



## The PCL: YV and recidivism in male and female juveniles: A follow-up into young adulthood <sup>☆</sup>

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### ABSTRACT

Adolescents, and most recently, adolescent females, have emerged as an important population in violence risk assessment and have sparked a debate regarding the downward and gendered extension of the *Psychopathy Checklist: Youth Version* (PCL:YV). This article evaluates the differential prediction of the three and four-factor models of the PCL:YV for male ( $n=201$ ) and female ( $n=55$ ) juvenile offenders using a prospective four and one-half year follow-up ( $M=3$  years) study. Both models of the PCL:YV were significant predictors for boys; however, contrary to findings from studies using shorter follow-up periods, the predictive power was due primarily to the behavioral features of psychopathy. The PCL:YV was not a significant predictor of non-violent or violent recidivism for girls. This study does not lend support for the use of the PCL:YV as a risk factor for girl offenders. More research is needed to understand the application of the psychopathy construct in youth, particularly in girls.

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### 1. Introduction

Clinicians are frequently asked to conduct assessments of delinquents' likelihood of future harm to others. These assessments stem from the juvenile justice system's obligation to protect public safety, and punitive laws involving the transfer of youths to adult court (see [Grisso, Vincent, & Seagrave, 2005](#)). One notion that pervades these assessments and the courts is the identification of those youth that are most likely to have chronic violent offending patterns that are less amenable to treatment. This stems from the host of longitudinal research that has established that a small proportion (around 6%) of early male delinquents will become chronically antisocial and proceed to commit over 50% of all crime (e.g., [Farrington & West, 1993](#); [Moffitt & Caspi, 2001](#)). As such, researchers have directed considerable attention to the identification of factors that put children and adolescents at highest risk for violent and serious delinquent behavior.

Over the last decade, girls in particular have become a particularly important population for research related to the assessment of risk for recidivism and violence: Increasing numbers of female adolescents have entered into juvenile correctional settings ([Porter, 2000](#)) and rates of official violent offending and self-report involvement in aggressive acts has increased ([Puzzanchera, Stahl, Finnegan, Tierney, & Snyder, 2003](#); [U.S Department of Health and Human Services, 2001](#)). As a result, urgent calls have been made for more research into key risk factors and pathways towards violence in girls ([Moretti, Odgers, & Jackson, 2004](#)).

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One approach to understanding the factors that may be contributing to the involvement of adolescent males and females in aggressive and antisocial behavior involves looking to previously established models for assessing violence risk in adults. Developmental research supports this type of gender neutral approach as the same taxonomy is assumed to explain the risk factors, developmental pathways and outcomes of antisocial behavior for both males and females (Moffitt, 2004; Moffitt, Caspi, Rutter, & Silva, 2001). One of these “models” for understanding risk is psychopathic personality disorder. Indeed, Lynam (1996) suggested that youths with hyperactivity-impulsivity-attention problems and severe conduct problems are “fledgling psychopaths” and are at highest risk for becoming chronic serious and violent offenders.

Among adult male offenders, there is substantial evidence supporting the assessment of psychopathic personality disorder using the Hare Psychopathy scales; namely, the *Psychopathy Checklist-Revised* (PCL-R; Hare, 2003) and its screening version (PCL:SV; Hart, Cox, & Hare, 1995) in the prediction of both violent and general recidivism (Hemphill, Hare, & Wong, 1998; Salekin, Rogers, & Sewell, 1996; Serin & Amos, 1995). In fact, the robust associations between these assessment tools and future acts of violence has compelled the conclusion that exclusion of these instruments from any assessment of violence risk in adults “may be unreasonable” (Hart, 1998, pg. 17).

Significant questions remain, however, as to how well these instruments generalize downward to adolescents in general (Seagrave & Grisso, 2002; Vincent, 2006), and to adolescent female offenders more specifically (Odgers, Moretti, & Reppucci, 2005). The Hare Psychopathy scales originally were designed and validated for use with adult male offenders. The majority of psychopathy studies with youth have not included females, and those that have attempted to collect data on girls eventually exclude girls from analyses because they represent “noise” within larger samples of male offenders. As such, this prospective study is one of the few to examine gender differences in the value of the PCL as a violence risk factor among adolescent offenders, and does so with a relatively long follow-up period.

