THE STABILITY OF PSYCHOPATHY FROM ADOLESCENCE INTO ADULTHOOD:

The Search for Moderators

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Abstract

This study examines moderators of the relation between psychopathy assessed at age 13 using the mother-reported Childhood Psychopathy Scale and psychopathy assessed at age 24 using the interviewer-rated Psychopathy Checklist: Screening Version (PCL:SV). Data from more than 250 participants of the middle sample of the Pittsburgh Youth Study were used. Thirteen potential moderators were examined, including demographics (i.e., race, family structure, family socioeconomic status [SES], and neighborhood SES), parenting factors (physical punishment, inconsistent discipline, lax supervision, and positive parenting), peer delinquency, own delinquency, and other individual differences (i.e., verbal IQ, behavioral impulsivity, and cognitive impulsivity). Moderators were examined for the total psychopathy score at age 24 as well as for each of the four PCL:SV facets. After relaxing the criterion for statistical significance, 8 out of a possible 65 interactions were statistically significant. Implications of the present findings and future directions are discussed.

Keywords

Recently, the construct of psychopathy has been borrowed from the adult literature in an attempt to differentiate those children with conduct problems who will become chronic offenders—specifically, psychopathic offenders—from those whose antisocial behavior will subside over time (Frick, Barry, & Bodin, 2000; Lynam, 1996, 1997). Initial validation studies of the juvenile psychopathy construct have focused on recreating the nomological network of adult psychopathy in juveniles. With few exceptions, the research has supported the idea that juvenile psychopathy looks like adult psychopathy (for a complete review, see Lynam & Gudonis, 2005). Juvenile psychopathy bears the expected relations to offending. In their review of the literature on adolescent psychopathy and aggression, Edens, Skeem, Cruise, and Cauffman (2001) identified "a robust, moderate association between the various operationalizations of psychopathy and aggressive behavior" (p. 71), which is very consistent with research using the Psychopathy Checklist–Revised (PCL-R) in offender samples. In addition, several studies have shown that juvenile psychopathy provides predictive utility

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above and beyond other relevant constructs, including previous offending, aggression, conduct problems, impulsivity, IQ, and attention problems (see Lynam, 1997; Ridenour, Marchant, & Dean, 2001).

Juvenile psychopathy has also been found to relate, as predicted, to constructs that do not involve offending, such as other forms of psychopathology, personality, and cognitive processing. In each case, the relations replicate those obtained in adults. Juvenile psychopathy shows the same patterns of comorbidity as does adult psychopathy; as in adults, psychopathic juveniles are relatively prone to externalizing problems but relatively immune to internalizing problems (Lynam, 1997). Juvenile and adult psychopathy are related in similar ways to basic dimensions of personality (Lynam et al., 2005; Salekin, Leistico, Trobst, Schrum, & Lochman, 2005). Finally, psychopathic juveniles, like their adult counterparts, show problems in emotional processing (e.g., Blair & Coles, 2000) and deficits in behavioral inhibition or impulsivity (e.g., O'Brien & Frick, 1996).

In response to several critiques (e.g., Edens et al., 2001; Seagrave & Grisso, 2002), recent work has begun to tackle the more basic and elemental question of stability: Namely, do psychopathic juveniles become psychopathic adults? As noted by Seagrave and Grisso (2002), "There must be a demonstration that psychopathy as measured in adolescence is predictive of … psychopathy in adulthood" (p. 233). There have been two studies that have examined the stability of juvenile psychopathy over time. In the first study, Frick, Kimonis, Dandreaux, and Farell (2003) examined the stability of scores on the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) during 4 years in a small ($n = 100$) sample of nonreferred children in the third, fourth, sixth, and seventh grades at the first assessment. The sample was selected from a larger population to overrepresent individuals scoring high on the two dimensions of the APSD–Callous-Unemotional Traits and Impulsive Conduct Problems. Within-informant stability, calculated using intraclass correlations, ranged from .88 at 2-year follow-up to .80 at 4-year follow-up, with an instantaneous stability of .93.

In a second study, Lynam, Caspi, Moffitt, Loeber, and Stouthamer-Loeber (2007) examined the stability of juvenile psychopathy assessed at age 13 using the mother-reported Childhood Psychopathy Scale (Lynam, 1997) and psychopathy assessed at age 24 using the interviewer-rated Psychopathy Checklist: Screening Version (PCL:SV; Hart, Cox, & Hare, 1995). Data from more than 250 male participants of the middle sample of the Pittsburgh Youth Study were used to examine this relation. Despite the lengthy time lag, different sources, and different methods, psychopathy from early adolescence into young adulthood was moderately stable across time (i.e., $r = .32$), was uninfluenced by initial risk status and initial psychopathy level, and held even after controlling for other age-13 variables. It should be noted, however, that stability was stronger for the facets of adult psychopathy assessing impulsivity and antisocial behavior (rs = .28 and .33) than for those assessing arrogant and deceitful interpersonal style and deficient affective experience (rs = .19 and .15).

Thus, juvenile psychopathy appears fairly stable across adolescence and into adulthood. A natural next question is whether juvenile psychopathy is similarly stable for all individuals or whether there are moderators of the relation: That is, are there experiences, environments, or characteristics that render psychopathy more or less stable? Identifying such moderators provides useful information about the psychopathy construct itself, mechanisms of stability, and potential intervention targets. For example, if poor parenting moderates the stability of psychopathy, this might suggest that psychopathy is responsive to parental control, and parent training might be an avenue for intervention. Frick et al. (2003) attempted to examine predictors of stability in CU traits by dividing the sample into groups based on whether they scored low or high at various ages. Comparing three groups—stable low ($n = 20$), stable high ($n = 12$), and decreasers ($n = 8$)—to one another, the authors found that the stable-high group had more

conduct problems, less positive parenting, more negative parenting, poorer impulse control, lower intelligence, and lower socioeconomic status (SES) than the stable-low group. Lynam et al. (2007) found that neither initial risk status (high risk versus low risk) nor initial psychopathy level influenced stability across time.

