors (which also resulted in poorer fit compared to a correlated factors model).

Exploratory Factor Analysis: Split Sample 1

Given that the CFAs performed on the full sample did not support the factor structure reported by Benning et al., (2003), we attempted to identify a factor structure that would best summarize the current offender data using a split-half of the total sample and then tried to replicate that solution with the other split-half of the sample. Specifically, using the SPSS procedure for randomly splitting samples, we obtained two split-halves of the sample (n1 = 591; n2 = 633), conducted an EFA on the first half, and then attempted to confirm this new structure using CFA with the second half. Consistent with Benning et al. (2003), we initially subjected the eight PPI subscales to a principal axis factor analysis with varimax rotation.

Table 5 shows the results of our exploratory analyses. This initial EFA resulted in extraction of three PPI factors (eigenvalues > 1) that accounted for 56.2% of the variance. The first factor accounted for 26.0% of the variance, whereas the second and third accounted for similar, lesser proportions of the variance (17.3% and 12.9%). The first factor consisted primarily of four PPI subscales: Impulsive Nonconformity, Blame Externalization, Machiavellian Egocentricity, and Fearlessness. The second factor consisted primarily of two PPI subscales: Stress Immunity and Social Potency. The third factor also consisted of two PPI subscales: Coldheartedness and Carefree Nonplanfulness.

To stay consistent with Benning et al. (2003), additional EFAs were conducted, which involved: (a) restricting the EFA to a two-factor solution, and (b) dropping the coldheartedness subscale. For the first supplementary EFA (a), the two PPI factors (eigenvalues > 1) accounted for 44.3% of the variance. The first factor accounted for 27.4% of the variance, whereas the second accounted for 16.9%. The majority of PPI subscales substantially loaded on the first factor: Impulsive Nonconformity, Blame Externalization, Machiavellian Egocentricity, Fearlessness, Stress Immunity (negatively), and Carefree Nonplanfulness. The second factor consisted primarily of two PPI subscales: Stress Immunity and Social Potency, but the Fearlessness and Impulsive Nonconformity subscales also cross-loaded onto this factor. The Coldheartedness subscale did not load appreciably on either factor. It is notable that the pattern of results matches very closely the two-factor EFA reported by Lilienfeld (1990). also Benning?

Consistent with Benning et al., we also dropped the Coldheartedness subscale and re-ran the EFA. For this final EFA (b), two PPI factors emerged (eigenvalues > 1) that accounted for 48.1% of the variance (first factor 29.1%, and the second 19.0%). The first factor again consisted of the majority of PPI subscales: Impulsive Nonconformity, Blame Externalization, Machiavellian Egocentricity, Fearlessness, and Social Potency. The second factor consisted primarily of two PPI subscales: Stress Immunity and Social Potency, and to a lesser extent, Carefree Nonplanfulness (negative loading).

Using the first split-half sample and following the recommendations of Prooijen and van der Kloot (2001), we attempted to recover our three-factor EFA solution via CFA by using the exact factor loadings from the three-factor solution to fix the loadings of the CFA (--note that, since our three-factor EFA solution was able to account for the greatest amount of variance in the PPI subscales, this was the optimal solution to attempt to recover). Model fit results were mixed. Fit was good terms of absolute fit (SRMR) and one of the incremental fit indices (CFI) was at an adequate fit level (Hoyle, 1995). The complete set of fit indices were, $X^2(22, 591) = 183.73$, CFI = .900, TLI = .861, RMSEA = .100, SRMR = .043.

Confirmatory Factor Analysis: Split Sample 2

Given some statistical evidence that our three-factor EFA could be recovered via CFA with the first split-half sample, we used the second split-half sample to attempt to confirm the three-factor model via a stringent CFA. That is, the Impulsive Nonconformity, Blame Externalization, Machiavellian Egocentricity, and Fearlessness subscales were set to load on their own factor. The Stress Immunity and Social Potency subscales were set to load on a separate second factor, and finally, the Coldheartedness and Carefree Nonplanfulness subscales were set to load on a final third factor. The model resulted in poor fit, $X^2(17, 633) = 453.99$, CFI = .687, TLI = .430, RMSEA = .225, SRMR = .140, and resulted in two lower bound errors—i.e., the error terms for the social potency and nonplanfulness subscales were set to zero-value because they were being estimated as negative variances.