### 1.1. Validity of the Hare scales for predicting violence in male adolescent offenders

Publication of the *Psychopathy Checklist: Youth Version* (PCL:YV; Forth, Kosson, & Hare, 2003) enabled the accumulation of empirical evidence supporting the use of psychopathic traits as a violence risk factor among adolescent offenders. Numerous studies with male children and adolescents indicate that the PCL:YV has good to excellent rater-agreement (see Forth et al., 2003, for a review) and is associated with disruptive behavior disorders (Rogers, Johansen, Chang, & Salekin, 1997), anomalies in executive functions (Roussey & Toupin, 2000), and poor interpersonal relations (Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002). However, there appears to be an age-related measurement bias such that, among those at low levels of psychopathy, youth are likely to show higher levels of psychopathic behaviors than adults (Vincent, 2002).

Increasing recidivism studies with male adolescents imply fair consistency with the adult literature. Retrospectively, higher PCL:YV scorers are most likely to have histories of dense and serious offending patterns beginning at a relatively early age (e.g., Brandt, Wallace, Patrick, & Curtin, 1997; Toupin, Mercier, Déry, Côté, & Hodgins, 1996). Studies with mixed predictive-postdictive designs spanning periods of 5 to 10 years generally have reported strong associations between PCL:YV scores and general and violent recidivism (see Edens, Skeem, Cruise, & Cauffman, 2001 for a review) with high scorers being three times as likely as low scorers to violently recidivate (Gretton, McBride, Hare, O’Shaughnessy, & Kumka, 2001). Though true prospective studies have been scarce, existing data has shown fairly strong predictions for violent recidivism generally (Catchpole & Gretton, 2004 [AUC=.73]; Vincent, Vitacco, Grisso, & Corrado, 2003) and for general recidivism occasionally (e.g., Brandt et al.; Ridenour, Marchant, & Dean, 2001; Toupin et al., 1996). However, the follow-up period for these studies has ranged from one to three years, meaning we still know little about the PCL:YV’s predictability over longer time periods, particularly into young adulthood.

### 1.2. Validity of the Hare scales for predicting violence in female adolescent offenders

While the larger field of developmental psychopathology set a precedent to establish measurement invariance across age and gender prior to assessing personality and behavioral functioning (see Mash & Barkley, 2003), this approach has not been accepted widely within the forensic psychology field. Though research into the generalizability of the Hare scales across gender is on the rise, we still know little about the usefulness of the PCLs with adult females and there are virtually no findings to inform the science and practice of assessments with adolescent girls (Odgers et al., 2005).

Few studies have evaluated use of the PCL:YV in girl samples. In the PCL:YV test manual, Forth et al. (2003) reported item and mean score comparisons between the male normative sample and 201 girls from various datasets, concluding that “PCL:YV total scores do not appear to be unduly influenced by a youth’s gender” (p. 51). At the time of this study, there was only one published study of the predictive validity of the PCL:YV with girls (Odgers et al., 2005), and an unpublished doctoral dissertation (Rowe, 2002, as cited in Forth et al., 2003). Using a sample of 81 girl offenders, Rowe (2002) reported a positive relationship between PCL:YV scores and general recidivism but the relationship with violent offending was not significant. Alternatively, Odgers and colleagues found that PCL:YV scores did not predict future offending in a sample of 62 adolescent female offenders after taking into account victimization experiences; however, the follow-up period for this study was only three months.

Uncertainty about the use of the PCL:YV with adolescent girls is compounded by the fact that many questions still remain with respect to use of the PCL-R in women. Only a handful of studies have reported the predictive validity of the PCL-R separately for women (see Hare, 2003 and Vitale & Newman, 2001, for reviews) and results vary, at least to some extent, based on the research design and methods. As summarized by Nicholls, Odgers, and Cooke (2007) recent narrative reviews have offered preliminary support for the PCL in identifying women at risk for antisocial behavior, poor treatment outcomes, and

violent criminal offending (Nicholls, Ogloff, & Douglas, 2004; Verona & Vitale, 2006). However, caution should be noted as the empirical body of literature is still limited and a meta-analysis of predictive validity of the PCL with adult women is required. Most studies have examined only general recidivism and not violence specifically, few have been prospective, and few have included male comparison samples.