Using data from Lynam et al. (2007), the present study extends and improves on the previous work by examining the moderators of stability in psychopathy from ages 13 to 24. Specifically, to improve on the Frick et al. (2003) study, we used moderated multiple regression to search for factors that either increase or decrease the stability of psychopathy across time. The group-based approach used by Frick et al. greatly reduced their power to detect significant predictors of stability; the three groups compared in their analyses included only 40 children, with only 8 in the decreasing group. In addition, the need to form groups resulted in somewhat arbitrary decisions about cut points and a great loss of information. Using multiple regression allows the entire sample to be used and keeps the psychopathy variables continuous, which provides a more powerful test. The present study extends the work of Lynam et al. beyond risk status and initial psychopathy level by examining a number of potential moderators including demographic factors (i.e., race, family structure, family SES, and neighborhood SES), parenting factors (physical punishment, inconsistent discipline, lax supervision, and positive parenting), peer delinquency, own delinquency, and other individual differences (i.e., verbal IQ, behavioral impulsivity, and cognitive impulsivity).

Although very little work has been conducted on the moderators of the stability of psychopathy, there are areas of research from which hypotheses can be drawn. Several studies have reported interactions between risk factors in predicting antisocial behavior (see Dodge, Coie, & Lynam, 2006). Some of these studies have reported synergistic interactions in which the risk factors combine in a more-than-additive fashion (Cohen, Cohen, West, & Aiken, 2003). For example, beginning with Mednick and Christiansen (1977), multiple studies have demonstrated that genetic and environmental risk factors interact synergistically to produce offending (e.g., Cadoret, Cain, & Crowe, 1983; Cadoret, Yates, Troughton, Woodworth, & Stewart, 1995; Cloninger, Sigvardsson, Bohman, & von Knorring, 1982). Several studies have also demonstrated that prenatal and perinatal complications are more strongly related to crime among those from disadvantaged families (e.g., Arseneault, Tremblay, Boulerice, Seguin, & Saucier, 2002; Brennan, Mednick, & Raine, 1997; Piquero & Tibbetts, 1999). Also, synergistic interactions have been observed between impulsivity and neighborhood (Lynam et al., 2000), maternal smoking and single parenthood (Rasanen et al., 1999), lower resting heart rate and family factors (Farrington, 1997), and pubertal development and sex composition of the school (Caspi, Lynam, Moffitt, & Silva, 1993).

Other studies have reported buffering interactions; these interactions are present when one variable (i.e., the moderator) reduces the impact of the other variable (i.e., the risk factor) on antisocial behavior (Cohen et al., 2003). For example, a higher IQ appears to protect against future antisocial behavior among those at risk (e.g., Fergusson & Lynskey, 1996; Moffitt, 1990). Better academic performance; a warm, nurturing relationship with an adult; and a prosocial peer group seem to have similar ameliorating effects of risk (e.g., Fergusson & Lynskey, 1996; Quinton & Rutter, 1988; Werner & Smith, 1992).

Finally, antagonistic interactions have also been observed (Cohen et al., 2003). In these interactions, the effect of the risk factor is stronger at the benign end of the moderator: in the context of interactions between biological and social variables. Raine has explained this pattern of interaction as the social-push phenomenon, arguing that the effects of biological variables may be overwhelmed in more malignant social environments. For example, Raine, Reynolds, Venables, and Mednick (1997) reported that reduced skin conductance orienting at age 3 was related to aggression at age 11 but only among those from high-social-class backgrounds.

Similarly, lower resting heart rate was more strongly related to antisocial behavior among individuals from higher social classes (e.g., Raine & Venables, 1984). Finally, a similar interaction was identified in the single study that included juvenile psychopathy. Wootton, Frick, Shelton, & Silverthorn (1997) reported that callous-unemotional (CU) traits, one aspect of psychopathy, interacted with parenting to predict conduct problems. Although Wootton et al. parsed the interaction in terms of the relation between parenting and conduct problems depending on the level of CU traits, an alternative rendering reveals that the relation between CU traits and conduct problems was stronger in families with more effective parenting than among families with ineffective parenting—a finding consistent with the social-push account.

Thus, a variety of interactive effects have been observed on antisocial behavior. To the degree that research on antisocial behavior is germane to research on juvenile psychopathy, there is reason to hypothesize that the relation between adolescent and adult psychopathy might differ as a function of other factors. Based on this past research, several hypotheses can be offered. Neighborhood disadvantage should interact with psychopathy at age 13 in a synergistic fashion, such that age-13 psychopathy is more strongly related to age-24 psychopathy among those who live in disadvantaged neighborhoods. IQ and peer delinquency should interact with age-13 psychopathy in a buffering or protective manner such that age-13 psychopathy is less strongly related to age-24 psychopathy among those with higher IQ scores or more prosocial friends. Parenting practices, according to the only study explicitly examining psychopathy, should interact with age-13 psychopathy in an antagonistic fashion such that age-13 psychopathy is more strongly related to age-24 psychopathy among more capable and competent parents. Previous studies lead us to expect an interaction with social class that may take one of two competing forms. In the synergistic version, the relation between age-13 psychopathy and age-24 psychopathy should be stronger among those from lower-SES families. In the antagonistic version, age-13 psychopathy should be more strongly related to age-24 psychopathy among those from higher-SES families. Finally, for some variables—specifically, the individual difference variables from age 13—no specific hypotheses are drawn; analyses are more exploratory for these variables.

