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Psychopathy and Risk Taking among Jailed Inmates

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Abstract

Several clinical descriptions of psychopathy suggest a link to risk taking; however the empirical basis for this association is not well established. Moreover, it is not clear whether any association between psychopathy and risk taking is specific to psychopathy or reflects shared variance with other externalizing disorders, such as antisocial personality disorder, alcohol use disorders, and drug use disorders. In the present study we aimed to clarify relationships between psychopathy and risky behavior among male county jail inmates using both self-reports of real-world risky behaviors and performance on the Balloon Analogue Risk Task (BART), a behavioral measure of risk taking. Findings suggest that associations between externalizing disorders and self-reported risk taking largely reflect shared mechanisms. However, psychopathy appears to account for unique variance in self-reported irresponsible and criminal risk taking beyond that associated with other externalizing disorders. By contrast, none of the disorders were associated with risk taking behavior on the BART, potentially indicating limited clinical utility for the BART in differentiating members of adult offender populations.

Keywords

psychopathy; risk taking; offenders; antisocial; substance abuse

Psychopathy and Risk taking among Criminal Offenders

Psychopathy is an externalizing syndrome that is closely associated with criminal behavior. However, despite evidence that psychopathy predicts violent and nonviolent crime and recidivism (Leistico, Salekin, DeCoster, & Rogers, 2008), studies have not yet identified the mechanisms underlying the heightened risk for these outcomes. Prominent efforts to explain the antisocial behavior of psychopaths have emphasized emotional deficits (Patrick, Cuthbert, and Lang, 1994), difficulty using peripheral information (Wallace, Vitale, & Newman, 1999), and inefficient cognitive function in situations that place differential demands on left hemisphere systems (Kosson, Miller, Byrnes, & Leveroni, 2007). Another potential mechanism – one that has received minimal empirical attention – is a propensity for risk taking.

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Several clinical descriptions of psychopathy suggest a link to risk taking, including sensation-seeking, recklessness, and impulsivity (Cleckley, 1976; Hare, 2003; Lykken, 1995). However, as with several of the attributes prominent in clinical descriptions of psychopathy, the empirical basis for the association between psychopathy and risk taking is not well-established.

In addition, it is not clear that any association between psychopathy and risk taking is specific to psychopathy. Psychopathy is commonly comorbid with antisocial personality disorder (ASPD) as well as with alcohol use disorders (AUDs) and other drug use disorders (DUDs), and there is evidence linking all of these externalizing disorders to a predisposition toward activities that are exciting, risky and challenging (Grau & Ortet, 1999; Lang & Belenko, 2001; Quay, 1965; Zuckerman, 1994). Moreover, there is evidence that shared genetic mechanisms underlie a substantial proportion of the variance in externalizing spectrum pathology (Kendler, Prescott, Myers, & Neale, 2003; Krueger, 2006). Therefore, the extent to which associations between externalizing psychopathology and risk taking reflect shared versus disorder-specific relationships is not yet clear. Only studies that simultaneously assess several distinct disorders along with risk taking can address this issue.

Assessment of the relationship between psychopathy and risk taking is also complicated by ambiguity about the nature of risk taking. Different risky behaviors have been included among the diagnostic criteria for disorders within the externalizing spectrum (i.e., impulsive and irresponsible behavior in ASPD and psychopathy, substance use in hazardous situations in DUDs). Although some of these disorders may be characterized only by specific kinds of risk taking, no prior studies have examined associations between psychopathy and specific dimensions of risk taking. Consequently, it is unclear whether psychopathic offenders can be differentiated by engagement in general versus specific classes of risky behaviors. Notably, the internal structure of risk taking is not well-established. In a study of risk taking using a community sample, Lejuez et al. (2002) found two distinct dimensions of risk taking: a dimension of delinquent or antisocial risk taking and a dimension of substance abuse and sexual risk taking. However, their characterization of risk taking was preliminary, and they emphasized the need for additional studies to establish the internal structure of risk taking behavior.

