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ORIGINAL ARTICLE

Psychopathy and Violent Crime: A Prospective Study of the Influence of Socioeconomic Status and Ethnicity

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Abstract The relationship between psychopathy and violence is well-established. However, few studies have examined the extent to which this relationship is influenced by sociodemographic predictors of violent criminality. In this prospective study we examine the power of psychopathy to predict criminal violence across ethnicity and levels of socioeconomic status in 199 European American and African American U.S. county jail inmates. A Psychopathy × SES × Ethnicity interaction was identified such that among European Americans psychopathy predicted recidivism at lower levels of SES but was unrelated to recidivism at higher levels of SES. The predictive power of psychopathy was relatively stable across SES among African Americans. The implications of our results for psychopathy and violence prediction are discussed.

Keywords Psychopathy · Socioeconomic status · Violence · Recidivism

Understanding violent behavior presents an important challenge to the social sciences. A large body of research has identified individual differences in personality (i.e. Hare, Clark, Grann, & Thornton, 2000; Wilson & Herrnstein, 1985), and sociodemographic characteristics (i.e. Barak, Flavin, & Leighton, 2001; Mauer, 2001) that predict violent criminality. However, despite calls for the integration of different classes of predictors (i.e. Raine, 1993; Silver, 2000), the majority of research on individual level predictors of violence continues to overlook the influence of sociodemographic factors. Research on psychopathy is no exception; the impact of sociodemographic factors on the relationship between psychopathy and violence remains largely unexamined. In this prospective study we attempt to refine our understanding of the relationship between psychopathy and violence by examining the unique and interactive effects of psychopathy, ethnicity, and socioeconomic status (SES) in the prediction of violent crime.

Psychopathy is among the most important and widely researched individual differences related to violent criminality (Hare, 2003). The psychopathic personality is characterized by a

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constellation of traits including impulsivity, callousness, and irresponsibility. Psychopathy is a well-documented predictor of violent criminality in European American (EA) males (Salekin, Rogers, & Sewell, 1996) and recent data indicate that this relationship extends to European (Hare et al., 2000), female (Salekin, Rogers, Ustad, & Sewell, 1998) and adolescent offenders (Långström & Grann, 2000).

Among sociodemographic predictors of violence, ethnicity and SES have received considerable attention (Bartol, 2002; Heller & Ehrlich, 1984; Mauer, 2001; Sampson, Morenoff, & Raudenbush, 2005). With regard to ethnicity, African Americans (AA) and European Americans share the tragedy of violence unequally; that is, AA individuals are more likely than EA individuals to report being victims of violence and to be apprehended for the commission of a violent crime (Lauritsen & Sampson, 1998). Importantly, we do not consider ethnic identity to be a distinct cause of violence, but conceptualize it as a marker for demographic contexts in American society (Sampson et al., 2005), which may involve factors such as neighborhood characteristics (Bickford & Massey, 1991), and differential treatment by the criminal justice system (Tonry, 1995). Nonetheless, in light of substantial ethnic disparities, the consideration of ethnicity is warranted when examining predictors of criminal violence.

Socioeconomic factors have been proposed to be important to understanding the relationship between ethnicity and violence (Silver, 2000). Indeed, criminality has been related to economic disadvantage (Ringel, 1996), and AA individuals are more likely than EA individuals to be economically disadvantaged (Williams & Collins, 1995). Moreover, the relationship between class and ethnicity in the U.S. is complex and difficult to disentangle. With regard to criminal behavior Barak et al. (2001) note "the systems of privilege and inequality derived from the social statuses of class, race and gender are overlapping and have accumulating effects on the type of crime control various groups of people receive" (p. 16). As such, the concurrent examination of SES and ethnicity may help to avoid erroneous inferences of ethnic differences at a genetic or behavioral level (Skeem, Edens, Sanford, & Colwell, 2003; Oakes & Rossi, 2003).

The relationship between ethnicity and psychopathy has received considerable attention (for a review see Sullivan & Kosson, 2005). The majority of research on psychopathy has involved primarily male EA participants. However, there is considerable evidence to suggest that Psychopathy Checklist—Revised (PCL-R) assessed psychopathy is valid in African Americans (Skeem, Edens, Camp, & Colwell 2004; Sullivan & Kosson, 2005). Indeed, although several items on the PCL-R have been found to perform differently in African Americans versus European Americans, these differences cancelled each other out at the level of the test as a whole (Cooke, Kosson, & Michie, 2001). In addition, psychopathy has been related to history of violence in both EA and AA jail inmates (Kosson, Smith, & Newman, 1990; Walsh, Swogger, & Kosson, 2004). However, the determination that psychopathy can be adequately measured across ethnicity does not indicate ethnic equivalence with regard to underlying mechanisms (Skeem et al., 2003). Indeed, several studies have reported ethnic differences on laboratory measures of mechanisms thought to underlie the disorder (Doninger & Kosson, 2001; Lorenz & Newman, 2002), and it has been proposed that ethnicity should be routinely considered in research on psychopathy and violence (Walsh et al., 2004).

With regard to psychopathy and SES, SES does not appear to be related to the interpersonal and affective component of PCL-R assessed psychopathy (Factor 1); however, a small negative relationship has been reported between the antisocial deviance factor (Factor 2) of the PCL-R and SES (Hare, 2003). Similarly, results from studies of self-reported psychopathy using the Psychopathic Personality Inventory (PPI, Lilienfeld & Andrews, 1996) in normal populations found modest inverse relationships between SES and the social deviance factor of the PPI (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003). Lower SES has also been related to personality disorders associated with psychopathy. Lahey and colleagues found that low familial

SES interacted with childhood conduct disorder to predict antisocial personality disorder (APD) in early adulthood, such that the positive relationship between conduct disorder and APD was limited to lower SES families (Lahey, Loeber, Burke, & Applegate, 2005). In addition, low familial SES has been related to the development of personality and disruptive disorders in general, even after controlling for parental IQ and psychopathology (Johnson, Cohen, Dohrenwend, Link, & Brook, 1999).

Despite the apparent interrelationships of SES and ethnicity with both violence and psychopathy, to our knowledge, prior prospective studies of psychopathy and criminal violence have not concurrently considered the impacts of these variables in a criminal sample. Consequently, with regards to violent criminality, it is unclear whether the predictive power of psychopathy is maintained after accounting for the effects of these sociodemographic variables, and whether the impact of psychopathy is consistent across ethnic groups and levels of SES. Such a determination appears warranted in light of calls to enhance the understanding of violent criminality across a wide range of social sectors (Raine, 1993).

Our examination of the relationship between psychopathy, violent crime, ethnicity and SES is novel; however, research involving related constructs suggests that sociodemographic factors may moderate the relationship between psychopathy and violent crime. Lynam et al. (2000) identified an interaction between impulsivity and neighborhood poverty, such that impulsivity was a stronger predictor of juvenile offending in lower income as compared to higher income neighborhoods. This finding is of interest to the present study due to the strong relationship between individual and neighborhood SES (Krieger, 1992) and because impulsivity is considered to be a core feature of the psychopathic personality (Hare, 2003; Hart and Dempster, 1997). This finding suggests that psychopaths may be particularly vulnerable to sociodemographic risk factors, and therefore the predictive power of psychopathy will be accentuated in higher risk groups. Relatedly, in a review of research examining the combination of biological and social factors in the prediction of violence, Raine (2002) reported an exponential increase in rates of violent behavior when both classes of risk factors are present.