### 1.3. Evaluating the contribution of psychopathy

Psychopathy is comprised of interpersonal, affective and behavioral traits. A preferred approach to predictive validity studies is to evaluate these symptom clusters of psychopathy separately to explain incongruent findings regarding the relationship between psychopathy and different types of crime and violence (Douglas, Vincent, & Edens, 2006) across populations. The factor structure of the Psychopathy Checklist instruments permit researchers and clinicians to examine categories of psychopathic traits separately, to explore their unique contributions to prediction models. Extensions of adult factor models downward to adolescents have converged on two primary factor structures (models) for the PCL:YV (Forth et al., 2003). The first model, referred to as the 'parceled four-factor model' (Forth et al., 2003) separates the 20 items of the PCL:YV into four factors. The second model, referred to as the 'three-factor model' (a derivative of Cooke and Michie's (2001) model for the PCL-R), discards the seven items of the PCL:YV that regard criminogenic characteristics and separates the remaining 13 items into three factors. There is substantial overlap between these models in that they both include the same three factors related to Interpersonal (Factor 1), Deficient Affective Experience (Factor 2), and Lifestyle Behavioral traits (Factor 3; e.g., impulsivity, irresponsibility). Where the two models differ is in the emphasis on criminogenic behaviors. The parceled four-factor model (Model 1) includes a fourth factor containing the specific antisocial behaviors rated on the PCL:YV (Factor 4; e.g., criminal versatility, serious delinquency). These antisocial behavior items are not included in the three-factor model (Model 2), in part because there is debate as to whether or not these items fit into a coherent factor structure, and in part because these items reflect, in Cooke, Michie, Hart, and Clark's (2004) words, "socially deviant behavior" as opposed to "personality deviance" (p. 350). In other words, there is the view that specific criminal activities, such as the versatility of crimes on one's juvenile record, are not personality traits, per se.

Examination of the unique contribution of psychopathy factors for different types of recidivism has led to interesting findings in adult populations. Among adult male offenders the interpersonal/affective and behavioral factors, both interactively and exclusively, predict violent recidivism while only the behavioral factor predicts general recidivism (Hemphill et al., 1998). Conversely, only behavioral traits have been found to predict violence and crime among male civil psychiatric patients (Skeem & Mulvey, 2001). For women, in striking contrast to findings that only behavioral traits predict general offending among men, Richards et al. (2003) found that the combination of interpersonal and affective traits alone (without the behavioral traits) predicted time to general re-offending.

Studies that employ this approach to models of the *Psychopathy Checklist: Youth Version* with adolescents have been rare. In a 27 month follow-up study, with an average follow-up around one year, Corrado, Vincent, Hart, and Cohen (2004) found that the prediction of violent recidivism among male adolescents was attributed to the interaction between all factors of the PCL:YV (regardless of whether the three or four-factor model was used), which may be indicative of the "construct" of psychopathy. Conversely, general recidivism was attributed only to behavioral factors. Of note, the lifestyle behavioral factor was a significant predictor in itself, suggesting that the antisocial behavior items were not an essential feature of psychopathy for the prediction of future offending in adolescents. To date, the unique contributions of the facets of psychopathy in the prediction of recidivism have not been reported with girls.

### 1.4. Current study

In sum, research suggests that the PCL:YV is a significant predictor of recidivism in male adolescents. Indeed, a recent meta-analysis reported that the effect of psychopathy in the prediction of recidivism among adolescents was .26 for general recidivism and .23 for violent recidivism (Edens, Campbell, & Weir, 2007). However, some questions still remain given there was substantial heterogeneity in these effects due to gender, the meta-analysis did not examine variability in these effects as a function of the lengths of follow-up periods in the included studies, and it did not examine the more recent three and four-factor models of the PCL:YV.