The present study was designed to clarify relationships between psychopathy and risk taking. Because there may be several distinct classes of risk taking (Lejuez et al., 2002; Reynolds, Ortengren, Richards, & de Wit, 2006), we conducted independent analyses to identify specific dimensions of risk taking in our sample and then examined associations between psychopathy and different kinds of real-world risk taking. In addition, we examined whether relationships between psychopathy and risk taking were specific to psychopathy or attributable to variance shared between psychopathy and three other categories of externalizing disorders: ASPD, AUDs, and DUDs. In so doing, we aimed to address gaps in the literature on risk taking and psychopathy by clarifying whether psychopathy's hypothesized link to risk taking indicates a disorder-specific relationship or can be accounted for by a vulnerability factor shared with the other externalizing disorders.

The Behavioral Assessment of Risk taking

Another purpose of the present study was to extend our understanding of associations between psychopathy and risk taking to include behavioral measures. Prior studies of risk taking (e.g., DiClemente, Hansen, & Ponton, 1995; Gullone & Moore, 2000) have been criticized for a reliance on self-report methodology, which raises doubts regarding the generalizability of findings due to inaccuracies in reporting associated with lack of insight, impression management, or fear of consequences of reporting risk taking behaviors (Lejuez et al., 2002). Optimally, studies should incorporate additional ways of measuring risk taking that augment traditional self-report methodology. Several behavioral tasks have been developed to assess

risk taking in the laboratory (Bechara, Damasio, Damasio, & Anderson, 1994; Lejuez et al., 2002; Mitchell, 1999; Rogers et al., 1999). Of these, the most compelling evidence for convergent validity has been established for the Balloon Analogue Risk Task (BART; Lejuez et al., 2002). BART scores are positively associated with self-reported risk taking behaviors such as smoking, gambling, theft, drug and alcohol use, and risky sexual behaviors in adult participants (Lejuez et al., 2002; 2003a), and with conduct disorder and substance use among adolescents (Aklin, Lejuez, Zvolensky, Kahler, & Gwadz, 2005; Crowley, Raymond, Mikulich-Gilbertson, Thompson, & Lejuez, 2006; Lejuez, Aklin, Zvolensky, & Pedulla, 2003b).

One study reported a specific correlation between BART performance and psychopathic characteristics (Hunt, Hopko, Bare, Lejuez, & Robinson, 2005). This study also identified an inverse relationship between BART-assessed risk taking and trait anxiety. However, conclusions from that study are limited by the use of the Self-Report Psychopathy Scale-2 (SRP-2; Hare, Harpur, & Hemphill, 1989) to assess psychopathic traits. The SRP-2 appears to provide a valid measure of the antisocial lifestyle features of psychopathy but may be less effective at assessing the core affective and interpersonal features of the disorder (Lilienfeld & Fowler, 2006) than the Psychopathy Checklist-Revised (PCL-R, Hare, 2003), the best-validated measure of psychopathy (Patrick, Poythress, Edens, Lilienfeld, & Benning, 2006). In addition, Hunt et al. (2005) employed a college student sample likely to be relatively low in psychopathic traits. The study also did not examine real world risk taking concurrently with the BART; thus the extent to which associations between psychopathic traits and BART performance indexed the real-world risky behaviors that are of particular clinical interest remains unclear. To date, we are aware of no studies that have examined relationships between psychopathy and risk taking propensity as measured by the BART using clinical measures such as the PCL-R or high-risk offender samples. Thus, there are limited data regarding links between psychopathy and performance on behavioral measures of risk taking.