Lastly, using the second split-half sample, we attempted to recover the three-factor EFA solution again by fixing the CFA factor loadings to those obtained from the EFA with the first split-half sample. Model fit for this fixed-loading CFA was good in terms of the SRMR absolute fit index and the CFI index approached adequate fit. The fit results were, $X^2(22, 633) = 226.90$, CFI = .873, TLI = .839, RMSEA = .112, SRMR = .055.

Discussion

Despite using a large sample of offenders, the overall findings provided little support for the two-factor PPI model proposed by Benning et al. (2003). Specifically, the model fit indices were poor whether the model was tested in terms of a strict two-factor model (i.e., the PPI subscales were specified to load on only one of two latent factors), as well as when we introduced post hoc model modifications (e.g., allowed the fearlessness subscale to cross-load) or used the exact factor loadings reported by Benning et al. Of course, one reason a model may show poor fit is that it cannot be profitably applied to certain populations (Prooijen & van der Kloot, 2001). Since the two-factor PPI model was developed with individuals from the general community, the model may not generalize to offenders. However, using a relatively moderately-sized sample of offenders (n = 302), Patrick et al. (2006) suggested that they were able to replicate the Benning et al. (2003) model, though Patrick et al. did not conduct a rigorous test of the two-factor model and some of their exploratory factor loadings were fairly low (e.g., nonplanfulness = .37, fearlessness = .49, Personal Communication with C. Patrick, 8/31/2006). It is also important to note that the pattern of skew and kurtosis displayed by the PPI subscales in the current sample matched very closely the pattern observed in the Patrick et al. study (Personal Communication with C. Patrick, 9/26/2006).

The current findings may help in furthering research on self-report of psychopathic traits in offender populations. This is an important endeavor since it is not yet clear whether the advantages of self-report outweigh several potential disadvantages (Lilienfeld & Fowler, 2006). An inevitable fact of studying extreme populations (offenders, psychiatric patients) is that the data will usually show substantial departures from normality (no pun intended really? probably better to omit). Thus, we relied upon robust estimation procedures to help in countering highly skewed and kurtotic data; however, non-normal data will occur with both interviews as well as self-reports of psychopathic traits. Still, the nature of the skew/kurtosis might vary by method of assessment. A more central concern for using the PPI with offenders involves the validity of their responses. While a small percentage of cases with deviant response styles in the current study likely contributed to the PPI subscales departure from normality, our results remained essentially unchanged when those cases with elevations on the PPI validity scales were not included in the analyses. Thus, as discussed by Lilienfeld and Fowler (2006), the responses of individuals to the PPI questions may or may not be veridical, but they nonetheless provide “helpful information regarding respondents’ apperceptions of themselves and the world” (p. 111). In this sense, delineating the latent structure of the PPI may lead to a better understanding of self-reported psychopathic traits in offender populations. It may also be fruitful to determine how replicable PPI psychopathy factors are linked with other psychopathy instruments based on interviews (Malterer et al. 2006).