As well as varying across ethnicity and levels of SES, rates of criminal violence differ dramatically across nations (Barclay & Tavares, 2003). The majority of research on recidivism and psychopathy has been conducted using non-U.S. samples (e.g. Hemphill, Hare, & Wong, 1998), and no published prospective studies have examined the relationship between psychopathy and criminal violence among U.S. county jail inmates. Because the U.S. has dramatically greater rates of violent crime and incarceration than nations in which the relationship between psychopathy and violence has been established (Gannon, 2001), it is possible that different factors underlie violent crime in the U.S. Indeed, a recent meta-analysis that examined the relationship between PCL-R assessed psychopathy and institutional violence found that effects sizes were generally weaker among U.S. samples (Guy, Edens, Anthony, & Douglas, 2005). As such, with regard to psychopathy and violent crime, the extent to which results from other nations generalize to the U.S. remains an open question with important implications.

In the present study we examine the ability of psychopathy to predict violence in a novel and important population, and address potentially important moderating effects of sociodemographic factors that have not been previously addressed. Based on the robust literature relating PCL-R assessed psychopathy to violence, we hypothesize that PCL-R scores will predict arrests leading to conviction for violent crimes, and that this relationship will hold after controlling for other variables. In light of prior findings regarding relationships between individual and social predictors of violence, we predict that psychopathy will be most predictive at higher levels of sociodemographic risk and that the greatest rates of violence will be observed among sociodemographically high risk psychopaths.

In addition, because prior criminality is related to both recidivism (Langan & Levin, 2002), and to PCL-R scores (Hare, 2003), it is possible that a relationship between psychopathy and recidivism may reflect their shared relationship with criminal history. To address this possibility, we conducted a supplementary set of analyses controlling for the number of prior charges for violent crimes. Finally, we included a second set of supplementary analyses addressing the main effects of dimensions underlying psychopathy and their interactions with sociodemographic factors.

Method

Participants

Participants were 199 male inmates, aged 17 to 40, serving sentences of one year or less for felony or misdemeanor convictions at a Northeastern Illinois county jail.[1] Inmates who reported taking psychotropic medication and those who were unable to read English were excluded. Participants were informed about the nature of the study, provided written consent to participate, and were paid for their time. This research was approved by the jail administration and by the university institutional review board.

The Illinois State Police provided criminal reconviction data for at least a three-year follow-up period for 203 participants. Four participants were removed from analyses due to raters reporting low confidence in their PCL-R ratings at the time of assessment. Demographic information is presented in Table 1.

Measures

Psychopathy

Psychopathy was assessed using the Hare Psychopathy Checklist-Revised (PCL-R), a validated behavioral rating scale, based on an in-depth semi-structured interview that queries relationship, family, education, medical, work, and criminal history and attitudes, and a review of available file information. Total scores on the PCL-R range from 0 to 40 based on a sum of 20 items rated 0 (absent), 1 (mixed or unclear), or 2 (present).

There is substantial evidence that total scores on the PCL-R provide a valid index of psychopathy (Hare, 2003; Hare & Neumann, 2005). Although factor analytic studies have presented evidence that psychopathy is a coherent construct (Cooke & Michie, 2001; Harpur, Hare, & Hakstian, 1989), they have also provided evidence that this construct can be represented by two correlated dimensions (Harpur, Hare, & Hakstian, 1989), and distinct correlates of these two

[1] These inmates were drawn from a larger sample of 296 inmates for whom we requested records from the Illinois State Police (ISP). We received records for 203 of these participants, and they comprise the sample analyzed in the present study. The records requested included all European American and African American inmates assessed for psychopathy during an approximately two-year period. An Illinois State Police representative reported that they were unable to provide the other 92 requested records due to either clerical limitations, inconsistencies in the reporting of court dispositions at the county court level, or an inability to make reliable identifications based on name and birth date. We conducted a series of one-way analyses of variance (ANOVA) to determine whether those individuals whose records were requested but not received differed from those whose records were available. Participants whose records were received and those for whom no records were received were not significantly different in age, education, SES, ethnicity, PCL-R scores, number of prior violent charges, and number of total prior charges, (all Cohen's ds $< .15$).

Table 1 Sample characteristics

		PCL-R		SES		Prior violent charges[a]		Age	
	N	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
European Americans	91	24.44	6.89	58.62	8.64	1.96	2.48	26.13	6.49
African Americans	108	26.72	6.82	61.39	8.25	3.41	3.92	26.31	6.31
Nonpsychopathic	51	16.45	3.27	59.16	10.67	2.04	2.22	26.73	6.30
Middle	82	25.33	2.39	60.18	7.93	2.46	2.95	25.99	6.40
Psychopathic	66	33.23	2.45	60.79	7.36	3.67	4.41	26.15	6.49
Total	199	25.68	6.93	60.12	8.52	2.77	3.43	26.23	6.38

Note. SES: Socioeconomic status; PCL-R: Scores on the Psychopathy Checklist—Revised; Nonpsychopathic: individuals with PCL-R scores of 20 or below; Middle range: indivuduals with PCL-R scores greater than 20 and less than 30; Psychopaths: individuals with PCL-R scores of 30 or greater.

[a] Analyses with prior violent charges $N = 175$.

dimensions have been documented (Harpur et al., 1989). According to this model, Factor 1 (F1) reflects callous and unemotional personality traits and a manipulative interpersonal style, and Factor 2 (F2) reflects impulsive and antisocial lifestyle and behavior. Recently, a three factor and a four facet model of psychopathy have emerged (Cooke & Michie, 2001; Hare, 2003), in which items are organized into correlated facets. Although there remains some debate regarding which model best captures the construct (i.e. Hare & Neumann, 2005; Cooke, Michie, & Hart, 2005), the majority of research on psychopathy and violence has employed the original two factors. Therefore, although our primary focus is on psychopathy itself, we conducted supplementary analyses using these two factors. A more detailed description of the relationship between violence and the dimensions underlying psychopathy scores in this sample is presented elsewhere (Walsh, Brook, & Kosson, 2005; Walsh & Kosson, 2006).

The mean PCL-R score for our sample was 25.68 ($SD = 6.93$). Two raters were present for 28% of the psychopathy assessment interviews, and scored the PCL-R independently. Interrater reliability and internal consistency for the PCL-R total and factor scores were acceptable; for total scores intraclass $r = .77$, Cronbach's $\alpha = .85$, for F1, intraclass $r = .76$, Cronbach's $\alpha = .79$, and for F2, intraclass $r = .86$, Cronbach's $\alpha = .75$. PCL-R cut-off scores described by Hare (2003) were used to classify 66 (33.2%) participants with scores of 30 and above as psychopathic, 51 (25.6%) participants with scores of 20 and below as nonpsychopathic, and 82 (41.2%) participants with scores greater than 20 but less than 30 as belonging in the middle group.

Ethnicity and socioeconomic status

Status as EA or AA was based on classifications in the jail roster. Socioeconomic status was rated using the Hollingshead Index (Hollingshead & Redlich, 1958). The Hollingshead Index incorporates weighted scores on occupational and educational achievement to derive a single index of SES. It remains the most widely used measure of socioeconomic status in psychological research (de Ribas, Moura, Soares, Gomes, & Bornstein, 2003), and it correlates highly with other indices of social status (Deonandan, Campbell, Ostbye, Tummon, & Robertson, 2000). Information used to assess SES was derived from interview and file information. Higher scores on the Hollingshead Index indicate lower SES. Therefore, to enhance clarity, individuals with high scores on the measure are referred to as *lower SES*, and those with low scores are referred to as *higher SES*. In addition to providing a continuous index, Hollingshead Index scores may be

used to assign individuals into one of five groups (Myers & Bean, 1968). In this sample 58.8% were in the fifth or lowest group, 37.7% were in the fourth group, and 3.5% were in the third group.

The mean SES score for the sample was 60.26 ($SD = 7.96$) and the median score was 61. A median split based on SES scores was used to classify participants into higher ($n = 102$) and lower ($n = 97$) SES groups. The median score used was derived from an analysis of the entire sample, with the same split point used for EA and AA participants.[2] The result of an ANOVA comparing high and low groups indicated that the median split created groups that differed substantively with regard to SES, $F(1,198) = 234.41$, $p < .05$, $d = 1.47$.