The objective of the current study was to evaluate whether or not the different models of the PCL:YV predicted recidivism in male and female adolescents over a relatively long follow-up period, spanning into young adult years for many adolescents in the sample. This was a prospective study, using a 4.8 year follow-up (average = 3 years), which evaluated the unique contribution of the PCL:YV's trait clusters according to both the three and four-factor models in the prediction of violent and non-violent recidivism. We separated boys and girls to investigate the differential predictive validity and the relative importance of individual factors in the prediction of violent and general re-offending.

## 2. Method

### 2.1. Participants

Participants in this study were young offenders sentenced to one of five youth custody settings in Vancouver, British Columbia from 1998 to 2001. This study is an extension of Corrado et al. (2004) given it uses the same base sample of

adolescent offenders; however, the follow-up period was longer, this study included more males because more had been released from secure custody, and this study included girls, which had been excluded from previous investigations. A total of 434 offenders between the ages of 12 to 18 years old completed an interview designed to provide information for scoring the PCL:YV. Of these, 66 girls and 257 boys had adequate file information to permit completion of the PCL:YV.<sup>1</sup> This resulted in a base sample of 316 young offenders, which included 250 boys with a mean age of 16.92 (SD=1.23) and 66 girls with a mean age of 16.37 (SD=1.21).

At follow-up, the authors searched release dates and provincial arrest records for the base sample of 316 young offenders in order to conduct the prospective analyses for this study. Only nine males and two females had not been released from custody at the time of follow-up. Arrest records could not be located for 40 male and nine female participants.<sup>2</sup>

The final sample included 201 boys and 55 girls. For the boys, 71% were Non-Hispanic Whites, 19% were First Nations, and 11% fell into the "Other" minorities category. The majority of boys were located in closed custody settings (71%) and the sample ranged from 12 to 18 years of age ( $M=16.83$ ,  $SD=1.26$ ) at the time of the PCL:YV interview. For the girls, 61% were Non-Hispanic Whites, 33% were First Nations, and 6% fell into the "Other" category. The majority of girls (60%) were located in less secure custody settings and they ranged from 13 to 18 years of age ( $M=16.30$ ,  $SD=1.25$ ) at the time of the PCL:YV interview. Girls were significantly younger than boys,  $t(256)=2.86$ ,  $p<.005$ , and more likely to be in minimum security settings,  $\chi^2(1, N=256)=18.28$ ,  $p<.001$ . The common categories of most serious index offenses was property offenses for boys (36%) and breaches of probation and other violations for girls (42%). Forty-four percent of the entire sample was convicted of at least one violent index offense with no significant differences between girls (32%) and boys (43%),  $\chi^2(1, N=254)=2.34$ ,  $p>.05$ . Boys and girls did not differ significantly with respect to the number of prior sentencing dates (Boys –  $M=4.36$ ,  $SD=3.73$ ; Girls –  $M=4.04$ ,  $SD=3.07$ ) or age of first arrest (Boys –  $M=14.34$ ,  $SD=1.45$ ; Girls –  $M=14.53$ ,  $SD=1.10$ ).

## 2.2. Measures

*Psychopathy Checklist: Youth Version (Forth et al., 2003).*<sup>3</sup> The PCL:YV is a downward extension of the PCL-R used to provide a dimensional assessment of the "prototypical" psychopath among youth. The PCL:YV is a symptom rating scale administered with a 60 to 90 minute semi-structured interview and thorough review of collateral information. It comprises 20 items scored on a three-point scale (0=*item does not apply*; 1=*item applies somewhat*; 2=*item definitely applies*) based on the symptom's pervasiveness, severity, and chronicity. Total and Factor scores can be prorated when a limited number of items must be omitted. No cut-off scores have been established to make categorical classifications of psychopathy or violence risk.