The present study aimed to fill gaps in the empirical literature by determining the extent to which psychopathy is related to a broad propensity for risky behavior using a multi-component assessment of risk taking and a clinical sample that included psychopathic offenders. Moreover, we aimed to determine the extent to which the relationship between psychopathy and risk taking is specific to psychopathy or attributable to a vulnerability factor shared with other externalizing disorders. The present investigation tested the hypothesis that psychopathy, ASPD, AUD, and DUD would be broadly related to an increased tendency toward risky behavior as measured by the BART and self-reported real-world risky behavior across two identified domains. We further hypothesized that the relationship between psychopathy and risk taking would remain after controlling for symptoms of other externalizing disorders. Our use of the BART, in addition to an interview measure of real-world risky behavior, enabled relatively comprehensive coverage of the construct of risk taking. Finally, because of negative relationships found between trait anxiety and performance on risk-related behavioral tasks (Hagopian & Ollendick, 1994; Hunt et al., 2005; Schmitt, Brinkley, & Newman, 1999), and the possibility that high anxiety may mask or suppress (Hicks & Patrick, 2006) relationships between core elements of psychopathy and propensity for risk taking, we also evaluated anxiety as a possible covariate in supplementary analyses. Based on prior findings, we predicted a negative relationship between anxiety and performance on the BART.

Method

Participants

Participants were 119 male inmates at a county jail near Chicago, awaiting trial or serving jail terms of one year or less (63 African-American and 56 European-American). Inmates were invited to participate if they were between 18 and 44 years of age (mean age = 27.92, *SD* =

6.96) and had been charged with or convicted of a felony or misdemeanor. Inmates taking psychotropic medications, with IQs below 70, or who had difficulty reading English were excluded. Of eligible inmates contacted, 89% agreed to participate.

Measures

Psychopathy—The PCL-R (Hare, 2003) is a 20-item measure of psychopathy on which a participant is rated based on a semi-structured interview and a review of file material. The two-factor PCL-R model was used to examine subcomponents of psychopathy, with Factor One (F1) assessing affective-interpersonal traits and Factor Two (F2) assessing antisocial-impulsive traits¹. Extensive research attests to the reliability and validity of PCL-R total and factor scores as measures of psychopathy. Observer PCL-R scores were available for 15 (12.6%) participants in the current sample. Interrater reliability for total PCL-R scores (intraclass $r = .93$), F1 scores (intraclass $r = .91$) and F2 scores (intraclass $r = .92$) was adequate.

Antisocial Personality Disorder (ASPD)—Based on *Diagnostic and Statistical Manual of Mental Disorders-4th Edition, Text Revision* (DSM-IV-TR; American Psychiatric Association, 2000) criteria, the presence or absence of ASPD was assessed during the semi-structured interview described above and review of file material. Diagnoses of ASPD correlated highly with PCL-R total scores ($r = .62, p < .01$). Antisocial personality disorder data were missing for 20 participants; thus analyses involving ASPD excluded these individuals.

Alcohol Use Disorder (AUD) and Drug Use Disorder (DUD)—The substance use disorders module of the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1997) was used to assess lifetime alcohol and drug abuse/dependence. Separate ordinal variables were generated for severity of alcohol and drug problems ranging from 0 (*no abuse*), to 1 (*abuse*) to 4 (*severe dependence*). Diagnoses based on this module exhibit good interrater reliability (Martin, Pollock, Bukstein, & Lynch, 2000) and validity (Kranzler, Kadden, Babor, & Tennen, 1996). Seventy-four percent of participants met criteria for one or more substance use disorders. Alcohol and DUD data were missing for nine participants; analyses involving AUD and DUD excluded these individuals.

Anxiety—The Welsh Anxiety Scale (WAS; Welsh, 1956) is a 39-item self-report measure of trait anxiety or negative affectivity (Watson & Clark, 1984). WAS scores exhibit excellent internal consistency and correlate with extratest measures of discomfort, anxiety, and pessimism (Graham, 1993). The mean WAS score in the present sample was 13.51 ($SD = 9.32$).

Real-World Risky Behavior—A separate interview was written for the current study to ask a series of 16 questions regarding participants' involvement in a number of risky behaviors. We chose to assess behaviors that were assessed in prior studies of the BART (e.g., Lejuez et al., 2002; 2003b; Lejuez et al., 2007) and added several additional questions about violent criminal risk taking that were pertinent to our sample. Some questions (e.g., "During the past year, with how many different sexual partners have you had unprotected sex?") yielded continuous data while others (e.g., "Have you ever mugged or robbed anyone?") yielded dichotomous (yes/no) data. Following each interview, a review of each participant's pretrial or probation file was conducted. If the file review indicated risky criminal behavior that was not reported by the participant, it was used to modify interview responses, thus providing increased sensitivity in the assessment of criminal risk taking. For example, if an individual

¹Although three and four-factor PCL-R models have also been validated, we incorporated the two-factor model for ease of comparison to results of a prior study of risk taking and psychopathy (Hunt et al., 2005) in which risk taking was related to F2 psychopathic traits (antisocial behavior), but not F1 (emotional detachment).

had a robbery charge on his criminal history, the mugging/robbery item would be scored “yes” regardless of his answer to the interview question.