Prior violent charges

The number of violent charges was derived from a review of jail pre-trial files. In keeping with prior studies (e.g. Hare & McPherson, 1984) violent charges were defined as charges for robbery, assault, murder, weapons charges, kidnapping, and sex crimes other than indecent exposure.

Recidivism

Recidivism was assessed using Illinois State Police records. All participants were followed for a minimum of three years subsequent to their last date of release from incarceration for their index crime. The index crime is identified as the crime for which the inmate was incarcerated at the time of the PCL-R assessment. Time to first *arrest leading to conviction for a violent crime* (ALCV) was reported in months for each offender by subtracting the month of release from incarceration from the month of arrest leading to conviction for a violent offense. Twenty participants were reincarcerated following their release for the index offense due to a violation of conditional release that did not involve reconviction for an additional offense; for these participants the period of reincarceration was subtracted from the ALCV in order to account for the additional time of incarceration in determining the time aspect of the recidivism criteria. The new violent offenses for which individuals in our sample were convicted included domestic battery, weapons charges, aggravated assault, simple battery, home invasion, sex crimes and harassment.

The follow-up period began with month of release from incarceration for the index crime and ended at the month in which files were requested. The mean follow-up time was 73.21 months ($SD = 11.40$). Length of follow-up time was not significantly correlated with psychopathy, ethnicity, or SES. The full follow-up interval provides the most comprehensive index of violent recidivism. However, criminal recidivism studies are often restricted to a follow-up period of two or three years (i.e. U.S. Sentencing Commission, 2004), and the relative influences of factors related to criminality may vary according to time from release (i.e. Tengström, Grann, Långström, & Kullgren, 2000). In order to examine the consistency of our findings across follow-up intervals, and to facilitate comparison with other studies, we conducted parallel analyses using 12 month, 36 month and total follow-up time as criteria.

[2] The relationship between ethnicity and SES resulted in different proportions of EAs and AAs in the two SES groups, $\chi^2(1, N = 199) = 7.10$, $p < .05$. We conducted separate analyses by ethnicity using ethnicity-specific median splits of 58 for EAs and 62 for AAs. Analyses conducted with groups defined by these ethnicity-specific SES median splits produced an equivalent pattern of results to analyses conducted with groups defined by a median split point derived from the entire sample. As a result, we report only analyses using the SES median split derived from the entire sample in our extreme group analyses.

Statistical analysis

Survival analysis

The relationship between psychopathy and violent criminality has been examined both in terms of the full range of PCL-R scores (i.e. Kroner & Mills, 2001), and in terms of discrete groups (i.e. Hart, Kropp, & Hare, 1988). In light of continued debate regarding the dimensionality of PCL-R assessed psychopathy (Lilienfeld, 1998; Harris, Rice, & Quinsey, 1994) we elected to employ both approaches in our analytic strategy. Cox proportional hazards regression was used to examine the full range of psychopathy and SES scores, and to examine psychopathy after controlling for, and in interaction with, SES and ethnicity. Kaplan–Meier survival analysis was used to examine discrete groups based on SES and psychopathy scores. For both the continuous and the extreme group analyses, the primary multivariate analyses were supplemented by univariate analyses that examined the relationships between ALCV and specific predictors irrespective of other variables. Univariate Cox regression was used to separately examine the relationships between ALCV and psychopathy, SES and ethnicity. Multivariate Cox regression examined these relationships concurrently. Univariate Kaplan–Meier survival analyses compared psychopathic, middle, and nonpsychopathic participants irrespective of ethnicity and SES. Multivariate Kaplan–Meier analyses compared higher and lower SES groups of psychopaths and nonpsychopaths separately by ethnicity.

The term censored refers to participants whose status regarding the outcome of interest remains unknown at the completion of the study. Survival analysis assumes independence of censoring which requires that censored participants do not differ systematically on the variables of interest from those who complete the study. The criminal records used to assess recidivism listed each participant's arrests leading to conviction in the state of Illinois. Based on this information, participants who moved out-of-state were censored. We conducted supplementary analyses of intrastate mobility to indirectly estimate the extent to which the assumption of independence of censoring was satisfied with regard to out-of-state offending. Logistic regression indicated that status as a participant whose arrest leading to reconviction occurred in the same (82.1%) county as their index offense was not predicted by psychopathy, SES, ethnicity or by number of prior violent charges (all *Wald* χ^2s $(1, N = 39) < .5$, all *p*s $> .10$), thereby suggesting that the assumption of independence of censoring was met.

Cox proportional hazards

Cox regression allows for the use of continuous predictor variables and their interactions in predicting survival. This approach also allows the effects of a predictor to be estimated while controlling for the effects of other predictors. In Cox regression all predictors are referred to as covariates (Tabachnik & Fidell, 2001), and the relationship between predictor and criterion is expressed as a Wald χ^2. A version of Cox and Snell R^2 modified for use with survival analysis provides an index of strength of association between predictor and criterion analogous to multiple R^2 in linear regression but more conservative than R^2 because its maximum must be less than 1.0 (Tabachnik & Fidell, 2001). Cox regression also allows for the estimation of the hazard ratio, *Exp*(*B*). This statistic is similar to the odds ratio in logistic regression; it provides an index of the predicted change in the hazard that accompanies a unit increase in the predictor. Cox regression requires testing the assumption of proportionality of hazards; that the relationship between survival rate and time is the same across all levels of the covariate. This assumption is tested by creating a time variable and examining interactions between this variable and the predictors of interest. Any interaction terms that are significant must be entered into analyses

together with the predictors of interest (Tabachnik & Fidell, 2001). Analyses were performed to determine whether PCL-R scores predict ALCV after controlling for ethnicity and SES. The relationships between ALCV and the two-way and three-way interactions of predictors were also calculated.

Kaplan–Meier survival curves

Kaplan–Meier analyses allow for the comparison of the survival of discrete groups and for the estimation of mean survival times and confidence intervals around these means. Kaplan–Meier analyses were used to compare nonpsychopathic, middle and psychopathic groups. In addition, four groups were constructed and compared for each ethnicity: high and low SES psychopathic and nonpsychopathic offenders. Sixteen EAs were in the high SES nonpsychopath group, 12 were in the low SES nonpsychopath group, 14 were in the high SES psychopath group, and 10 were in the low SES nonpsychopath group. Among AAs, the *n*s were 13, 10, 16 and 26 respectively (see Footnote 2). A one-way ANOVA revealed a pattern of between group differences that was consistent with the pattern intended in the formation of the groups: the two nonpsychopathic groups differed with regard to SES but not with regard to psychopathy, as did the two psychopathic groups. The two higher SES groups differed with regard to psychopathy but not with regard to SES, as did the two lower SES groups. Participants with middle range PCL-R scores were excluded from the primary set of extreme group analyses. Pairwise comparisons were conducted to identify between-group differences using the Breslow statistic.

Results

Preliminary analyses

Assumptions regarding multicollinearity were met, and analyses with and without transformation of outliers yielded equivalent results.[3] Small but significant point biserial correlations were identified between ethnicity and both SES ($r = -.16$, $p < .05$), and PCL-R ($r = -.16$, $p < .05$), indicating that African Americans were slightly lower SES and slightly higher on PCL-R psychopathy than were European Americans. PCL-R total scores were not significantly correlated with SES ($r = .10$, $p = .14$).[4] The SES $\times$ Ethnicity interaction did not predict psychopathy scores, ($\beta = -.78$, $p = .14$), which suggests that the relationship between psychopathy and SES was consistent across ethnicity.

The mean survival time was 63.52 months ($SD = 23.33$) for the entire sample and 23.46 months ($SD = 16.88$) for participants who experienced ALCV. The percentages of the sample that experienced ALCV were 6.53% at 12 month follow-up, 16.58% at 36 month follow-up, and 19.60% at full follow-up.