The current results should in no way dissuade researchers from using the PPI, as it does hold promise for understanding the broader construct of psychopathy (Lilienfeld & Fowler, 2006). Indeed, given the importance of the psychopathy construct (Hare, 1996) and recent evidence that the PPI (Marcus et al., 2004), as well as the PCL-R (Edens et al., 2006; Guay et al., 2005), are likely continuously distributed, the PPI may be useful for measuring psychopathic traits in the general population (Hall & Benning, 2006), as well as incarcerated populations (Patrick et al., 2006; Poythress et al., 1998). Moreover, it is reasonable to expect that a viable latent model of the PPI can be discovered and that it will hold across diverse samples. For instance, in a series of studies with the PCL-R and its derivatives, the four-factor model has shown good fit in adult offenders (Neumann et al., in press; Neumann, Vitacco, Hare, & Wupperman, 2005), adolescents (Neumann et al., 2006; Vitacco, Neumann, et al., 2006), psychiatric patients (Hill, Neumann, & Rogers, 2004; Vitacco et al., 2005), and also individuals from the general population (Hare & Neumann, 2006; Neumann & Hare, 2006). Note also that the four correlated factors PCL model is essentially equivalent to a model with two correlated higher-order factors (i.e., the Interpersonal and Affective first-order factors load onto a traditional F1 higher-order factor, and the Lifestyle and Antisocial factors load onto a traditional F2 factor, and these higher-order factors, F1 and F2, are allowed to freely correlate), which could be linked in future research to replicable PPI factors.

Given the intense scrutiny that the PCL-R has been subjected to in terms of its latent structure (Hare & Neumann, 2005), it is remarkable that no studies have examined the structural features of the PPI at the item level since its initial development (Lilienfled, 1990). This is a critical issue for investigators to address in future research. For example, the zero-order correlations between the PPI subscales in the current study are not highly consistent with an underlying two-factor model, and our EFA of the PPI subscales resulted in a three-factor solution with a complex pattern of cross-loadings, consistent with the findings of Benning et al. (2003, 2005), as well as Lilienfeld's (1990) EFA subscale results. Moreover, the mis-specified CFA model results in the current study suggest that there may be unidentified item relations across the PPI subscales. As such, the complex pattern of findings it likely due, in part, to associations among the 160 items used to make up the eight PPI subscales, and therefore, the item-to-subscale relations for the PPI need to be worked out. More generally, the level at which the psychopathy construct is mathematically represented—i.e., item-to-factor versus subscale-to-factor relations—needs to be addressed (Neumann et al., 2006; Neumann, Hare, & Newman, in press).

One way to parse the complexity of the PPI items is to examine them at differing levels of disaggregation. As discussed by Baggozi and Hearthton (1994) and others (Little et al., 2002; Neumann, Kosson, et al., 2006; Neumann, Kosson, & Salekin, in press) it may be necessary to model some constructs at the item level (completely disaggregated model) versus the subscale level (partially disaggregated model). In part, this is due to the fact that constructs can vary in terms of their level of explicitness, and highly explicit constructs (e.g., autonomic responsivity) may be more easily represented in terms of specific variables or 'items' (e.g., heart rate, skin conductance). Conversely, it may be necessary to model other constructs (e.g., fearlessness) in terms of a broader domain of variables by aggregating representative items into item composites or parcels (Little et al., 2002). However, it is essential that such aggregated or parceled variables be clearly understood in terms of how the items that make up a parcel are interrelated.

Models of the PPI at the subscale level represent partially disaggregated models (Bagozzi & Heatherton, 1994; Little et al., 2002). The subscales themselves can be understood in terms of parcels (Little et al., 2002), which can be advantageous to use for latent variable modeling. Statistical research has shown that parcels are more reliable and valid indicators of their underlying factors, have higher communalities, provide more efficient (low variability) parameter estimates, are more normally distributed than individual items, and reduce the number of parameters that have to be estimated, thus improving the ratio of the number of subjects relative to the number of estimated parameters (Bagozzi & Heatherton, 1994; Bandalos, 2002; Little et al., 2002; Marsh, 1994; West et al., 1995). However, it is absolutely necessary that the items which make up a parcel are unidimensional; otherwise, use of multidimensional item sets within a parcel can result in model mis-specification (Bandalos, 2002). Thus, the dimensionality of each PPI subscale needs to be investigated in conjunction with development of structural models for the PPI. For instance, the PCL-R and PCL: YV items have been successfully parceled to test latent variable psychopathy models with male and female offenders (Hare & Neumann, 2006) and incarcerated adolescents (Neumann et al., 2006), but this was only possible given that the items which formed each parcel had been previously shown to represent unidimensional factors (Cooke & Michie, 2001).