METHOD

PARTICIPANTS

Participants are members of the middle sample of the Pittsburgh Youth Study PYS. Full details of background characteristics and initial recruitment in 1987–1988 when children (all male) were aged 10 are given elsewhere (Loeber, Farrington, Stouthamer-Loeber, & van Kammen, 1998). Briefly, boys attending the fourth grade in the public school system in inner-city Pittsburgh (about 1,000 in each grade) were randomly selected from schools across the city. Of families contacted, 85% of the boys and their parents agreed to participate. An initial screening assessment identified high-risk participants; specifically, about 250 boys (30% of each sample) with the most severe disruptive behavior problems based on caretaker, teacher, and self-reports were identified in each sample. In addition, an equivalentsized random subset of the remaining 70% of boys was drawn to complete each sample. This selection process resulted in 508 boys for the middle sample, half high–risk and half non–high risk. The sample also had approximately equal representations of White and African American boys.

The sample was followed from age 10 to age 13 and again in young adulthood between ages 22 and 26 and assessed on a variety of measures assessing the correlates, causes, and consequences of antisocial behavior. Most of the young men also participated in a substudy, when the boys were approximately 12.5 years old, which allowed assessment of psychopathy. Four hundred and three of the boys provided valid data during this assessment.

Three hundred and sixteen members of the middle sample were reinterviewed 9 to 13 years (mean = 11.0 years, SD = .63) after the final adolescent assessment. Most were interviewed in their homes, but 4% were interviewed in prisons. Of these 316 participants, 271 had psychopathy data available at age 13 and were eligible for inclusion in the analyses.[1] Importantly, the men who participated in the present study and those who did not, did not differ significantly on initial risk status at intake (χ^2 [1] = .15, ns; d = .03), psychopathy at age 13 (t [401] < 1, ns; d = .08), the Hollingshead (1979) two-factor SES index at age 13 (t [469] = 1.58, ns; d = .14), or seriousness of delinquent involvement at age 13 (χ^2 [5] = 1.78, ns; d = .12). The men who participated in the follow-up were more likely to be Caucasian (χ^2 [1] = 17.73, p < .001; d = .38); at follow-up, 53% were Caucasian compared to 44% at intake.

MEASURES

Juvenile psychopathy—Juvenile psychopathy was assessed using the Childhood Psychopathy Scale (CPS; Lynam, 1997) when boys were 13 years old. The CPS was developed to operationalize, in childhood and adolescence, the personality traits found in the PCL-R (PCL; Hare, 2003). Using descriptions of the PCL-R constructs and items previously collected from caregivers, 12 of the 20 PCL-R constructs were operationalized as 2- to 4-item scales: glibness (3 items; α = .60), untruthfulness (3 items; α = .66), manipulation (3 items; α = .62), lack of guilt (2 items; α = .25), poverty of affect (2 items; α = .56), callousness (4 items; α = .64), parasitic lifestyle (2 items; α = .36), behavioral dyscontrol (3 items; α = .62), lack of planning (2 items; α = .51), impulsiveness (4 items; α = .65), unreliability (3 items; α = .53), and failure to accept responsibility (3 items; α = .65). Two PCL-R items, criminal versatility and juvenile delinquency, were not included so that the CPS might serve as a pure measure of personality uncontaminated by antisocial behavior. Also, six constructs were not included because they could not be adequately operationalized (boredom susceptibility), did not correlate with other items (grandiosity), or had no childhood counterparts (promiscuous sexual behavior, early behavior problems, many short-term marital relationships, and revocation of conditional release). In the final operationalization, as can be seen above, 8 of the 12 construct scales had alphas greater than .60, and 10 were greater than .50. The reliability of the total scale was .91.

In the original validation study (Lynam, 1997), scores on the CPS were related to serious and stable offending, impulsivity, and externalizing psychopathology. In addition, scores on the CPS predicted serious delinquency above and beyond other known predictors (SES, IQ, previous delinquency, and impulsivity) and alternative parsings of the item pool. Additional studies have shown that the CPS is related to other theoretically relevant constructs, including recidivism and poor treatment outcomes in adolescence (Falkenbach, Poythress, & Heide, 2003), the five-factor model of personality (Lynam et al., 2005; Salekin et al., 2005), and electrodermal hyporesponsivity (Fung et al., 2005).

Adult psychopathy—Psychopathy in adulthood was assessed with the PCL:SV (Hart et al., 1995), which is derived from the PCL-R (Hare, 2003). The PCL:SV was developed with the goal of creating a shorter psychopathy assessment that could be used to assess psychopathy in noncriminal settings and to screen for psychopathy in criminal settings. The PCL:SV is strongly associated with the PCL-R (weighted mean r = .80) and is highly similar to the PCLR in its structure and pattern of relationships to external variables. The PCL:SV consists of 12 items derived from the 20-item PCL-R. There has been much recent discussion regarding the factor structure of PCL:SV and its parent instrument, the PCL-R. For the present article, we employed the four-factor structure recently proposed by Hare (2003). Three PCL:SV items assess an arrogant, deceitful interpersonal style (Facet 1): superficial, grandiose, and deceitful; 3 items

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[1]The actual number of participants in each analysis ranged from 256 to 271.

assess deficient affective experience (Facet 2): lacks remorse, lacks empathy, and does not accept responsibility; 3 items assess an impulsive and irresponsible behavioral style (Facet 3): impulsivity, lacks goals, and irresponsible; and 3 items assess antisocial behavior (Facet 4): poor behavioral controls, adolescent antisocial behavior, and adult antisocial behavior. The 12 items together provide an overall index of psychopathy. For this study, the adolescent antisocial behavior item was dropped to avoid predictor–criterion overlap.

Each participant was administered a semistructured interview, lasting 30 to 45 minutes, derived from the suggested PCL:SV interview. The interview asked about attitudes and behavior in multiple domains, including interpersonal, occupational, financial, and criminal. Following this interview, each of the 12 PCL:SV items were rated on a 3-point scale (0 = *not present*, 1 = *possibly present*, 2 = *definitely present*). Importantly, interviewers were blind to previous study variables and had no access to previous reports of psychopathy or offending. Following the interviews, official arrest records were obtained. Total number of arrests from age 18 to the time of the interview were compared to interviewer ratings of adult antisocial behavior; the correlation was 0.56. A comparison of interview reports of adult arrests and records revealed significant discrepancies for 9% of the respondents (29 of 316). Scores on the adult antisocial behavior item were augmented by 1 for these individuals; scores on the deceitful item were also augmented by 1. This procedure is consistent with previous studies of the effects of criminal record data on PCL-R scores (Alterman, Cacciola, & Rutherford, 1993). Because there was no difference in the results for the original and adjusted scores, results using adjusted scores are reported.