[3] Three high scores greater than three standard deviations from the sample mean for SES, and three multivariate outliers were identified. Supplementary analyses in which multivariate outliers were removed and univariate outliers were transformed to scores equivalent to three standard deviations from the mean (Tabachnik & Fidell, 2001) produced results equivalent to those in which all data were included without transformation. Consequently, analyses are reported without transformations and without excluding participants with outlying scores. Squared multiple correlations were computed for ethnicity, SES and psychopathy, none of which exceeded $R^2 = .05$, indicating an acceptably low level of multicollinearity.

[4] Supplementary analysis revealed that, consistent with Hare (2003), there was a small but significant correlation between SES and scores on Factor 2 of the PCL-R ($r = .14$, $p < .05$).

Table 2 Kaplan–Meier estimated survival time for psychopathy groups

	12 Months		36 Months		Full follow up	
	Mean	95% CI	Mean	95% CI	Mean	95% CI
Nonpsychopathic	11.69	11.33–12.04	34.08	32.18–35.98	82.49	75.58–89.40
Middle range	11.94	11.82–12.06	35.15	34.23–36.06	90.24	85.89–94.58
Psychopathic	11.15	10.58–11.72	29.59	26.94–32.24	66.94	58.26–75.62

Note. Mean: Kaplan–Meier estimated means survival time; 95% CI: 95% confidence interval for mean survival time; Nonpsychopathic: individuals with PCL-R scores of 20 or below; Middle range: indivuduals with PCL-R scores greater than 20 and less than 30; Psychopaths: individuals with PCL-R scores of 30 or greater.

Univariate analyses

Cox regression identified relationships between PCL-R and ALCV that approached significance at 12 months, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 2.73$, $Exp(B) = 1.08$, $p = .10$, and were significant at 36 months, $R^2 = .04$, *Wald* $\chi^2(1, N = 199) = 7.97$, $Exp(B) = 1.08$, $p < .05$, and at full follow-up, $R^2 = .03$, *Wald* $\chi^2(1, N = 199) = 5.38$, $Exp(B) = 1.06$, $p < .05$. The relationship between SES and ALCV was significant at all three follow-up intervals; at 12 months, $R^2 = .05$, *Wald* $\chi^2(1, N = 199) = 7.47$, $Exp(B) = 1.16$, $p < .05$, at 36 months, $R^2 = .04$, *Wald* $\chi^2(1, N = 199) = 7.05$, $Exp(B) = 1.08$, $p < .05$, and at full follow-up, $R^2 = .03$, *Wald* $\chi^2(1, N = 199) = 5.45$, $Exp(B) = 1.06$, $p < .05$. The relationship between ethnicity and ALCV was not significant at 12 months, $R^2 < .01$, *Wald* $\chi^2(1, N = 199) = .28$, $Exp(B) = .74$, $p = .58$, approached significance at 36 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 3.41$, $Exp(B) = .50$, $p = .07$, and was significant at full follow-up, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 4.00$, $Exp(B) = .50$, $p < .05$.

The curves derived from a Kaplan–Meier analysis that compared psychopathic, middle, and nonpsychopathic groups on ALCV, collapsing across SES and Ethnicity, are presented in Fig. 1. Means and confidence intervals are presented in Table 2. These analyses identified significant differences between the psychopathic group and the middle group at 12 months, *Breslow* $\chi^2(1, N = 148) = 9.02$, $p < .05$, at 36 months, *Breslow* $\chi^2(1, N = 148) = 16.05$, $p < .05$, and at full follow-up, *Breslow* $\chi^2(1, N = 148) = 13.92$, $p < .05$. The difference between the psychopathic group and the nonpsychopathic group was not significant at 12 months, *Breslow* $\chi^2(1, N = 117) = 1.93$, $p = .16$, but was significant at 36 months, *Breslow* $\chi^2(1, N = 117) = 6.76$, $p < .05$ and at full follow-up, *Breslow* $\chi^2(1, N = 117) = 5.54$, $p < .05$. The middle group and the nonpsychopathic group were not significantly different at any of the follow-up intervals, all *Breslow* χ^2s $(1, N = 133) < 2.50$.

Multivariate analyses

The results of the Cox regression are presented in Table 3. After controlling for SES and Ethnicity, psychopathy approached significance as a predictor of violent reconviction at 12 months and significantly predicted violent reconviction at 36 months and at full follow-up.[5]

[5] Prior to conducting the primary multivariate Cox regression Time × SES, Time × Ethnicity, and Time × PCL-R interactions were tested as predictors of ALCV at each time interval to test proportionality of hazards. The Time × SES interaction was a significant predictor of violent reconviction at 36 months and at full follow-up and was entered together with SES in analyses involving these criteria. The Time × PCL-R interaction was a significant predictor at full follow-up and was entered as a covariate together with PCL-R scores in that analysis.

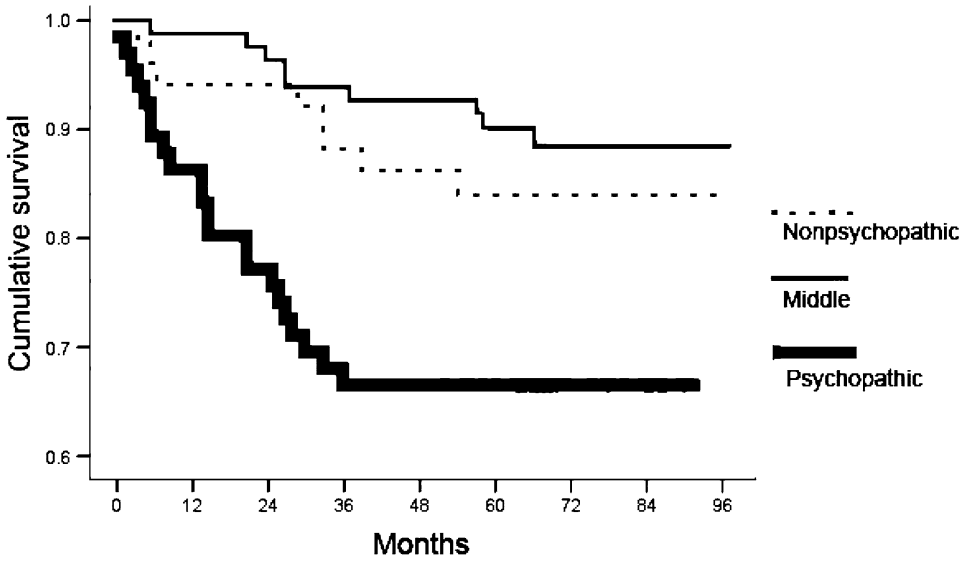

Fig. 1 Kaplan–Meier survival curves for psychopathic, middle and nonpsychopathic groups. *Note*. Psychopathic group defined as PCL-R > 29.9; Middle group defined as PCL-R 20.1–29.9; Non psychopaths defined as PCL-R < 20.1; MONTHS: Months from release to arrest leading to conviction; CUMULATIVE SURVIVAL: Proportion of group not arrested

Table 3 Multivariate Cox regression—violent reconviction

	12 Months			36 Months			Full follow-up		
	χ^2	*Exp*(*B*)	R^2	χ^2	*Exp*(*B*)	R^2	χ^2	*Exp*(*B*)	R^2
Step 1									
SES	7.33*	1.16		7.18*	1.18		7.09*	1.12	
Ethnicity	.01	1.07		1.72	.60		2.36	.58	
Model change			.05			.07			.06
Step 2									
PCL-R	3.28	1.09		6.82*	1.08		8.06*	1.14	
Model change			.02			.04			.04
Step 3									
SES × Ethnicity	2.76	1.26		2.39	1.10		1.70	1.07	
SES × PCL-R	.02	1.00		.24	1.00		< .01	1.00	
Ethnicity × PCL-R	2.30	1.17		.76	1.06		.32	1.03	
Model change			.02			.02			.01
Step 4									
Ethnicity × SES × PCL-R	7.04*	1.04		6.76*	1.02		2.89	1.01	
Model change			.03			.03			.02

Note. SES: Socioeconomic status; PCL-R: Scores on the Psychopathy Checklist—Revised; χ^2: Wald; R^2: Cox & Snell for variable or variables entered at step; *Exp*(*B*): Hazard ratio.