Lifetime Violent Charges—The total number of violent charges for each participant was determined via a review of pre-trial services or probation files. Following Walsh, Swogger, & Kosson (2004) the following were considered violent charges: robbery, assault, murder, domestic battery, weapons charges, kidnapping, arson, criminal damage to property, and sex crimes other than indecent exposure.

Apparatus and Tasks

The BART—A procedure similar to that used by Lejuez et al. (2002) was employed. The BART was presented on an 8.5×11.5 laptop computer screen that displayed a small simulated balloon accompanied by a balloon pump, a reset button labeled *Collect \$\$\$*, and a permanent money-earned display labeled *Total Earned*. On the task, each mouse click on the pump inflates the balloon slightly in all directions. With each pump, one cent accrues in a temporary reserve. When a balloon is pumped past its explosion point, a “pop” sound is generated, and all the money in the temporary bank is lost. The next balloon then appears on the screen.

At any time during each trial, the participant can stop pumping the balloon and click the mouse to the *Collect \$\$\$* button. Doing so transfers all money from the temporary bank to the permanent bank, and the total earned is updated. After each balloon explosion or money collection a new balloon appears until all 30 trials have been completed. Each balloon has a different bursting point, with the most likely to burst exploding on the first pump and the least likely exploding after 128 pumps. The dependent measure of risk taking is the adjusted average number of pumps (i.e., the average number of pumps on each balloon, excluding those balloons that pop). The adjustment is made because the number of pumps is necessarily constrained on balloons that pop, thereby limiting variability in absolute averages (Lejuez et al., 2002). Higher scores on the BART indicate greater risk taking. Based on BART performance, money was deposited in participants’ commissary account following the session.

As noted above, there is considerable evidence that the BART is associated with self-reported, real-world, risk taking in adult and adolescent samples (Aklin et al., 2005; Crowley et al., 2006; Lejuez et al., 2002; 2003a). The BART exhibits good test-retest reliability (average $r = .82$; Lejuez et al., 2002; 2003b).

Procedure

The study involved two sessions on separate days. In the first session consenting inmates completed a semi-structured interview that queried several life history domains. Subsequent to this semi-structured interview, the SCID-I substance use disorders module was used to assess alcohol and drug use. These interviews and a file review were used to complete the PCL-R and ASPD and SCID diagnoses. Participants were administered the BART, the WAS, and then the interview regarding specific risky behaviors during the second session.

Analytic Plan

Following transformation of real-world risk taking items to z-scores, a principal components analysis was conducted to reduce the data to two dimensions. Pearson (for continuous data) and point-biserial (for analyses involving dichotomous data) bivariate correlations between scores for each externalizing disorder, anxiety, and all risk taking variables were examined. All significant bivariate relationships between psychopathy total and factor scores and components of risk taking were then followed up with partial correlations in which we controlled for ASPD, AUD, and DUD scores, providing a test of the unique contribution of psychopathy beyond that of other externalizing disorders. Supplementary partial correlations

were computed to determine whether significant relationships between psychopathy total and factor scores and risk taking remained after controlling for anxiety.

Results

Data Screening and Preliminary Analyses

There were no outliers (± 3 standard deviations from the mean) identified for any variables in the study. Scores on the BART were normally distributed. Scores on the WAS, PCL-R, AUD, and DUD exhibited skewed distributions. Square-root transformations corrected skewness; however analyses using transformed scores and untransformed scores yielded equivalent patterns of significant results. Therefore untransformed scores are reported for ease of interpretation. In general, interrelationships among indices of psychopathology were as expected: indices of externalizing disorders were intercorrelated such that psychopathy was related to ASPD and DUD. Also, consistent with prior findings (Hale, Goldstein, Abramowitz, Calamari, & Kosson, 2004) anxiety was related to PCL-R F2 but was unrelated to F1.