Confirmatory factor analyses have found both the three-factor and parceled four-factor models to be valid test structures for the PCL:YV (Forth et al., 2003). Although both these factor structures were reported to have good fit in the PCL:YV test manual, the normative sample was primarily male. Thus, our use of these models with a female sample required some evidence of good model fit with girls. The female sample in this study was not large enough to conduct confirmatory factor analyses (CFA). However, Odgers (2005) and Odgers, Reppucci, and Moretti (2005) reported the CFA model fit for both the parceled 4-factor and the 3-factor models using a larger sample of girls from a juvenile correctional facility. The 3-factor model had the best relative model fit (CFI=.93, WRMR=.81, and RMSEA=.06), but the parceled 4-factor model had acceptable fit (CFI=.96, WRMR=.57, and RMSEA=.08). Though there were limitations with both of these models for female adolescent samples (see Odgers, unpublished dissertation), they were sufficient for this study given it was necessary to use comparable factor models of the PCL:YV for boys and girls in order to compare its predictive validity.

For the four-factor model, prorated scores could range from 0 to 40 for the total, 0 to 8 for Factors 1: *Interpersonal* and 2: *Affective*, and 0 to 10 for Factors 3: *Behavioral* and 4: *Antisocial*. For the three-factor model, prorated scores could range to 8 for Factors 1: *Arrogant/Deceitful Interpersonal Style* and 2: *Deficient Affective Experience*, and to 10 for Factor 3: *Impulsive and Irresponsible Behavioral Style*. A unique total score ranging 0 to 26 was calculated for the three-factor model. To avoid confusion with the standard PCL:YV total test score, we refer to total scores as either PCL-13 or PCL-20 scores.

<sup>1</sup> The young offenders excluded from the study due to insufficient file information ( $n=118$ ) did not differ significantly from participants with file information on any demographic variables, such as age or ethnicity. However, they did have significantly shorter criminal histories than those with file information.

<sup>2</sup> These members of the base sample who were not included in the follow-up ( $n=60$ ) differed significantly from those who were included in the follow-up ( $n=256$ ) with respect to a few variables. Participants Not Included were significantly older at the time of their PCL:YV interview ( $M=17.15$ ,  $SD=1.03$ ) than participants Included ( $M=16.71$ ,  $SD=1.28$ ),  $t(312)=2.80$ ,  $p<.01$ , and they had more prior sentencing dates ( $M=5.8$ ,  $SD=3.99$  vs.  $M=4.29$ ,  $SD=3.59$ , respectively),  $t(307)=2.86$ ,  $p<.01$ . These groups also differed with respect to ethnicity such that a higher percentage of those Not Included in the follow-up were in the "other minorities" category (26%) than those Included in the follow-up (9.8%),  $V=.18$ ,  $p<.05$ . However, these groups did not differ on the PCL:YV total score (Not included –  $M=20.18$ ,  $SD=6.43$ ; Included –  $M=21.81$ ,  $SD=6.23$ ),  $t(314)=-1.72$ ,  $p>.05$ , or in the length of their sentences (Not included –  $M$  Rank=157.69; Included –  $M$  Rank=147.28),  $U=5650$ ,  $p>.05$ .

<sup>3</sup> The manualized version of the PCL:YV (Forth et al., 2003) was not available when interviews were taking place. The version of the PCL:YV (Forth, 1995) used in this study involved several age appropriate modifications to the PCL-R. Most modifications were minor changes to item descriptions (e.g., youth did not have to succeed in being charming to obtain high scores on *Glibness/Superficiality*), while four items underwent major coding changes (e.g., youth's prior offenses needed to fall within four different offense categories to score high on *Criminal Versatility*, while the requirement for adults is six types). Only the antisocial behavior items were substantially different from the PCL-R. Other than changes to the labels of a few test items, the only differences between the final PCL:YV (Forth et al., 2003) and the version used in this study were in the coding rules of five behavioral items (e.g., *Early Behavioral Problems*, *Serious Criminal Behavior*, *Criminal Versatility*).