*$p < .05$.

Table 4 Multivariate Cox regression—Violent reconviction by Ethnicity

	12 Months			36 Months			Full follow-up		
	χ^2	*Exp(B)*	R^2	χ^2	*Exp(B)*	R^2	χ^2	*Exp(B)*	R^2
European Americans									
Step 1									
SES	5.49*	1.24	.08	4.39*	1.11	.06	3.57	1.09	.04
Step 2									
PCL-R	4.63*	1.20	.06	4.08*	1.12	.05	1.81	1.06	.02
Step 3									
SES × PCL-R	6.31*	1.02	.03	6.50*	1.01	.04	3.47	1.01	.02
African Americans									
Step 1									
SES	2.36	1.10	.03	2.21	1.05	.02	1.42	1.03	.01
Step 2									
PCL-R	.54	1.04	< .01	3.83*	1.07	.04	2.90	1.05	.03
Step 3									
SES × PCL-R	1.20	.99	.01	.15	1.00	< .01	.08	1.00	< .01

Note. SES: Socioeconomic status; PCL-R: Psychopathy Checklist—Revised; χ^2: Wald; R^2: Cox & Snell for variable entered at step; *Exp(B)*: Hazard ratio.

*$p < .05$.

The two-way interactions, SES × PCL-R, SES × Ethnicity, and PCL-R × Ethnicity, did not significantly add to the prediction of violent reconviction at any of the follow-up times. The main effect of psychopathy was qualified by the SES × PCL-R × Ethnicity interaction, which contributed significantly to the prediction of ALCV at 12 months and at 36 months and approached significance at full follow-up.

To determine the nature of the SES × PCL-R × Ethnicity interaction, the two-way SES × PCL-R interaction was evaluated separately in EA and in AA participants. The results of separate analyses by ethnicity are displayed in Table 4. Among EAs, the SES × PCL-R interaction contributed significantly to the prediction of ALCV at 12 months and at 36 months and approached significance at full follow-up. Among AAs, the SES × PCL-R interaction was not significant at any of the follow-up intervals.

To further understand the SES × PCL-R interaction in EAs simple effects were calculated to test the relationship between PCL-R scores and the ALCV criterion at lower, medium, and higher levels of SES. These levels were defined as one standard deviation below the mean, at the mean, and one standard deviation above the mean (Aiken & West, 1991). Results indicated that, among EAs, psychopathy was a significant predictor of ALCV only at the lower level of SES. This pattern was consistent across follow-up intervals; psychopathy was significant at lower SES at 12 months, $R^2 = .08$, *Wald* $\chi^2(1, N = 91) = 5.45$, *Exp(B)* $= 1.24$, $p < .05$, at 36 months, $R^2 = .09$, *Wald* $\chi^2(1, N = 91) = 7.85$, *Exp(B)* $= 1.20$, $p < .05$, and at full follow-up, $R^2 = .05$, *Wald* $\chi^2(1, N = 91) = 4.37$, *Exp(B)* $= 1.13$, $p < .05$. Among EAs, psychopathy did not predict ALCV at medium SES or at higher SES at any follow-up intervals; all $R^2 < .02$, all *Wald* χ^2s$(1, N = 91) < 2.00$, all *Exp(B)*s .80–1.05.

Kaplan–Meier survival analyses were conducted to compare survival curves of psychopathic and nonpsychopathic offenders at higher and lower levels of SES. These analyses produced results that were consistent with the continuous analyses, in that psychopathy was more predictive at lower levels of SES. Among lower SES participants, the difference between psychopaths and nonpsychopaths was significant at 36 months, *Breslow* $\chi^2(1, N = 58) = 3.92$, $p < .05$, and

approached significance at full follow-up, *Breslow* $\chi^2(1, N = 58) = 3.62$, $p = .06$, but did not attain significance at 12 months, *Breslow* $\chi^2(1, N = 58) = .70$, $p = .40$. In contrast, among higher SES participants, differences between psychopaths and nonpsychopaths did not attain significance at any follow-up intervals, all *Breslow* χ^2s $(1, N = 59) < 2$. Similarly, SES appeared to be an important predictor among psychopaths but relatively unimportant among nonpsychopaths. Higher SES psychopaths were significantly less likely to experience ALCV than were lower SES psychopaths at 12 months, *Breslow* $\chi^2(1, N = 66) = 4.73$, $p < .05$, at 36 months, *Breslow* $\chi^2(1, N = 66) = 4.46$, $p < .05$, and at full follow-up, *Breslow* $\chi^2(1, N = 66) = 5.12$, $p < .05$. In contrast differences between higher SES and lower SES nonpsychopaths were significant only at 12 months, *Breslow* $\chi^2(1, N = 51) = 4.14$, $p < .05$, and were negligible at the other follow-up intervals, all *Breslow* χ^2s $(1, N = 51) < .5$.

In light of the significant three way interaction identified by continuous analyses, extreme group analyses were also conducted separately by ethnicity. Although the resulting small group sizes reduced the statistical power of these analyses,[6] the pattern of results is consistent with the Psychopathy × SES × Ethnicity interactions identified by the Cox regression analyses. Survival curves for violent offenses among EA participants are presented in Fig. 2 and among AA participants in Fig. 3; estimated mean survival times and confidence intervals are presented in Table 5. Among EA participants, higher SES psychopaths were significantly less likely to experience ALCV than were lower SES psychopaths at 12 months, *Breslow* $\chi^2(1, N = 24) = 4.67$, $p < .05$, at 36 months, *Breslow* $\chi^2(1, N = 24) = 4.06$, $p < .05$, and at full follow-up, *Breslow* $\chi^2(1, N = 24) = 4.06$, $p < .05$. In contrast no significant differences were identified between higher SES and lower SES nonpsychopaths at any of the follow-up intervals (all *Breslow* χ^2s $(1, N = 28) < 1$). Among lower SES EA participants, comparisons of psychopaths and nonpsychopaths approached significance at 36 months, *Breslow* $\chi^2(1, N = 22) = 3.12$, $p = .08$, but did not attain significance at other follow-up intervals (all *Breslow* χ^2s $(1, N = 22) < 2$). Among higher SES EA participants comparisons of psychopaths and nonpsychopaths revealed negligible differences (all *Breslow* χ^2s $(1, N = 30) < .1$). Examination of Fig. 2 reveals that this pattern of results is consistent with the effects identified by the more powerful continuous analyses. Psychopathy was an important predictor at lower SES but not at higher SES: among lower SES participants, 40% of psychopaths had recidivated by the end of follow-up, compared to roughly 17% of the nonpsychopathic group, whereas among higher SES participants approximately 7% of psychopaths had recidivated by the end of follow-up, compared to approximately 6% of the nonpsychopathic group.