In order to examine whether the risk taking variables could be summarized by a small number of higher-order dimensions of risky behavior, principal components analyses (PCA) were conducted on the real-world risk taking items. First, scores were standardized to z -scores due to the different metrics (frequency versus dichotomous) that were incorporated for different items. We conducted an initial PCA with varimax rotation. Seven items that exhibited very low communalities ($< .20$) were deleted. Next, the number of components was determined using a Humphreys-Montanelli parallel analysis (Humphreys & Montanelli, 1975). The parallel analysis suggested that two valid components could be reliably identified. We then conducted a final PCA with varimax rotation using the remaining nine items. The two rotated components (Eigenvalues = 2.20 and 1.56) accounted for 23.8% and 17.9% of the variance in risk taking respectively, indicating that each component contributed meaningfully. In addition, as shown in Table 1, each item loaded above .40 on one of the two components². Of the six items that comprised the first component, most or all constituted acts characterized by irresponsible or criminal risky behavior. Thus, this component was labeled Irresponsible and Criminal Risk Taking (ICRT). The second component was comprised of three types of risky behavior that have been associated with sensation-seeking in prior studies (Hansen & Breivik, 2001; Roberti, 2004). This component was labeled Sensation-Seeking Risk taking (SSRT).

Real-World Risk Taking

Bivariate correlations among variables are shown in Table 2. PCL-R total scores exhibited significant positive associations with the ICRT and SSRT components. As shown in Table 2, F1 scores also correlated significantly with both ICRT and SSRT scores; however, F2 scores correlated only with SSRT scores.

Correlations for other kinds of externalizing pathology were more specific. Antisocial personality disorder symptoms exhibited a significant positive relationship with ICRT but not SSRT scores. Severity of drug and alcohol use disorders was positively correlated only with SSRT. In order to ensure that the association between DUDs and SSRT was not due to predictor-criterion contamination, we removed “number of drug classes tried” from this component and re-examined the relationship. The association remained significant ($r = .22$,

²Because PCA based upon Pearson correlations has limitations with dichotomous variables, we conducted a second analysis designed to test the reliability of the PCA. Mplus Version 5.1 was used for this analysis because it was designed to accommodate datasets in which some variables are continuous and others are categorical or dichotomous. This additional exploratory factor analysis with varimax rotation based upon polychoric correlations again suggested that a two-factor model provided a good fit (Root Mean Square Error Of Approximation $< .01$; Root Mean Square Residual = .06), with each risk taking variable loading on the same factor as in the primary analysis.

$p < .05$). Severity of AUD exhibited no significant relationship with scores on ICRT, though DUD severity exhibited a trend-level association ($r = .18, p = .06$).

Psychopathy and real-world risk taking after controlling for other externalizing disorders—Significant bivariate relationships between psychopathy and real-world risk taking components were reexamined using partial correlations that controlled for variance associated with other externalizing disorders. After controlling for ASPD, AUDs, and DUDs, the relationship between PCL-R total scores and ICRT remained significant (partial $r = .31, p < .01$), whereas the relationship between PCL-R total scores and SSRT was almost entirely accounted for by variance that overlapped with the other externalizing disorders (partial $r = .03, p = .79$). The relationship between psychopathy and ICRT was driven primarily by F1 scores, which continued to correlate with ICRT scores after controlling for other externalizing pathology (partial $r = .22, p < .05$), whereas F2 scores did not (partial $r = .17, p = .11$)³.

Supplementary analyses were conducted in order to determine the extent to which the relationships between other externalizing disorders and risk taking components were due to unique variance or variance shared among the disorders. The relationship between ASPD and ICRT was no longer significant after variance accounted for by the other three externalizing disorders was removed (partial $r = .09, p = .40$). Likewise, relationships between AUD severity and SSRT (partial $r = .09, p = .40$) and between DUD severity and SSRT (partial $r = .14, p = .17$) became non-significant, indicating that variance common to the externalizing disorders accounted for these relationships.