To check the reliability of the PCL:SV ratings, 4% of the interviews were rescored by the first author. Interrater reliability was examined using intraclass correlations (ICC) based on a single rater and absolute agreement. For the individual items, ICCs ranged from .20 for poor behavioral controls to .86 for lacks goals, with an average of .61. The reliabilities of the total score and the facets were adequate to good: ICCs = .86, .59, .71, .84, and .65 for the total, Facet 1, Facet 2, Facet 3, and Facet 4 scales, respectively. Coefficient alphas for the scores were also good; α = .89, .72, .83, .91, and .77 for the total, Facet 1, Facet 2, Facet 3, and Facet 4 scales, respectively. Twenty-seven out of 315 participants (8.6%) met criteria suggested by Hart et al. (1995) for possible psychopathy. Of these 27, 21 (78%) were from the higher-risk status group, providing some validation for both the PCL:SV ratings and the sample selection.

Moderator variables at age 13—The potential moderator variables include demographic information, neighborhood SES, parenting, peer delinquency, delinquency, and several other individual difference variables. Each variable has been linked to antisocial behavior in the present data set (e.g., Loeber et al., 2001; Stouthamer-Loeber et al., 1993; White et al., 1994), and several have been shown to interact with one another (Lynam et al., 2000; Lynam, Moffitt, & Stouthamer-Loeber, 1993).

Demographics—Four demographic variables were included: race (0 = *White* versus 1 = *non-White*), family structure (0 = *two-parent* versus 1 = *not*), family SES and census-defined neighborhood context. The SES of the boys caretakers was assessed using Hollingshead's two-factor index. If a boy had both a male and female parent and caretaker, the scores were averaged; if he had only one caretaker, that score was used. The neighborhood-SES variable was created by factor analysis of nine variables from the 1990 census data (Lynam et al., 2000). The strongest factor accounted for 58% of the variance; the variables loading on this factor were single-parent households, median income, families below the poverty line, families on public assistance, unemployed adults, and percentage who are African American. Neighborhoods with factor scores in the lowest quartile were classified as high-SES; followed by medium-SES neighborhoods, which made up the middle 50%; and those in the upper quartile of factor scores were classified as low-SES neighborhoods. The low-SES group was split once more,

distinguishing low-SES neighborhoods predominated by public housing from low-SES nonpublic housing areas. These four levels were represented by three dummy codes with the low-SES plus public-housing neighborhoods serving as the comparison group.

Family variables—Four family variables were included in the analyses: use of physical punishment, inconsistent discipline, lax supervision, and positive parenting. Physical punishment is a combined caretaker and child construct measuring the extent of physical punishment used by the caretaker. Inconsistent discipline combines four caretaker and five child questions on persistence in disciplining. Lax supervision, based on boys' and caretakers' reports (four questions each), reflects parental knowledge of the boys' whereabouts and activities. Low-positive parenting is based the frequency of the parent's positive behaviors toward the boy. Seven items represent the construct in both child-report and caretaker-report scales. Each of these scales shows adequate reliability in the present sample (Loeber et al., 2001).

Peer delinquency—Peer delinquency represents the proportion of friends reported by each participant who engaged in each of 11 different forms of delinquency.

Other individual differences—Three measures of other important individual differences were also included in the analyses: behavioral impulsivity, cognitive impulsivity, and verbal IQ. Behavioral and cognitive impulsivity are each taken from a multimethod, multisource battery of impulsivity measures. These measures included self-, parent, and teacher reports; observer ratings; and a variety of performance measures (details are provided in White et al., 1994). White et al. (1994) identified two underlying factors within these 11 impulsivity variables—behavioral impulsivity and cognitive impulsivity. Verbal IQ was individually assessed via a short form of Wechsler Intelligence Scale for Children–Revised (WISC-R; Wechsler, 1974). In this version, all 12 subtests were administered, but individual subtests were shortened by administering every other item.

Delinquency—At the age-13 assessment, boys completed the Self-Report Delinquency Instrument used in the National Youth Survey (Elliott, Huizinga, & Ageton, 1985). The instrument inquires about each boy's delinquency during the previous 6 months. The items assess both less serious (e.g., skipping school and stealing something worth less than $5) and more serious forms of delinquency (e.g., breaking and entering and robbery). Self-report delinquency data were supplemented with teacher and caretaker reports of delinquent behavior. Self-report measures of delinquency have strong psychometric properties, particularly when supplemented by reports from other informants (see Junger-Tas & Marshall, 1999).

Because simple frequency counts of delinquent behavior neglect the relative seriousness of the behaviors and can fail to order persons adequately along a dimension of delinquency, a seriousness classification scheme was developed (Loeber et al., 1998). The severity ratings, adapted from those developed by Wolfgang, Figlio, Tracey, and Singer (1985), place a boy in one of six delinquency levels from 0 (*no delinquency activity*) to 5 (*multiple serious delinquent acts*; i.e., stealing cars, breaking and entering, or selling drugs) based on the most serious act committed in the past 6 months according to the boy, his teacher, or his caretaker.

RESULTS

ZERO-ORDER RELATIONS

At the zero-order level, psychopathy at age 13 was significantly related to total scores on the PCL:SV at age 24 and to each of the PCL:SV facets, *r*s equal .31, .19, .15, .28, and .33 for the total, Facet 1 (interpersonal), Facet 2 (affective), Facet 3 (impulsive), and Facet 4 (antisocial)

scores, respectively (all ps < .05). Within the facets, the correlations for Facets 3 and 4 were significantly stronger than the correlations for Facets 1 and 2.