Among AA participants, high and low SES psychopaths did not differ significantly from one another at any of the follow-up intervals ($N = 42$, all *Breslow* χ^2s < 1.5). Similarly, comparisons of high and low SES nonpsychopaths did not identify significant differences at any of the three follow-up intervals (all *Breslow* χ^2s $(1, N = 23) < 3$). Comparisons of psychopathic and nonpsychopathic groups did not attain significance among AA participants at higher SES (all *Breslow* χ^2s $(1, N = 29) < 2$) or at lower SES (all *Breslow* χ^2s $(1, N = 36) < 2$). However, examination of Fig. 3 reveals a pattern of results that is consistent with the significant psychopathy effects identified with the more powerful continuous analyses and suggests that the failure of extreme group analyses reflects the small group sizes in these analyses; at lower SES roughly 46%

[6] A set of supplementary analyses were conducted in which Psychopathy × SES groups were formed using SES medians derived separately by ethnicity. Analyses using these ethnicity specific cut points produced more equal group sizes than were used in the primary analyses, and the pattern of results was equivalent to those reported in the primary analyses in which groups were created using median scores derived from the entire sample. In light of this similarity only analyses in which groups were formed based on the SES median derived from the entire sample are reported.

Table 5 Kaplan–Meier estimated survival time for Psychopathy × SES groups by Ethnicity

	12 Months		36 Months		Full follow-up	
	Mean	95% CI	Mean	95% CI	Mean	95% CI
European Americans						
NP HIGH SES	12.00	–	35.63	34.91–36.34	88.13	80.77–95.48
NP LOW SES	11.58	10.80–12.37	33.58	29.05–38.12	75.58	61.86–89.30
PP HIGH SES	12.00	–	34.50	31.67–37.33	84.64	74.52–94.76
PP LOW SES	9.60	7.18–12.02	25.00	16.07–33.93	58.00	32.75–83.25
African Americans						
NP HIGH SES	12.00	–	35.69	35.30–36.08	80.35	67.74–92.96
NP LOW SES	10.90	9.47–12.33	30.10	22.77–37.43	70.10	50.39–89.81
PP HIGH SES	11.56	10.73–12.39	31.75	27.53–35.97	70.25	54.18–86.32
PP LOW SES	11.04	10.18–11.90	27.38	22.89–31.88	56.50	42.32 –70.68

Note. Mean: Kaplan–Meier estimated means survival time; 95% CI: 95% confidence interval for mean survival time; NP HIGH SES: individuals with PCL-R scores of 20 or less and with Hollingshead scores above the median; NP LOW SES: individuals with PCL-R scores of 20 or less and with Hollingshead Index scores below the median; PP HIGH SES: individuals with PCL-R scores of 30 or greater and with Hollingshead scores above the median; PP LOW SES: individuals with PCL-R scores of 30 or greater and with Hollingshead Index scores below the median.

of psychopaths had recidivated by the end of follow-up, compared to 20% of the nonpsychopathic group. Similarly, at higher SES approximately 31% of psychopaths recidivated compared to 23% of nonpsychopaths.

Supplementary analyses

We conducted two sets of supplementary analyses. In the first set, number of prior charges for violent offenses was entered in the first step of hierarchical Cox regression analyses, followed by entry of psychopathy, sociodemographic predictors and the interactions of these variables. Analyses controlling for prior violent criminality produced a pattern of results highly similar to those in which prior violent charges were not considered.[7]

[7] Reliable estimates of number of prior violent charges were unavailable for 24 participants (12.1%), and these participants were excluded from these analyses. The number of prior violent charges ($M = 2.77$, SD 3.43) was a significant predictor of recidivism across all follow-up intervals, at 12 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 175) = 5.75$, $Exp(B) = 1.11$, $p < .05$, at 36 months, $R^2 = .03$, *Wald* $\chi^2(1, N = 175) = 6.93$, $Exp(B) = 1.09$, $p < .05$, and at full follow-up, $R^2 = .03$, *Wald* $\chi^2(1, N = 175) = 7.05$, $Exp(B) = 1.09$, $p < .05$. Psychopathy was a significant predictor after controlling for SES, ethnicity, and prior violence across all follow-up intervals; at 12 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 175) = 3.85$, $Exp(B) = 1.11$, $p < .05$, at 36 months, $R^2 = .04$, *Wald* $\chi^2(1, N = 175) = 7.45$, $Exp(B) = 1.09$, $p < .05$, and at full follow-up, $R^2 = .05$, *Wald* $\chi^2(1, N = 175) = 8.71$, $Exp(B) = 1.16$, $p < .05$. The PCL-R × SES × Ethnicity interaction was significant at 12 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 175) = 5.32$, $Exp(B) = 1.06$ $p < .05$,

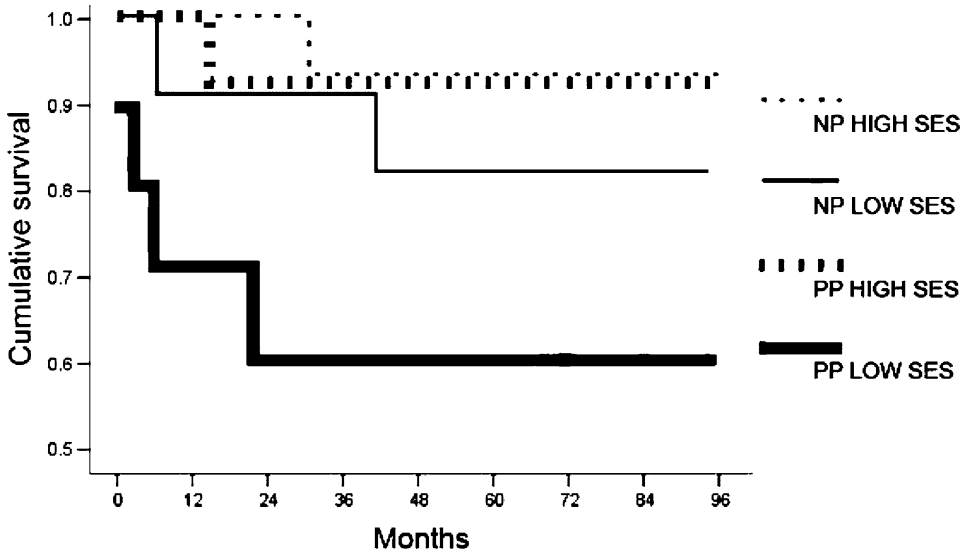

Fig. 2 Kaplan–Meier survival curves for psychopathic, middle and nonpsychopathic groups of European Americans. *Note*. NP HIGH SES: Nonpsychopathic—higher socioeconomic status; NP LOW SES: Nonpsychopathic—lower socioeconomic status; PP HIGH SES: Psychopathic—higher socioeconomic status; PP LOW SES: Psychopathic—lower socioeconomic status. Higher and lower socioeconomic status derived from a median split on a measure based on Hollingshead. Psychopaths defined as PCL-R > 29; Non psychopaths defined as PCL-R < 21; MONTHS: Months from release to arrest leading to conviction; CUMULATIVE SURVIVAL: Proportion of group not arrested

In the second set of supplementary analyses, we examined factor level relationships. Both Factor 1 and Factor 2 predicted ALCV after controlling for sociodemographic variables. However, when both factors were entered concurrently into the Cox regression neither factor significantly predicted ALCV at any interval, suggesting that shared variance between the factors was responsible for these effects.[8] Factor level analyses of the moderating effects of sociodemographic variables on the relationship between psychopathy and violence produced a pattern of results that was similar to that presented for PCL-R total scores (Table 3). When entered independently both factors interacted with ethnicity and SES to predict recidivism. We also examined unique factor level interactions; that is the effects of each factor after controlling for the other factor and the interactions between that factor and sociodemographic variables. These analyses indicated

at 36 months, $R^2 = .03$, *Wald* $\chi^2(1, N = 175) = 5.40$, $Exp(B) = 1.03$, $p < .05$, and approached significance at full follow-up, $R^2 = .02$, *Wald* $\chi^2(1, N = 175) = 3.59$, $Exp(B) = 1.02$, $p = .06$.