The ICRT dimension includes two items that involve violent crime, raising the possibility that violent criminality, more than risk taking, may be responsible for the relationship between this dimension and psychopathy. We thus conducted an additional supplementary analysis in which the relationship between ICRT and psychopathy was examined after controlling for participants' lifetime number of violent charges along with other externalizing disorders. The results were nearly identical to the primary analysis (partial $r = .32, p < .01$).

Psychopathy and real-world risk taking after controlling for anxiety—Additional supplementary analyses examining the relationship between psychopathy and real-world risk taking after controlling for anxiety resulted in the same relationship between psychopathy total scores and ICRT reported above (partial $r = .38, p < .01$). However, the relationship between psychopathy and SSRT became non-significant with anxiety as a covariate (partial $r = .16, p = .09$). Neither F1 (partial $r = -.07, p = .53$) nor F2 (partial $r = .07, p = .54$) was related to SSRT after controlling for anxiety.

BART performance—Contrary to predictions, risk taking on the BART was unrelated to psychopathy total or factor scores. BART performance was also unrelated to AUD and DUD scores and to ASPD diagnosis. As predicted, performance on the BART was inversely related to anxiety scores. Interestingly, BART performance was positively associated with SSRT ($r = .22, p < .05$), but was negatively associated with ICRT scores ($r = -.19, p < .05$). Finally, we conducted supplementary analyses to investigate whether controlling for anxiety revealed relationships between psychopathy total and factor scores and performance on the BART. These relationships remained nonsignificant after controlling for anxiety scores^{4,5}.

³To examine the robustness of the link between PCL-R F1 and ICRT after controlling for other externalizing psychopathology, an additional partial correlation was calculated. In this analysis, F1 scores contributed uniquely to the prediction of ICRT even after removing the variance associated with F2, DUD, and AUD, partial $r = .21, p < .05$.

⁴Based on Newman's work (e.g., Newman & Schmitt, 1998) and studies demonstrating that anxiety may characterize a subtype of criminal psychopaths (e.g., Swogger & Kosson, 2007), we also tested for Psychopathy X Anxiety interactions in relation to BART scores and real-world risk taking factor scores. In all cases, interaction terms were not significant. All analyses were re-run in order to examine race as a moderator of observed results. There were no Race X Externalizing Disorder interactions.

Discussion

Results of the present study suggest complex relationships between externalizing psychopathology and risk taking that differ across indices of risk taking. Consistent with the extensive literature on psychopathy and crime (Leistico et al., 2008), in the present study psychopathy was associated with ICRT. Moreover, the association remained even after controlling for ASPD and severity of AUDs and DUDs. This finding adds to the evidence for psychopathy as a particularly powerful construct for understanding willingness to take extreme personal risks during the course of criminal behavior, and suggests that processes unique to psychopathy are at work in ICRT. The hypothesis that psychopathy would be associated with SSRT was also corroborated, though this relationship became non-significant after controlling for the other disorders, suggesting that a vulnerability factor shared among externalizing disorders may account for the association between psychopathy and stimulation-seeking risky behavior. Similarly, whereas scores on the psychopathy dimension associated with impulsive, irresponsible antisocial behavior were also associated with risk related to sensation-seeking, this association was also attributable to variance shared between this dimension and other measures of externalizing pathology.

Consistent findings across methods of assessment would increase our confidence in a broad relationship between psychopathy and risk taking. However, the hypothesis that psychopathy would be related to risk taking propensity measured by the BART was not corroborated by the results. This is the first study to examine the relationships of PCL-R-assessed psychopathy to risk taking on the BART, and we failed to replicate Hunt et al.'s (2005) finding of an association between psychopathic traits and BART performance in a non-criminal sample. Our findings underscore the importance of caution in generalizing conclusions from non-criminal to criminal samples. As well, the current results may reflect differences between PCL-R-assessed psychopathy and self-report-assessed psychopathy (e.g., Hunt et al., 2005), though this explanation is speculative, and studies incorporating both measures in the same sample would be helpful to clarify this point.