MODERATOR ANALYSES

To identify moderators of stability, separate regression analyses were conducted for each moderator and for each of the five outcomes (total score plus four facets scores). For all variables except the neighborhood-SES variable, each outcome was regressed onto psychopathy at age 13, the given moderator, and a product term carrying the interaction between psychopathy and the moderator; a statistically significant coefficient for the product term indicated that the moderator and psychopathy at age 13 interacted to predict psychopathy at age 24. All continuous predictors were centered, and all dichotomous predictors were given meaningful zero-points (e.g., for race, 0 = *White*). For the neighborhood-SES construct, three dummy codes were needed to represent the four neighborhoods; for this variable, psychopathy at age 13 and the three dummy codes were entered at Step 1, followed by three product terms entered at Step 2; in this case, a significant change in the variance accounted for from Step 1 to Step 2 indicates the presence of an interaction. Because interactions are underpowered relative to main effects and difficult to detect in field settings (Aiken & West, 1991), the criterion for statistical significance was relaxed to .10 for the present analyses. In the face of a significant interaction, simple slope analyses were conducted to examine the relation between psychopathy at age 13 and psychopathy at age 24 at high and low levels of the moderator.

For each of five outcomes, 13 interactions were examined. Across these 65 tests, only 8 were statistically significant. There was, however, consistency across the variables involved. Physical punishment and peer delinquency interacted with age-13 psychopathy to predict age-24 psychopathy for the total score and for scores on Facets 1 and 4; family SES interacted with age-13 psychopathy to predict scores on Facets 2 and 3 at age 24. Simple slope analyses, shown in Table 1, revealed that the nature of the interactions was the same across all variables. For each moderator, psychopathy at age 13 was more strongly related to psychopathy at age 24 at the noncriminogenic pole of the moderator, for instance, at low levels of physical punishment, low levels of peer delinquency, and high levels of family SES.

Figures 1 through 3 illustrate three of the interactions. In each case, stability is indexed by the steepness of the slope; steeper slopes represent higher stability. Figure 1 shows that the relation between psychopathy at 13 and Facet 3 scores at 24 is stronger at higher levels of family SES, defined as 1 standard deviation greater than the sample mean; as can be seen in the table, the relation is not significant at low levels of family SES, defined as 1 standard deviation less than the mean. Similarly, as shown in Figures 2 and 3, the relation between age-13 psychopathy and Facet 4 scores at age 24 is stronger at lower levels of physical punishment and lower levels of peer delinquency. However, as Table 1 shows, the relation between age-13 psychopathy scores and Facet 4 scores at age 24 is still statistically significant at higher levels of physical punishment and higher levels of peer delinquency.

DISCUSSION

The present research examined the ability of various constructs to moderate the stability of psychopathy from early adolescence into young adulthood in the middle sample of the PYS. Psychopathy was assessed with the CPS when boys were 13 years old and again with the PCL:SV when the men were 24 years old on average. Potential moderators included demographics (i.e., race, family structure, family SES, and neighborhood SES), parenting factors (physical punishment, inconsistent discipline, lax supervision, and positive parenting), peer delinquency, own delinquency, and other individual differences (i.e., verbal IQ, behavioral impulsivity, and cognitive impulsivity). Moderators were examined for the total psychopathy score at age 24 as well as for each of the four PCL:SV facets.

Only 8 of the 65 tests of the interactions were statistically significant; 12 of the 16 simple slopes examined were statistically significant. Thus, one general finding is of moderate stability between psychopathy at age 13 and psychopathy at age 24 that is not influenced by other factors. There was consistency across the variables involved in these 8 interactions, which may increase confidence in the findings; physical punishment and peer delinquency interacted with age-13 psychopathy to predict total age-24 psychopathy scores and scores on Facets 1 and 4, and family SES interacted with age-13 psychopathy to predict scores on Facets 2 and 3. Simple slope analyses revealed that all interactions were of the same form; psychopathy at age 13 was more strongly related to psychopathy at age 24 at the noncriminogenic pole of the moderator, for instance, at low physical punishment, low peer delinquency, and high family SES.

These results are consistent with previous research on the interaction of CU traits and parenting in predicting conduct problems. This previous research showed that CU traits were more strongly related to conduct problems among those with more effective parents (Wootton et al., 1997). These results are also consistent with other work reviewed previously illustrating Raine's (2002) social-push perspective, which argues that biological influences are more likely to be seen in benign environments because in malignant environments, "the social causes of crime camouflage the biological contribution" (p. 314). The way in which this camouflage occurs is evident in the figures. Boys who were high in psychopathy at 13 tended to remain high at age 24 regardless of their status on the moderators. The important changes across time occurred for the boys who were low in psychopathy at age 13. Boys who were low in psychopathy at age 13, who grew up in wealthier families, who had fewer antisocial peers, and who experienced less physical punishment remained low in psychopathy across time. However, boys who were low in psychopathy at age 13, who grew up poorer, who had antisocial friends, and who experienced more physical punishment became more psychopathic over time. It is this latter group of boys that reduces the stability of psychopathy across time.

IMPLICATIONS

There are several implications to the present results. The results suggest that family SES, delinquent peers, and physical punishment may be contributors to adult psychopathy. This appears to be the case among boys who are not already psychopathic at age 13. It may also be the case that these variables were operative previously among the boys who were psychopathic at age 13 and that their effects are now contained within the more proximal measure of psychopathy at age 13.

The fact that parental SES moderated juvenile psychopathy for PCL:SV Facets 2 and 3, whereas physical punishment and peer delinquency moderated the total score and Facets 1 and 4 has implications for how we think about psychopathy. Psychopathy appears to be a multidimensional construct. Several researchers have suggested that psychopathy represents a combination of personality traits drawn from diverse domains (e.g., Lynam & Derefinko, 2006). The four facets of the PCL:SV itself and the multifactorial structure of other psychopathy inventories (e.g., Lilienfeld & Andrews, 1996) argue against psychopathy as a unitary construct. The present results underscore this point.