[8] After controlling for ethnicity and SES, Factor 1 was a significant predictor at 36 months, $R^2 = .04$, *Wald* $\chi^2(1, N = 199) = 6.57$, $Exp(B) = 1.18$, $p < .05$, and approached significance at 12 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 3.20$, $Exp(B) = 1.20$, $p = .07$, but was not significant at full follow-up, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 2.41$, $Exp(B) = 1.09$, $p = .12$, After controlling for ethnicity and SES, Factor 2 was a significant predictor of ALCV at 36 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 4.36$, $Exp(B) = 1.13$, $p < .05$, and at full follow-up, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 4.18$, $Exp(B) = 1.11$, $p < .05$, but was not significant at 12 months, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 2.56$, $Exp(B) = 1.16$, $p = .11$. When both factors were entered concurrently, neither factor was a significant predictor of ALCV at any of the other follow up intervals, all $R^2 < .02$, *Wald* $\chi^2(1, N = 199) < 3.25$.

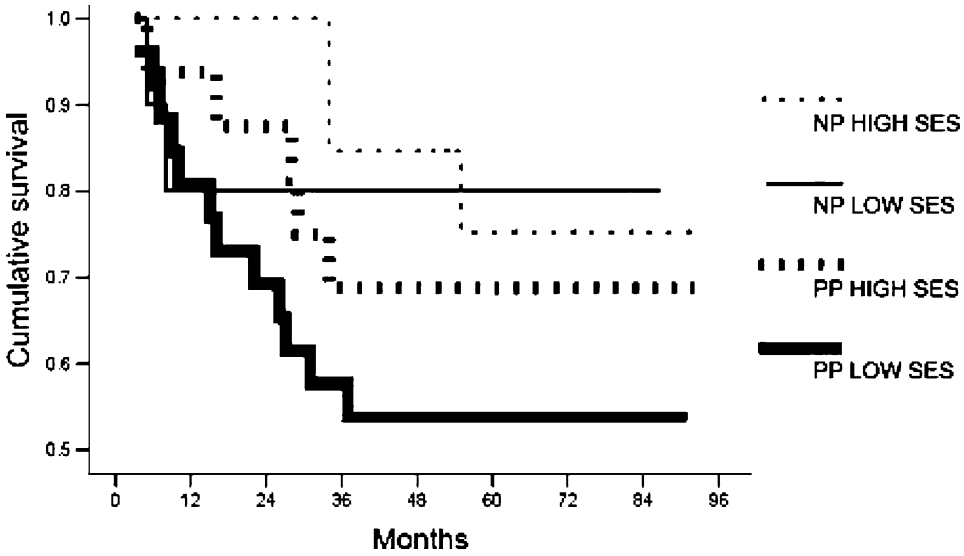

Fig. 3 Kaplan–Meier survival curves for psychopathic, middle and nonpsychopathic groups of Africann Americans. *Note*. NP HIGH SES: Nonpsychopathic—higher socioeconomic status, NP LOW SES: Nonpsychopathic—loweer socioeconomic status, PP HIGH SES: Psychopathic—higher socioeconomic status, PP LOW SES: Psychopathic—lower socioeconomic status. Higher and lower socioeconomic status derived from a median split on a measure based on Hollingshead; Psychopaths defined as PCL-R > 29, Non psychopaths defined as PCL-R < 21; MONTHS: Months from release to arrest leading to conviction; CUMULATIVE SURVIVAL: Proportion of group not arrested

that both factor scores appeared to operate in a manner similar to PCL-R total scores with regard to interaction with sociodemographic factors in the prediction of violence.[9]

Discussion

The findings of this prospective study provide further evidence for the utility of the PCL-R as a predictor of recidivism; by the end of the study the proportion of psychopaths who had been convicted for a violent offense was roughly twice that of nonpsychopaths (33% versus

[9] When each factor was examined independently of the other factor; the F1 × SES × Ethnicity interaction predicted recidivism at 12 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 4.39$, *Exp*$(B) = 1.09$, $p < .05$, and at 36 months, $R^2 = 02.$, *Wald* $\chi^2(1, N = 199) = 3.94$, *Exp*$(B) = 1.05$, $p < .05$, but did not predict at full follow-up, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 1.82$, *Exp*$(B) = 1.02$, $p = .14$. The F2 × SES × Ethnicity interaction followed a similar pattern; it predicted violence at 12 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 4.52$, *Exp*$(B) = 1.07$, $p < .05$, was a trend at 36 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 3.66$, *Exp*$(B) = 1.03$, $p = .06$, but did not predict violence at the end of the follow-up period, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 1.51$, *Exp*$(B) = 1.02$, $p = .19$. When both factors and their interactions with sociodemographic variables were entered concurrently into Cox regressions, the relationship between F1 × SES × Ethnicity interaction and violence was a trend at the end of the follow-up period, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 2.98$, *Exp*$(B) = 1.04$, $p = .08$, and was not significant at 36 months, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 2.43$, *Exp*$(B) = 1.05$, $p = .12$, or at 12 months, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 1.84$, *Exp*$(B) = 1.08$, $p = .18$. When entered concurrently with F1 and the F1 interactions with sociodemographic variables, the F2 × SES × Ethnicity interaction predicted violence at 12 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 4.83$, *Exp*$(B) = 1.09$, $p < .05$, and at 36 months, $R^2 = .02$, *Wald* $\chi^2(1, N = 199) = 4.81$, *Exp*$(B) = 1.05$, $p < .05$, but not at the full follow-up period, $R^2 = .01$, *Wald* $\chi^2(1, N = 199) = 2.56$, *Exp*$(B) = 1.03$, $p = .11$.

16%). Although the effects we identified were somewhat smaller than those reported in research conducted with non-U.S. samples, our findings provide support for the premise that research on psychopathy and violence conducted in other nations, and with other types of incarcerated samples, can be generalized to county jail inmates in the U.S. Our results also suggest that the PCL-R is a valid predictor of violent criminality among African American males. This generalizability is of particular interest due to the overrepresentation of AAs in the U.S criminal justice system, and in light of discrepant findings for EAs and AAs on some correlates of psychopathy (Kosson et al., 1990; Lorenz & Newman, 2002). In addition, supplemental analyses suggest that the predictive power of psychopathy was not due to predictor-criterion contamination by prior violence, and that the observed effects were not confined to a single PCL-R factor.

However, despite the apparent strong performance of the PCL-R as a violence predictor, the significant three-way Ethnicity × SES × Psychopathy interaction indicated that the predictive power of the PCL-R was contingent on SES among EAs. An examination of the proportion reconvicted further illustrates the nature of the interaction. Among European Americans, 6% of higher SES nonpsychopaths and 17% of lower SES nonpsychopaths had been reconvicted by the end of the study, compared to 7% of higher SES psychopaths and 40% of lower SES psychopaths. In summary, EA psychopaths differed in rates of violent crime across levels of SES, and EA nonpsychopaths did not. This novel finding indicates that, although psychopathy adds unique predictive information to that provided by ethnicity and SES, the relationship between psychopathy and violent criminality is not entirely independent of these factors. Indeed, among EAs, SES appears to moderate the impact of psychopathy on violent behavior. Furthermore, if replicable, such a finding might indicate a limitation on the predictive power of PCL-R assessed psychopathy among higher SES EAs. This finding also raises the possibility that the psychopathy effects observed in prior recidivism studies involving EAs may have been due, primarily, to the presence of lower SES psychopaths. However, in light of the robust relationship between psychopathy and violent crime across many samples, this finding requires replication before being viewed as limiting the predictive power of the PCL-R.

With regard to our hypotheses concerning the moderating effect of demographic variables on the relationship between psychopathy and violence, results for European American participants are largely consistent with predictions: psychopathy was most predictive of criminal violence at lower levels of SES. This appears to be consistent with prior findings regarding the potentiating effects of sociodemographic risk on personological predispositions toward antisociality (i.e. Lynam et al., 2000). Results from EAs also appear consistent with the observation that the combination of classes of factors exponentially increases rates of antisocial and violent behavior (Raine, 2002). The recidivism rate of the group with both personological and demographic risk (lower SES psychopaths) was more than six times that of the lowest risk group (higher SES nonpsychopaths). However, findings regarding moderation did not generalize across ethnicity in our sample; the effect of psychopathy was relatively consistent across levels of SES for AAs.