**Table 1**

PCL:YV total and factor scores and reliabilities by gender

Prorated PCL:YV scores	Boys (n=201)			Girls (n=55)			t(254)
	M	(SD)	$\alpha$	M	(SD)	$\alpha$	
Three-factor model							
PCL-13 Total	13.39	(4.75)	.79	11.58	(4.76)	.78	2.51*
F1: Interpersonal	3.34	(2.13)	.71	2.94	(1.84)	.59	1.27
F2: Affective	4.68	(2.01)	.68	3.49	(1.94)	.68	3.91**
F3: Lifestyle behavior	5.39	(2.15)	.59	5.18	(2.06)	.58	.65
Parceled four-factor model							
PCL-20 Total	22.15	(6.69)	.82	20.56	(6.29)	.70	1.58
F4: Antisocial behavior	6.32	(2.16)	.65	6.55	(1.80)	.32	-.71

Note: Scores for Factors 1 through 3 are given only once because these are equivalent in both models. \* $p < .05$ , \*\* $p < .01$  following a Bonferoni correction.

### 2.3. Procedures

Participants who consented to participate in the study were interviewed in their respective custody setting by one of six undergraduate and graduate level researchers trained in administration and scoring of the PCL:YV.<sup>4</sup> Demographic and collateral information was obtained from institutional files. Past arrests and convictions were coded from provincial offense records. PCL:YVs were not coded for participants missing psychosocial history information or a provincial offense sheet from their institutional files. Inter-rater-agreement for full scale total scores, calculated from 30 randomly selected cases, was high ( $ICC_1 = .92$ ).

Recidivism data were collected from British Columbia correctional movement sheets 4.8 years after the study commenced. Dates of the most serious charges (or convictions when the dates of charges were not available) were recorded for each charge following the first release. Recidivism was categorized as follows: 1) *violent* offenses were those involving direct harm against persons (e.g., robbery, assaults, arson); 2) *non-violent* offenses were all remaining crimes that did not involve direct harm (e.g., property offenses, fraud, threats or intimidation) excluding breaches of probation and other violations of conditional releases; and 3) *any recidivism* included all violent and non-violent offenses as well as breaches of probation and violations of conditional releases.<sup>5</sup>

The follow-up period for the 256 participants for whom records could be located ranged from 120 to 1637 days ( $M = 1057.47$  days,  $SD = 353.89$ ), averaging about 35 months. The average follow-up period was significantly shorter for girls ( $M$  Rank = 110.90) than boys ( $M$  Rank = 133.32),  $U = 4559.90$ ,  $p = .05$ . However, girls still had sufficient opportunity to re-offend ( $M = 945.05$  days,  $SD = 398.07$ ), on average. Participants ranged from 15 to 22 years of age ( $M = 19.86$ ,  $SD = 1.55$  years) at follow-up with girls ( $M = 19.01$ ,  $SD = 1.49$ ) being significantly younger than boys ( $M = 20.10$ ,  $SD = 1.50$ ),  $t(254) = 4.76$ ,  $p < .001$ .

### 2.4. Data analysis

The analyses proceeded in 2 steps. First, logistic regression analyses were used to test whether PCL:YV scores predicted offending among both males and females. Second, we evaluated whether PCL:YV scores predicted *time to first offense* using Cox regression analyses. The regression approaches complimented each other. The logistic regression enabled identification of the odds of re-offending given an increase in PCL:YV score, and it enabled us to conduct power analyses. One of the limitations of logistic regression methods, however, is that they do not consider the length of opportunity to re-offend. Since true follow-up periods or *risk intervals* (the number of days between the release date and the last follow-up date) varied widely across participants, discounting time at risk could distort estimates of predictive validity. For example, a non-recidivating offender with only 30 days in the community is not necessarily in the same category as one with 1000 days in the community without a re-offense. Therefore, we also conducted Cox regressions to account for variance in the lengths of follow-up. In addition, we used Cox regressions to evaluate the unique contribution of factors of psychopathy and usefulness of the different factor models by including separate examinations for total and factor scores. All analyses were reported separately for boys and girls according to findings for the three categories of recidivism (any, non-violent, and violent recidivism).