The disappointing aspect of these results is what they do not show. None of the moderators acted as classic protective factors to the stability of psychopathy. That is, no moderator acted to reduce future psychopathy among those at risk; such an interaction would have been evinced in a graph showing low levels of age-24 psychopathy regardless of level of age-13 psychopathy at one end of the moderator. This is disappointing, as such moderators would suggest potential intervention targets. Targeting moderators identified in the present study might reduce age-24 psychopathy among those low in age-13 psychopathy but would likely have little impact on those who were already high on age-13 psychopathy.

These results may also suggest something about early psychopathy, particularly when interactions are discussed in terms of the influence that parenting, peers, and SES have on age-24 psychopathy at differing levels of age-13 psychopathy.[2] Examining Figures 1 through 3 reveals that physical punishment, delinquent peers, and low SES have much smaller effects on age-24 psychopathy for individuals high in age-13 psychopathy than for those low in psychopathy at age 13. In fact, physical punishment, delinquent peers, and low SES have virtually no impact on future psychopathy among those high in psychopathy at age 13. These results are consistent with previous accounts that suggest psychopathy is an innate temperament that is relatively resistant to socialization efforts (e.g., Lykken, 1995; Wootton et al., 1997). Psychopathy at 13 appears little influenced by classic agents of socialization such as parents and peers.

LIMITATIONS AND FUTURE DIRECTIONS

As with any study, there are limitations that temper our conclusions and push for future research. The most obvious limitation is the high participant loss across the 11 years between assessments. Although there were no differences between those lost and those retained in risk status at intake, SES at age 13, psychopathy at age 13, or seriousness of delinquent involvement at age 13, the groups did differ in the proportion of African Americans. There are sure to be other differences as well. Despite these problems, the sample is important in that it represents one of the largest community studies on psychopathy, particularly psychopathy across time.

Another limitation is the inclusion of only men in the PYS. Although this exclusion is understandable from a pragmatic standpoint given the focus of the PYS (i.e., the causes and correlates of serious delinquency) and does not influence our conclusions regarding the stability of psychopathy for men, this exclusion precludes comparison of psychopathy across sex—an important area receiving increased interest. Future research should examine the generalizability of these findings across sex.

A third limitation lies in the limited number of moderators examined. The number of potential moderators is infinite, and we examined only 13. These particular 13 constructs have been shown to relate to antisocial behavior, and several have been shown, in this sample and in other samples, to interact to predict antisocial behavior. Nonetheless, it is entirely possible that important moderators were overlooked or unmeasured in the present study. Future research should focus on including additional moderators in the analyses. For example, Moffitt's (1993) theory posits that risk for chronic offending is highest among individuals with early starting behavior problems and certain types of neuropsychological deficits; neither of these constructs was included in the present study.

The fourth limitation lies in our substantive interpretation of 8 out of a possible 65 interactions. Given that we relaxed our criterion for significance to .10, one would expect to obtain 6.5 significant interactions from a population in which there was no interaction; that is, one would expect to make 6.5 Type I errors. Making eight or more Type I errors across these 65 trials will happen at least 20% of the time. Thus, these eight interactions may represent nothing more than Type I errors. Replication becomes extremely important in such instances.

Finally, it is important to note that low statistical power is unlikely to have been a severe limitation, despite the fact that interactions are more difficult to detect than main effects (Aiken & West, 1991). Although it is difficult to obtain an exact estimate of power for these analyses, a general estimate is possible. Three factors serve to make interactions more difficult to detect,

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[2]Because interactions are symmetrical, the current interactions can be discussed as reflecting the influence of age-13 psychopathy on age-24 psychopathy as a function of moderator level or as the influence of the moderator on age-24 psychopathy as a function of age-13 psychopathy level.

particularly in field settings. The first is the reliability of the product term, which is equal to the product of the reliabilities of the components (Aiken & West, 1991). The second factor is the joint distribution of the two variables that, in field studies, tends to have many cases in the middle of the distribution, which serves to reduce power (McClelland & Judd, 1993). The third factor influencing power is the size of the main effects; interactions are more difficult to detect in the face of large main effects. Several factors in the present study serve to ameliorate some of these concerns. Main effects are moderate rather than large. The enrichment strategy of the PYS serves to lessen some of the distributional concerns and actually increases power (Cohen et al., 2003). Furthermore, increasing alpha to .10 rather than .05 serves to increase power as well. In a classic power analysis, assuming perfectly reliable variables, a sample size of 268 (the average number available for the analyses), main effects accounting for 12% of the variance, and an alpha of .10, power was greater than .50 to detect an increment in variance of 1% because of the interaction, greater than .80 for an increment of 2%, greater than .90 for an increment of 3%, and approaching 1 for increments greater than or equal to 4%.

In sum, the present research sought to identify factors that moderated the relation between age-13 psychopathy and age-24 psychopathy. Thirteen potential moderators were examined, including demographics (i.e., race, family structure, family SES, and neighborhood SES), parenting factors (physical punishment, inconsistent discipline, lax supervision, and positive parenting), peer delinquency, own delinquency, and other individual differences (i.e., verbal IQ, behavioral impulsivity, and cognitive impulsivity). Moderators were examined for the total psychopathy score at age 24 as well as for each of the four PCL:SV facets. Three variables— use of physical punishment, peer delinquency, and parental SES—moderated the relation for at least two of the five outcomes. In each case, psychopathy at age 13 was more stable at the noncriminogenic pole of the moderator. Results underscore the moderate stability of psychopathy from 13 to 24 and are consistent with the idea of psychopathy as a temperament or personality-based construct that is relatively resistant to socialization pressures.