The finding that the apparently attenuating effect of SES on the relationship between psychopathy and violent crime was limited to EAs is curious. One possible explanation for the ethnic discrepancy involves ethnic differences in the social sequelae of low SES. Indeed, ethnic differences have been identified on several factors related to both violence and SES, including childhood exposure to violence (Paschall, Flewelling, & Ennett, 1998), concentrated poverty (Silver, Mulvey, & Monahan, 1999), and a complex web of neighborhood factors (Sampson et al., 2005). Although a review of the impact of this network of relationships is beyond the scope of the present study, it is possible that a broader range of SES would allow for the exhibition of the apparent prophylactic effects of higher SES in AAs. These ethnic differences highlight the importance of conducting further research on the cross-cultural and cross-ethnic predictive validity of psychopathy.

A review of research concerning the relationship between psychopathy and violence suggests that prior studies have reported a heterogeneous array of effect sizes (Douglas, Vincent, & Edens, 2005). Nonetheless, the magnitudes of the psychopathy effects reported in the present study were somewhat smaller than those reported in studies conducted with primarily Canadian and European inmate and psychiatric samples (Hare et al., 2000; Hemphill et al., 1998; Hart et al., 1998). Indeed, based on largely non-U.S. studies, meta-analyses (Gendreau, Goggin, & Smith, 2002; Walters, 2003; Hemphill et al., 1998) have estimated that the effect size for psychopathy predicting violence ranges from approximately $R^2 = .04$ to $R^2 = .12$, whereas the R^2s for psychopathy reported in our study ranged from .02 to .04. Our findings are consistent with recent reports regarding psychopathy and violence, which suggest a relative attenuation of the predictive power of the PCL-R with U.S. samples (Guy et al., 2005; Hemphill, Newman, & Hare, cited in Hare et al., 2000). However, there are a number of additional aspects of the current study that could account for these relatively smaller effects. Firstly, it is possible that psychopathy would account for more variance in recidivism if recidivism were operationalized more liberally (i.e. all arrests rather than arrests leading to conviction). Indeed, convictions provide a conservative estimate of criminality, as many violent crimes remain undetected and because, of those that are detected, some do not lead to convictions. However, a recent study concluded that, although the magnitude of effects may differ across arrest- and conviction-based recidivism criteria, the two measures "lead to nearly identical conclusions" (p.5, U.S. Sentencing Commission, 2004). We feel that our conservative criterion provides an appropriately cautious and objective index and encourage the replication and extension of the present findings employing other indices of recidivism.

The relatively smaller psychopathy effects reported in this study may also be due to the limitation of our follow-up data to within-state offenses, which may provide a less sensitive index of recidivism than do the federal conviction records used in Canadian and European studies that have reported relatively larger psychopathy effects. Indeed Hare et al. (2000) suggested that these national differences in the nature of accessible follow-up data may have contributed to the relatively smaller psychopathy group effects identified in the only prior prospective study of psychopathy and recidivism using a U.S. inmate sample (Hemphill et al., cited in Hare et al., 2000). Although this study has not been published, a summary in Hare et al. (2000) reported violent recidivism rates of 33, 16, and 8% for psychopathic, middle and nonpsychopathic participants during a seven-year follow-up period, which are similar to rates in the present study.

Variation across follow-up intervals also warrants brief discussion. In general, the pattern of effects was generally consistent across the 12 month, 36 month and full follow-up periods. However, the predictive power of psychopathy appeared to increase somewhat with longer follow-up times. This finding suggests that psychopathy effects that have been identified using shorter follow-up periods (i.e. Salekin et al., 1998; Gray et al., 2003; Vitacco, Neumann, & Jackson, 2005) may provide low estimates of the long-term effects of psychopathy on risk for violence. Although the main effect of psychopathy appeared to increase over time, the effects of the interactions between psychopathy and sociodemographic variables were relatively more pronounced earlier in the study. This suggests that the pernicious combination of sociodemographic risk and psychopathy may impact risk relatively soon after release from incarceration, whereas the simple effects of these predictors may operate more consistently across time. In general, the variability that was observed across follow-up intervals highlights the value of using multiple follow-up intervals when examining violence.

Several limitations of the present study should be noted. Firstly, although our analyses of intrastate mobility in violent crime identified no significant relationships between mobility and any of the variables of interest, these analyses did not entirely rule out the possibility that significant relationships existed between these variables and interstate mobility in offending.

Nevertheless, Langan and Levin's (2002) study of all U.S. offenders released from prison in 15 states, including the state in which the present study was conducted, indicated that only 7.6% of released prisoners were rearrested in a state other that from which they were released. This study suggests that, if anything, our finding that 17.1% of participants were convicted out-of-county may have overestimated the extent of interstate mobility in offending. In sum, the censoring of out-of-state offenders does not appear to substantially limit the validity of our study.

Secondly, although our aim in concurrently examining psychopathy and sociodemographic variables was to expand our understanding of the relationship between psychopathy and violent criminality across social sectors, the SES of our sample was not distributed across the entire range of SES, with the vast majority of the participants falling in the two lowest SES categories. However, relatively lower SES is typical of inmate populations (Barak et al., 2001), which suggests that the apparent restriction in the range of SES should not present a challenge to the external validity of our results. Moreover, that we found significant effects with SES demonstrates that the restricted range did not unduly reduce the power of our analyses. Relatedly, no classic definition of SES exists and as such our measurement of the construct is not absolute and is instead intended only to create an index sufficient for statistical analysis. Indeed, the conceptualization and measurement of SES is a controversial subject in social science research (Oakes & Rossi, 2003), and no widely accepted, psychometrically advanced measurement tool exists. Nonetheless, the measure used in the present study remains by far the most commonly used in psychological research (de Ribas et al., 2003) and incorporates information similar to that considered by competing measures. In short, we recognize the difficulties inherent in valid measurement of SES, and join in calls for future research to refine the measurement of this important construct (Oakes & Rossi, 2003).

Finally, the present findings identify ethnicity and SES as important factors in predicting violent criminality with psychopathy. However we do not specify the mechanisms by which these effects operate, nor do we rule out the possibility that the observed effects are due to related but unexamined factors. In particular we did not examine several potentially important sociodemographic factors, including the influence of marriage of parents (Sampson et al., 2005), or neighborhood factors such as concentrated poverty (Silver et al., 1999; Lynam et al., 2000) and social cohesion (Sampson, Raudenbush, & Earls, 1997), all of which have been identified as correlates of SES, ethnicity and crime. Further examination of relationships between psychopathy and such correlates of SES and ethnicity appears to be warranted and may provide insight into the factors that underlie the apparent ethnic differences identified in this study.

The finding that, among a subgroup of psychopaths, criminal recidivism may be partly contingent on SES may have implications for interventions aimed at the attenuation of psychopaths' criminal behavior. As noted by Oakes and Rossi (2003), "SES arguably can be changed by social policy, and this is arguably good health policy" (p. 769). Current findings suggest the possibility that interventions capable of increasing SES may provide a worthwhile avenue of exploration in the search for ways to reduce the likelihood of violent recidivism among some psychopathic offenders. Indeed, regardless of psychopathy, our identification of main effects for SES argues for the potential importance of such interventions. Moreover, in light of the disproportionate number of crimes committed by psychopathic offenders, the putatively refractory nature of psychopathic criminality (Hare, 2003), and the considerable social benefit derived from even a small reduction in violent criminality, findings such as these merit further investigation.

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