## 3. Results

### 3.1. Descriptive statistics

Distributions of PCL-13 and PCL-20 total scores were reasonably normal and the majority of test items were omitted in less than 5% of cases. The exceptions were item 9: *Parasitic lifestyle*, omitted in 6% of cases, and item 17: *Short-term marital relationships*, omitted in 18% of cases. Girls and boys did not differ significantly in the number of omits assigned to any item.

<sup>4</sup> Training procedures have been described elsewhere (Corrado et al., 2004; Vincent et al., 2003).

<sup>5</sup> Violations, particularly breaches of probation, were non-serious offenses that occurred commonly in this sample. They were not included in the non-violent offense category in order to lessen the influence on recidivism rates.

**Table 2**Logistic regression by gender ( $n=201$  boys,  $n=55$  girls)

	Any recidivism odds ratio (C.I.)		Non-violent odds ratio (C.I.)		Violent odds ratio (C.I.)	
	Boys	Girls	Boys	Girls	Boys	Girls
PCL-13 total scores	1.1 (1.02–1.2)	1.1 (.9–1.2)	1.1 (1.03–1.18)	1.0 (.90–1.1)	1.1 (1.01–1.14)	.98 (.8–1.1)
Model fit	$R^2 = .06$	$R^2 = .03$	$R^2 = .06$	$R^2 = .00$	$R^2 = .04$	$R^2 = .00$
1 SD above the <i>M</i>	9.18 (1.2–69.5)	.31 (.06–1.79)	2.70 (1.0–7.4)	.20 (.02–1.8)	2.78 (1.3–6.1)	.00
	$P = .03$	$P = .20$	$P = .05$	$P = .16$	$P = .02$	$P = .99$
PCL-20 total score	1.1 (1.03–1.2)	1.1 (.9–1.2)	1.1 (1.04–1.1)	.9 (.9–1.1)	1.1 (1.01–1.1)	.9 (.8–1.1)
Model fit	$R^2 = .09$	$R^2 = .04$	$R^2 = .09$		$R^2 = .05$	$R^2 = .02$
1 SD above the <i>M</i>	10.86 (1.4–81.7)	.48 (.7–3.2)	5.90 (1.7–20.1)	.23 (.02–2.2)	3.46 (1.6–7.5)	.00
	$P = .02$	$P = .44$	$P = .004$	$P = .002$	$P = .20$	$P = .99$

Note: The first columns reflect the increase in odds of re-offending following a 1 unit increase in PCL total scores. The third columns reflect the increase in odds of re-offending for total scores falling 1 standard deviation above the mean. For males PCL scores explained between 4 and 9% of the variance in offending outcomes. For females the models explained between 0 and 4% of the variance in offending outcomes.

Table 1 reports descriptive statistics for prorated PCL:YV total and factor scores by gender for boys and girls in the follow-up. For girls, the three-factor model had higher internal consistency than the four-factor model where the alpha for Factor 4 (.32) was strikingly low. In contrast, although the internal consistency of the three-factor model among boys was comparable to that for girls, item reliability for the four-factor model was acceptable and better for boys. Relative to the proper norm groups (see Forth et al., 2003), total scores averaged in the 34th percentile for boys and the 40th percentile for girls (but note that the girl norm sample is relatively small). Mean total and factor scores only differed significantly between gender groups with respect to the Affective Factor (Factor 2) with girls scoring lower, on average (see Table 1).

With respect to re-offense data, 80% of the sample of 256 youthful offenders included in the follow-up had been charged at least once; however, much of the re-offending was due to minor violations. Overall, recidivism base-rates did not differ significantly between boys (82%,  $n=164$ ) and girls (75%,  $n=41$ ). After removing minor violations, boys (71%,  $n=143$ ) were significantly more likely than girls (49%,  $n=27$ ) to have received at least one non-violent ( $\chi^2(1)=9.41$ ,  $p<.01$ ) and at least one violent charge (boys=46%,  $n=92$ ; girls=15%,  $n=8$ ;  $\chi^2(1)=17.70$ ,  $p<.01$ ). The follow-up period did not differ significantly between non-recidivators ( $M=994.10$  days,  $SD=373.60$ ) and recidivators ( $M=1073.24$  days,  $SD=347.98$ ),  $t(254)=-1.37$ ,  $p>.05$ .