Findings with regard to the other externalizing disorders and risk taking were mixed. Surprisingly, risk taking on the BART was not related to symptoms of externalizing disorders examined. This finding suggests limited externalizing spectrum diagnostic utility for the BART among incarcerated offenders. Given prior evidence that BART scores correlate with substance use severity and antisocial behavior (Crowley et al. 2006; Lejuez et al., 2002), it could be argued that the lack of an association between BART-assessed risk taking and externalizing disorders in the current study may reflect reduced variability in externalizing pathology in the current sample due to the high prevalence of ASPD, AUDs, and DUDs in our sample. However, such an explanation does not account for the relationships that were observed between individual differences in ASPD, AUD, and DUD scores and scores on ICRT and SSRT. Alternatively, it could be that our BART methodology would have had greater predictive utility in a nonclinical sample than in our current sample. A recent study indicated that using the BART with greater rewards for risky behavior than in the standard version of the paradigm may lead to greater differentiation between impulsive/sensation-seeking individuals and others (Bornovalova et al., 2009). We cannot rule out that our use of the standard version of the paradigm (i.e., one-cent rewards) contributed to the failure to detect relationships between BART-assessed risk taking and externalizing disorders.

Consistent with prior descriptions of a link between ASPD and risky behavior (Rogers, Salekin, Sewell, & Cruise, 2000) ASPD was related to ICRT. Unlike the relationship between psychopathy and ICRT, however, the association between ASPD and ICRT was reliant upon variance shared with the other externalizing disorders. As in prior studies of sensation-seeking and substance use (Martin et al., 2002; Stephenson et al., 2002), substance use disorders were

related to SSRT. The lack of an association between substance use disorders and ICRT suggests that the presence of a substance use disorder does not necessarily increase the likelihood of antisocial risk taking among criminal offenders, for whom both substance use disorders and risk taking occur at high rates and for many different reasons. However, a substantial body of literature corroborates the notion that there are meaningful subtypes of abusers of specific substances (Ball, Carroll, Babor, & Rounsaville, 1995; Moss, Chen, & Yi, 2007) and there are personality differences among abusers of different substances (Hopwood, Baker, & Morey, 2008; Walsh, Allen, & Kosson, 2007). These differences may confer differing propensities toward risk taking that were not examined in the present study, and our aggregate approach to DUD may have obscured more subtle relationships.

Risk taking on the BART was positively associated with the sensation-seeking component of self-reported risk taking. Moreover, scores on the BART were negatively associated with trait anxiety. This pattern of relationships suggests that, among adult criminal offenders, the BART may primarily assess a characterological tendency toward what has been described as impulsive decision-making (Reynolds et al., 2006; Reynolds, Penfold, & Patak, 2008) or, alternatively, as an initial propensity toward risk taking that may or may not involve impulsivity (Crowley et al., 2005) and may be associated with excessive approach behavior. These traits can be distinguished from a characterological tendency toward behavioral disinhibition, which refers to a failure to inhibit prepotent responses in spite of a high likelihood of negative outcomes (Reynolds et al., 2008). Psychopathy is commonly described as a prototype for disinhibitory psychopathology, but several other forms of externalizing disorders have also been characterized by disinhibition (Gorenstein & Newman, 1980; Levenson, 1990). Indeed, Reynolds et al. (2006) found that BART scores were orthogonal to measures of disinhibition (e.g., passive avoidance learning) that are commonly associated with higher levels of psychopathy (Blair et al., 2004; Newman & Kosson, 1986). The negative association between BART scores and ICRT in the present study may reflect the role of disinhibition in ICRT, and the failure to find relationships between BART-assessed risk taking and externalizing pathology may reflect the role of disinhibition in externalizing disorders among criminal offenders. Moreover, risky criminal behavior in adult offender populations is multi-determined, arising from a variety of complex interactions among a number of personality (Zuckerman & Kuhlman, 2000), cognitive (Walsh, Swogger, & Kosson, 2004), and social (Beyers, Loeber, Wikstrom, & Stouthamer-Loeber, 2001) factors other than sensation-seeking. Prominent efforts to explain the antisocial behavior of psychopaths have emphasized emotional deficits (Patrick, Cuthbert, and Lang, 1994), impairments in response modulation (Wallace, Vitale, & Newman, 1999), and state-dependent cognitive deficits associated with left hemisphere activation (Kosson et al., 2007), each of which may play a more important role in ICRT than the behavioral tendencies measured by the BART.