Its likely that the PPI item-to-factor relations can be worked out, as has been done for the Antisocial Processing Screen Device (APSD; e.g., Vitacco, Rogers, Neumann, 2003; Vitacco, Salekin, & Neumann, 2006), as well as the family of PCL instruments (Hare & Neumann, 2006). Indeed, Cale and Lilienfeld (2006) have recently employed a selected sub-set of 56 PPI items (referred to as the PPI-short form), and these items could be examined via CFA to determine if the items which make up each shortened PPI subscale are truly unidimensional, and how well they serve as indicators of their respective factors.

Another methodological factor which complicates the associations between the PPI items, subscales, and latent factors, is that two PPI subscales are composed of nearly all reverse scored items (coldheartedness and nonplanfulness) and others of nearly all positively scored items (impulsive nonconformity and blame externalization). Thus, it possible that some of the PPI factors which emerged in the current study and other EFA research on the PPI subscales reflect group factors (Reise et al., 2000). Group factors can stem from smaller groups of variables that share specific variance with each other (separate from their common variance with a larger set of variables), representing a narrowly defined but legitimate group factor (Reise et al., 2000). For instance, recent research with the BDI-II found that a general factor accounted for the bulk of the variance of all BDI items, but that two smaller group factors (reflecting self-blame and fatigue, respectively), accounted for a small amount of unique variance (Ward, 2006). Also, as discussed by West et al. (1995), a set of items (or scales) that have similar agreement rates can give rise to spurious factors reflecting only the common degree of departure from normality among specific items (or subscale scores). The coldheartedness and nonplanfulness subscales showed very similar (positive) skew, which may reflect a response bias to the predominantly reverse scored items in these two scales.

Another important issue that warrants further investigation involves the exclusion of coldheartedness from the Benning et al. (2003) two-factor model. This particular subscale is one of the eight original PPI subscales and is often considered a central component of psychopathy (Lilienfeld, 1990). Malterer et al. (2006) found that coldheartedness correlated significantly with PCL-R/SV total score across all three independent samples, suggesting that it may be an important component of self-reported psychopathic traits.

In sum, the original Benning et al. (2003) two-factor model was not an adequate representation of the underlying structure of the PPI subscales in our sample?, and we were not able to achieve suitable model fit despite the introduction of model modifications based on the empirical literature or when we used the exact factor loadings reported by Benning et al. In addition, our results suggest that the PPI may not be best employed as a unidimensional measure (i.e., use of PPI total scores), and that the unidimensionality of at least some of the PPI subscales may be questionable. Our concerns about unidimensionality are consistent with the initial development of the PPI and the findings that various items cross-loaded onto other PPI factors (Lilienfeld, 1990) (I see potential problems with the last sentence. our “concerns” are not consistent with… do you mean our results..? Also, do concerns about unidimensionality apply to the cross-loaded problems?. Thus, we would recommend that investigators re-examine the PPI structure using methods that delve deeper than the existing subscale level, and then follow the procedures outlined by Lilienfeld and Andrews (1996) to better understand any derived factor structure. Finally, it is important to remember that the PPI instrument was designed to capture a variety of psychopathic characteristics that had been suggested by diverse literatures, and therefore, the PPI items likely assess a broad diversity of psychopathic trait dimensions, and (new sentence here?) whether such dimensions can be narrowed to only two higher-order dimensions remains to be seen.

References

Alterman AI, Cacciola JS, Rutherford MJ. Reliability of the revised psychopathy checklist in substance abuse patients. Psychological Assessment 1993;5:442–448.

Aluja A, Garcia O, Garcia L, Seisdedos N. Invariance of the 'NEO-PI-R' factor structure across exploratory and confirmatory factor analyses. Personality and individual differences 2005;38:1879–1889.

Bagozzi RP, Heatherton TF. A general approach to representing multifaceted personality constructs: Application to self-esteem. Structural Equation Modeling 1994;1:35–67.

Bandalos DL. The effects of item parceling on goodness-of-fit and parameter bias in structural equation modeling. Structural Equation Moldeling 2002;9:78–102.