Acknowledgments

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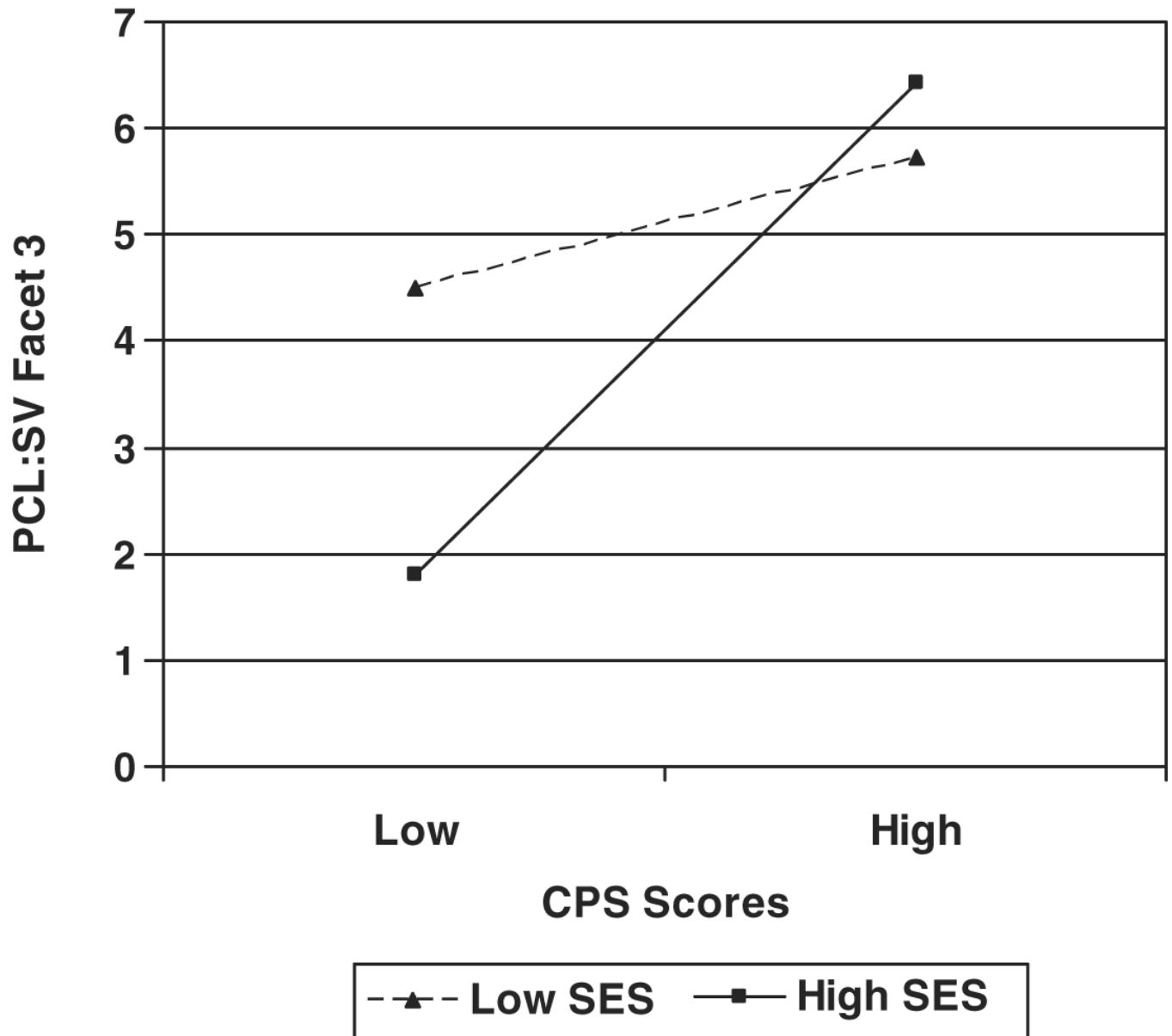
Figure 1. Interaction Between CPS Scores at Age 13 and Family SES in Predicting Scores on Facet 3 of the PCL:SV at Age 24
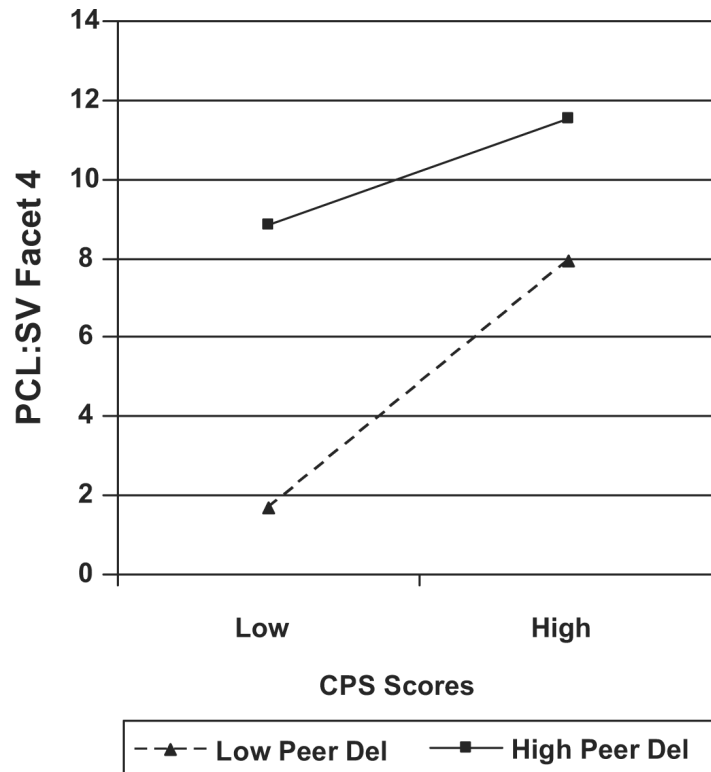Note. High and low values of the predictors correspond to 1 standard deviation greater than and less than the sample means, respectively. PCL:SV = Psychopathy Checklist: Screening Version; CPS = Childhood Psychopathy Scale; SES = socioeconomic status.
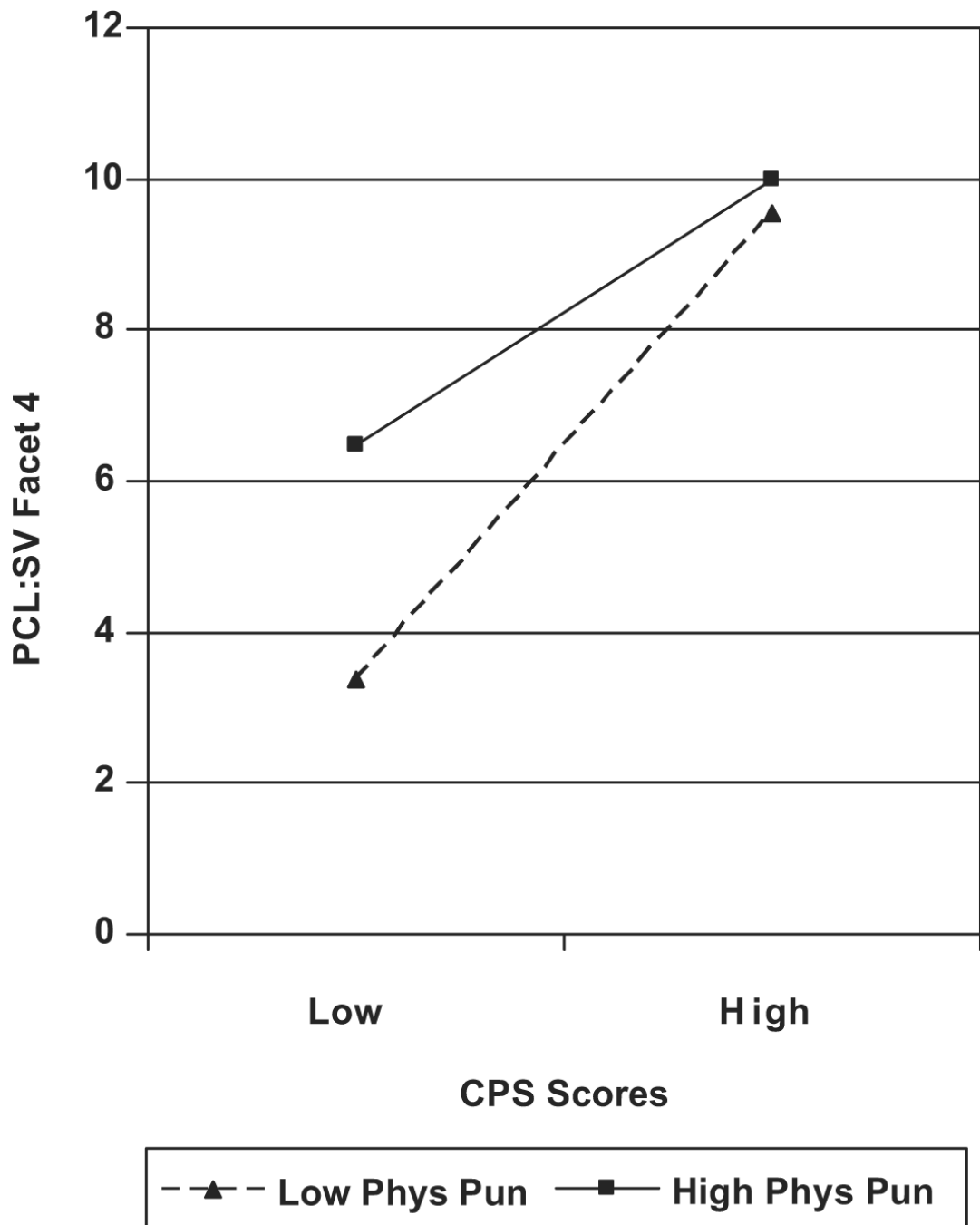
Figure 2. Interaction Between CPS Scores at Age 13 and Use of Physical Punishment in Predicting Scores on Facet 4 of the PCL:SV at Age 24
Note. High and low values of the predictors correspond to 1 standard deviation greater than and less than the sample means, respectively. PCL:SV = Psychopathy Checklist: Screening Version; CPS = Childhood Psychopathy Scale.