Several limitations of this study are worth noting. Only African American and European American offenders were included in the study, and findings should not be generalized to other groups. The decision to include only African American and European American participants was based upon the limited evidence for PCL-R construct validity among other ethnic populations. However, such evidence is growing (Sullivan, Abramowitz, Lopez, & Kosson, 2006), and future studies of risk taking and psychopathy might benefit from the inclusion of individuals of other ethnicities. In addition, although the factor analysis enabled an empirically-driven and convenient characterization of risk taking data, our limited sample size and the limited number of items in each component of real-world risk taking suggests that independent replication is necessary to establish the reliability of our risk taking classification scheme beyond the current analysis. Finally, use of the current sample limits the generalizability of findings to criminal offenders. These limitations are balanced by a number of strengths, including relatively comprehensive coverage of risk taking and use of a well-validated measure to assess psychopathy.

In summary, in the context of prior work the present findings suggest that associations between externalizing disorders and real-world risk taking appear to largely reflect shared mechanisms. However, psychopathy appears to confer some non-shared propensity toward irresponsible and criminal risk taking beyond that associated with other externalizing disorders. This additional propensity is related to the core psychopathic personality traits that comprise F1. For this reason, assessing F1 traits of psychopathy may be especially important for understanding and predicting irresponsible and criminal risky behavior, even in populations with high rates of such behavior. Moreover, our findings suggest the importance of assessing core psychopathic traits in studies of specific types of risky behavior among offenders. Future work that elucidates the means by which these traits contribute uniquely to irresponsible and criminal risk taking is warranted.

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Table 1

Principal-components analysis for real-world risk taking behaviors.

	Rotated Components	
	Irresponsible/Criminal Risk taking Behavior (ICRT)	Sensation-Seeking Risk taking Behavior (SSRT)
<i>In past year:</i>		
Theft from store	.31	.51
Gamble for money	.65	-.17
Unprotected sex	.52	.31
Driving while intoxicated or high	.54	.20
<i>Lifetime:</i>		
Number of drug classes tried	-.01	.71
Mugged or robbed someone	.62	.05
Pulled a weapon on someone	.70	-.29
Participated in extreme/risky sports	-.10	.64
Played chicken with cars or trains	.42	.27

Table 2

Intercorrelations among study variables.

Variable	1	2	3	4	5	6	7	8	9	10
1. PCL total	-	.85**	.83**	.62**	.14	.47**	.24**	-.13	.41**	.18*
2. PCL F1		-	.47**	.43**	-.03	.35**	.10	-.15	.32**	.10
3. PCL F2			-	.60**	.23*	.42**	.29**	-.05	.33**	.26**
4. ASPD				-	.14	.22*	.21*	-.12	.34**	.11
5. AUD					-	.29**	.22*	-.10	.06	.21*
6. DUD						-	.14	.02	.18	.38**
7. Anxiety							-	-.27**	.28**	.11
8. BART								-	-.19*	.22*
9. ICRT									-	.16
10. SSRT										-

Note. PCL Total, F1, and F2 = Psychopathy Checklist-Revised total, Factor One, and Factor Two scores, respectively; ASPD = diagnosis of antisocial personality disorder; AUD = presence and severity of alcohol use disorder; DUD = presence and severity of drug use disorder; BART = scores on Balloon Analogue Risk Task; ICRT = Irresponsible/criminal real-world risk taking; SSRT = sensation-seeking real-world risk taking.

*
p < .05

**
p < .01