Benning S, Patrick C, Blonigen D, Hicks B, Iacono W. Estimating Facets of Psychopathy From Normal Personality Traits: A Step Toward Community Epidemiological Investigations. Assessment 2005;12:3–18. [PubMed: 15695739]

Benning SD, Patrick CJ, Hicks BM, Blonigen DM, Krueger RF. Factor structure of the Psychopathic Personality Inventory: Validity and implications for clinical assessment. Psychological Assessment 2003;15(3):340–350. [PubMed: 14593834]

Benning SD, Patrick CJ, Salekin RT, Leistico AR. Convergent and discriminant validity of psychopathy factors assessed via self-report: A comparison of three instruments. Assessment 2005;12(3):270–289. [PubMed: 16123248]

Bentler, PM. EQS structural equations program manual. Multivariate Software, Inc; Encino, CA: 1995.

Bollen KA. Latent variables in psychology and the social sciences. Annual Review of Psychology 2002;53:605–34.

Brinkley CA, Schmitt WA, Smith SS, Newman JP. Construct validation of a self-report psychopathy scale: Does Levenson's self-report psychopathy scale measure the same constructs as Hare's psychopathy checklist-revised? Personality & Individual Differences 2001;31:1021–1038.

Cooke DJ, Michie C. Refining the construct of psychopathy: Towards a hierarchical model. Psychological Assessment 2001;13:171–188. [PubMed: 11433793]

Dematteo, et al. An empirical investigation of psychopathy in a noninstitutionalized and noncriminal sample. Behavioral Science and the Law 2006;24:133–43.

Floyd FJ, Widaman KF. Factor analysis in the development and refinement of clinical assessment instruments. Psychological Assessment 1995;7:286–299.

Edens JF, Hart SD, Johnson DW, Johnson J, Olver ME. Use of the Personality Assessment Inventory to assess psychopathy in offender populations. Psychological Assessment 2000;12:132–139. [PubMed: 10887759]

Edens JF, Marcus DK, Lilienfeld SO, Poythress NG. Psychopathic, Not Psychopath: Taxometric Evidence for the Dimensional Structure of Psychopathy. Journal of Abnormal Psychology 2006;115:131–144. [PubMed: 16492104]

Everitt, B.; Dunn, G. Applied multivariate data analysis. Oxford University Press; New York: 2001.

Guay, et al. A taxometric analysis of the latent structure of psychopathy. Evidence for dimensionality. Journal of Abnormal Psychology. (in press).

Hare RD. A comparison of procedures for the assessment of psychopathy. Journal of Consulting and Clinical Psychology 1985;53:7–16. [PubMed: 3980831]

Hare RD. Psychopathy: A clinical construct whose time has come. Criminal Justice and Behavior 1996;23:25–54.

Hare, RD. The Hare Psychopathy Checklist—Revised. 2nd ed. Multi-Health Systems; Toronto, Ontario, Canada: 2003.

Hare RD, Harpur TJ, Hakstian AR, Forth AE, Hart SD, Newman JP. The Revised Psychopathy Checklist: Reliability and factor structure. Psychological Assessment 1990;2:338–341.

Hare RD, Neumann CS. The structure of psychopathy. Current Psychiatry Reports 2005;7:1–32. [PubMed: 15717976]

Hare, RD.; Neumann, CS. The PCL-R assessment of psychopathy: Development, structural properties, and new directions. In: Patrick, C., editor. Handbook of psychopathy. John Wiley & Sons; New York: 2006. p. 58-88.

Harpur TJ, Hare RD, Hakstian AR. Two-factor conceptualization of psychopathy: Construct validity and assessment implications. Psychological Assessment: A Journal of Consulting and Clinical Psychology 1989;1:6–17.

Hart, SD.; Cox, DN.; Hare, RD. Manual for the Psychopathy Checklist: Screening Version (PCL:SV). Multi-Health Systems; Toronto, ON: 1995.

Hart, SD.; Hare, RD. Psychopathy: Assessment and association with criminal conduct. In: Stoff, DM.; Breiling, J., editors. Handbook of antisocial behavior. John Wiley & Sons, Inc; New York, NY, US: 1997. p. 22-35.