Figure 3. Interaction Between CPS Scores at Age 13 and Peer Delinquency in Predicting Scores on Facet 4 of the PCL:SV at Age 24
Note. High and low values of the predictors correspond to 1 standard deviation greater than and less than the sample means, respectively. PCL:SV = Psychopathy Checklist: Screening Version; CPS = Childhood Psychopathy Scale; SES = socioeconomic status.

TABLE 1

Simple Slope Regressions of PCL:SV Scores at Age 24 on CPS Scores at Age 13

Moderator Variable	At Low Level	At High Level	*F* Value for Interaction
PCL:SV total score			
Physical punishment	.395****	.221***	3.04*
Peer delinquency	.378****	.171**	3.46*
PCL:SV Facet 1 (arrogant, deceitful)			
Physical punishment	.275***	.099	2.96*
Peer delinquency	.285***	.044	4.08**
PCL:SV Facet 2 (deficient affective experience)			
Family SES	.011	.266***	3.98**
PCL:SV Facet 3 (impulsive and irresponsible)			
Family SES	.109	.412****	6.00**
PCL:SV Facet 4 (antisocial)			
Physical punishment	.401****	.228***	3.05*
Peer delinquency	.409****	.177**	4.32**

Note. PCL:SV = Psychopathy Checklist: Screening Version; CPS = Childhood Psychopathy Scale; SES = socioeconomic status. Coefficients in the table indicate the simple regression of age-24 psychopathy onto age-13 psychopathy at a low or high level of the moderator.

*
$p < .10$.

**
$p < .05$.

***
$p < .01$.

****
$p < .001$.