Hart SD, Forth AE, Hare RD. The MCMI-II and psychopathy. Journal of Personality Disorders 1991;5:318–327.

Hill C, Neumann CS, Rogers R. Confirmatory factor analysis of the Psychopathy Checklist: Screening Version (PCL:SV) in offenders with axis I disorders. Psychological Assessment 2004;16:90–95. [PubMed: 15023097]

Ishikawa SS, Raine A, Lencz T, Bihrle S, Lacasse L. Autonomic stress reactivity and executive functions in successful and unsuccessful psychopaths from the community. Journal of Abnormal Psychology 2001;110:423–432. [PubMed: 11502085]

Lilienfeld SO, Andrews BP. Development and preliminary validation of a self-report measure of psychopathic personality traits in noncriminal populations. Journal of Personality Assessment 1996;66:488–524. [PubMed: 8667144]

Lilienfeld, SO.; Fowler, KA. The self-report assessment of psychopathy: Problems, pitfalls, and promises. In: Patrick, CJ., editor. Handbook of Psychopathy. Guilford Press; New York: 2006. p. 107-132.

Lilienfeld, SO. Doctoral Dissertation. University of Minnesota; Minneapolis: 1990. Development and preliminary validation of a slf-report of psychopathic personality.

Little TD, Cunningham WA, Shahar G, Widaman KF. To parcel or not to parcel: Exploring the questions, weighting the merits. Structural Equation Modeling 2002;9:151–73.

MacCallum RC, Austin J. Applications of structural equation modeling in psychological research. Annual Review of Psychology 2000;51:201–226.

Malterer, M.; Lilienfeld, S.; Newman, JP. Concurrent Validity of the Psychopathic Personality Inventory with Offender and Community Samples: A Replication and Extension. 2006. Manuscript in preparation

Marcus DK, John SL, Edens JF. A Taxometric Analysis of Psychopathic Personality. Journal of Abnormal Psychology 2004;113:626–635. [PubMed: 15535794]

McCrae RR, Zonderman AB, Costa PT, Bond MH, Paunonem SV. Evaluating replicability of factors in the revised NEO personality inventory: Confirmatory factor analysis versus procrustes rotation. Journal of Personality and Social Psychology 1996;70:552–566.

Neumann, CS.; Hare, RD. Psychopathic traits in a large community sample: Links with violence, substance use and intelligence; Paper presented at the 21st Annual Conference of the Society for Research in Psychopathology; Miami, FL. October, 12-15; 2006.

Neumann CS, Hare RD, Newman JP. The super-ordinate nature of the psychopathy. Special Issue on Psychopathy: Journal of Personality Disorders. (in press).

Neumann CS, Kosson DS, Forth AE, Hare RD. Factor structure of the Hare Psychopathy Checklist: Youth Version (PCL:YV) in incarcerated adolescents. Psychological Assessment 2006;18:142–154. [PubMed: 16768590]

Neumann, CS.; Kosson, D.; Salekin, RT. Exploratory and confirmatory factor analysis of the psychopathy construct: Methodological and conceptual issues. In: Hervé, H.; Yuille, J., editors. Psychopathy: Theory, Research, and Social Implications. Lawrence Erlbaum Associates; New York: (in press)

Neumann CS, Vitacco MJ, Hare RD, Wupperman P. Re-construing the reconstruction of psychopathy: A comment on Cooke, Michie, Hart, & Clark. Journal of Personality Disorders 2005;19:624–640. [PubMed: 16553559]

Patrick, CJ. Back to the future: Cleckley as a guide to the next generation of psychopathy research. In: Patrick, CJ., editor. Handbook of psychopathy. Guilford Press; New York: 2006. p. 606-617.

NIH-PA Author Manuscript
NIH-PA Author Manuscript

Patrick CJ. Emotion and psychopathy: Startling new insights. Psychophysiology 1994;31(4):319–330. [PubMed: 10690912]

Patrick CJ, Edens JF, Poythress NG, Lilienfeld SO, Benning SD. Construct Validity of the Psychopathic Personality Inventory Two-Factor Model With Offenders. Psychological Assessment 2006;18:204–208. [PubMed: 16768596]

Poythress NG, Edens JF, Lilienfeld SO. Criterion-related validity of the Psychopathic Personality Inventory in a prison sample. Psychological Assessment 1998;10:426–430.

Reise SP, Waller NG, Comrey AL. Factor analysis and scale revision. Psychological Assessment 2000;12:287–297. [PubMed: 11021152]

Schroeder ML, Schroeder KG, Hare RD. Generalizability of a checklist for assessment of psychopathy. Journal of Consulting & Clinical Psychology 1983;51:511–516. [PubMed: 6619357]

Tomarken AJ, Waller NG. Structural equation modeling: Strengths, limitations, and misconceptions. Annual Review of Clinical Psychology 2005;1:31–65.

van Prooijen J-W, van der Kloot WA. Confirmatory analysis of exploratively obtained factor structure. Educational and Psychological Measurement 2001;61:777–792.

Vitacco MJ, Neumann CS, Caldwell M, Leistico AM, Van Rybroek G. The four-factor model of adolescent psychopathy and its association with instrumental violence. Journal of Personality Assessment 2006;87:74–83. [PubMed: 16856788]

Vitacco M, Neumann CS, Jackson RL. Testing of a four-factor model of psychopathy: Associations with gender, ethnicity, intelligence and violence. Journal of Consulting and Clinical Psychology 2005;73(3):466–476. [PubMed: 15982144]

Vitacco MJ, Rogers R, Neumann CS. The Antisocial Processing Screening Device: An examination of its construct and criterion validity. Assessment 2003;10(2):143–50. [PubMed: 12801186]

Vitale JE, Smith SS, Brinkley CA, Newman JP. The reliability and validity of the Psychopathy Checklist—Revised in a sample of female offenders. Criminal Justice and Behavior 2002;29:202–231.

West, SG.; Finch, JF.; Curran, PJ. Structural equation modeling with nonnormal variables: Problems and remedies. In: Hoyle, RH., editor. Structural equation modeling: Concepts, issues and applications. Sage; Thousand Oaks: 1995. p. 56-75.

Widom CS. A methodology for studying noninstitutionalized psychopaths. Journal of Consulting and Clinical Psychology 1977;45:674–683. [PubMed: 886050]

Yang Y, Raine A, Lencz T, Bihrle S, LaCasse L, Colletti P. Volume reduction in prefrontal gray matter in unsuccessful criminal psychopaths. Biological Psychiatry 2005;57:1103–1108. [PubMed: 15866549]

Table 1

Descriptive statistics for PPI Subscales: Total (N = 1224) and split half samples (n = 591, 633)

	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
						SE		SE
Total sample (N =1224)								
Impulsive nonconformity	17	64	37.50	8.18	.353	.070	−.012	.140
Blame externalization	18	70	43.74	9.48	−.140	.070	−.443	.140
Machiavellian Ego.	30	117	69.58	14.31	−.028	.070	−.037	.140
Carefree nonplanfullness	20	72	38.44	9.37	.726	.070	.627	.140
Stress immunity	16	44	31.66	5.53	−.040	.070	−.404	.140
Social potency	33	94	64.99	10.59	−.201	.070	−.030	.140
Fearlessness	21	76	48.67	10.78	.031	.070	−.527	.140
Coldheartedness	24	81	47.19	9.56	.659	.070	.788	.140
First split-half sample (n = 591)								
Impulse nonconformity	19	64	37.64	8.10	.315	.100	.033	.200
Blame externalization	19	70	43.69	9.79	−.039	.100	−.446	.200
Machiavellian ego.	30	117	69.73	14.22	−.019	.100	.088	.201
Carefree nonplanfulness	20	72	38.54	9.38	.728	.100	.637	.200
Stress immunity	16	44	31.40	5.56	−.013	.101	−.344	.201
Social potency	33	94	65.13	10.76	−.178	.100	−.113	.200
Fearlessness	22	76	48.64	10.78	.037	.100	−.482	.201
Coldheartedness	26	81	47.17	9.41	.643	.100	.921	.200
Second split-half sample (n = 633)								
Impulsive Nonconformity	17	62	37.37	8.29	.379	.097	−.063	.194
Blame Externalization	18	66	43.85	9.20	−.252	.097	−.440	.194
Machievellian Ego.	33	113	69.46	14.39	−.039	.097	−.135	.194
Carefree Nonplanfullness	20	71	38.39	9.42	.740	.097	.630	.194
Stress immunity	16	44	31.88	5.51	−.061	.097	−.466	.194
Social potency	35	91	64.79	10.49	−.211	.097	.010	.193
Fearlessness	21	76	48.71	10.77	.023	.097	−.551	.194
Coldheartedness	24	81	47.16	9.79	.699	.097	.722	.194

Table 2

Manifest Variable PPI Subscale Correlations: Total Sample (N = 1224)

Subscale	1	2	3	4	5	6	7	8
1. Impulse nonconformity	-	.39	.54	.32	−.17	.12	.56	.04ns
2. Blame externalization		-	.50	.09	−.39	.00ns	.24	−.17
3. Machiavellian egocentricity			-	.29	−.31	.28	.39	.14
4. Carefree nonplanfulness				-	−.34	−.25	.15	.41
5. Stress immunity					-	.39	.00ns	.19
6. Social potency						-	.24	.01ns
7. Fearlessness							-	−.05ns
8. Coldheartedness								-

Note. PPI scales ordered by factor designation based on Benning et al. (2003) EFA solution

Table 3

Confirmatory Factor Analysis of Benning et al. 2003 Two-Factor PPI Model (N = 1224)

PPI Subscale	PPI-I	PPI-II	error/unique var.
Impulse nonconformity		.604	.797
Blame externalization		.542	.840
Machiavellian ego.		.928	.372
Carefree nonplanfulness		.311	.951
Stress immunity	.389		.921
Social potency	1.000		.000ns
Fearlessness	.237		.971

Note. All factor loadings and error variance terms significant (p’s < .05-.001) unless otherwise indicated.

Table 4

Largest Residuals from Confirmatory Factor Analysis of Benning et al. 2003 Two-factor Model

Residual covariance	residual value
Fearlessness/Impulsive noncon.	.529
Fearlessness/Mach. Ego.	.333
Fearlessness/Blame extrn.	.207
Stress immune./Blame extrn.	−.442
Stress immune./Mach. Ego.	−.408
Stress immune./Carefree nonpl.	−.379
Social poten./Carefree nonpl.	−.329
Stress immune./Impulsive noncon.	−.235

Table 5

Results of EFA using Principal Axis Factor Analyses of PPI Subscales (n = 591)

	Three-factor solution			Two-factor solution		Two-factor solution without Coldheartedness	
Subscale	**A**	**B**	**C**	**A**	**B**	**A**	**B**
Impulse nonconformity	**.774**	−.023	.170	**.715**	**.408**	**.787**	−.131
Blame externalization	**.524**	−.319	−.211	**.557**	.006	**.439**	−.333
Machiavellian egocentricity	**.779**	−.076	.094	**.708**	**.344**	**.770**	−.178
Carefree nonplanfulness	*.242*	**−.415**	**.743**	**.436**	−.086	*.244*	**−.401**
Stress immunity	−.246	**.864**	.092	**−.682**	**.693**	−.150	**.828**
Social potency	.332	**.555**	−.086	−.036	**.588**	**.386**	**.566**
Fearlessness	**.610**	*.137*	.061	**.457**	**.450**	**.631**	*.073*
Coldheartedness	.005	.172	**.613**	.056	.175	*	*

Note. Factor loadings > .34 in boldface and those that differ from Benning et al. (2003) are underlined. Boldface plus underlined are *unexpected* strong loadings and italicized plus underlined were *expected* strong loadings.