### 3.2. Analysis I: Do PCL:YV scores increase the odds of re-offending

Logistic regression analysis was applied to test whether or not PCL:YV total scores predicted re-offending. Results are presented in Table 2 and demonstrate two main points. First, both PCL-13 and PCL-20 scores were significantly associated with all forms of offending for boys. That is, a one unit increase in PCL:YV total scores increased the odds of any, non-violent, and violent offending by approximately 1.1 times. There is no established cut-off value for the PCL:YV. However, as shown in Table 2, boys who scored one standard deviation above the mean on the PCL-13 scores were 9.2 times more likely to have received a conviction for 'any' offence and were at an increased risk for both non-violent (OR=2.7) and violent offending (OR=2.8). A similar pattern of results was found for boys who scored one standard deviation above the mean on PCL-20 scores with respect to any (OR=10.9), non-violent (OR=5.9) and violent (OR=3.5) recidivism.

Second, PCL:YV scores did not increase the odds that girls would re-offend. Specifically, both PCL-20 and PCL-13 total scores did not predict any, non-violent or violent offending among girls during the follow-up period. Moreover, as demonstrated in Table 2, 'high scoring girls', that is girls who scored more than one standard deviation above the mean on the PCL-13 and PCL-20 scales, appeared to have a decreased odds of any (OR=.31 and .48 respectively), non-violent (OR=.20 and .23 respectively) and violent (OR=0) offending. Although these results were not statistically significant, this trend was reflected in the prevalence rates of re-offending across groups displayed in Table 3, where 'high scoring' girls had lower rates of all types of offending when compared to the rest of the girls in the sample. Power analyses indicated that, given the prevalence of re-offending, the current study had only

**Table 3**Prevalence rates (%) for offending by PCL scores (binary) and gender ( $n=201$  boys,  $n=55$  girls)

	Type of recidivism					
	Any recidivism		Non-violent recidivism		Violent recidivism	
	Males	Females	Males	Females	Males	Females
PCL-13						
Low PCL-13 scorers	77.2	76.1	66.7	50.0	40.7	15.2
High PCL-13 scorers	96.9	50.0	84.4	16.7	65.6	.0
PCL-20						
Low PCL-20 scorers	76.3	76.0	65.1	52.0	39.6	16.0
High PCL-20 scorers	97.2	60.0	91.7	20.0	69.4	.0

Note: "High PCL scorers" were defined as individuals scoring 1 standard deviation or more above the mean.

30% power to detect a small relationship (OR=1.2), but 75% power to detect a *clinically significant* relationship (OR=2.0), between PCL:YV scores and re-offending among girls.

### 3.3. Analyses II: Do PCL:YV scores predict time to re-offending?

Cox regressions were performed to examine the predictive validity of total scores while accounting for time at risk. Cox regression is a semi-parametric test that functions much like a multiple regression in that it models the relation between predictor variables and an *event* (i.e., re-offending), however, it accounts for time to the occurrence of the event. The dependent variable, time at risk, is based on the *cumulative survival function*; that is, the proportion of cases “surviving” (not charged with a re-offense) at a particular point in time. Cox regression is capable of including all cases regardless of whether they have completed the event – in this case being charged with a re-offense – by estimating time to a hypothetical event for these *censored cases*. Inclusion of censored cases is essential because each released youth who has not recidivated, theoretically, could still re-offend in the future. Time at risk was calculated separately for each form of recidivism based on the days between release from custody and the first arrest of that type. For non-recidivators, time at risk was calculated according to the follow-up date.

Predictor variables with positive regression coefficients ( $\beta$ ) decrease survival times (re-offending occurs sooner after release) while variables with negative coefficients increase survival times (re-offending occurs later). These coefficients are not standardized so values are dependent on each covariate's scale, making interpretation difficult. As such, hazard functions ( $\text{Exp}[B]$ ), a ratio of the likelihood of a case to experience an event, given it has survived that long, are the preferred index for interpretation. For example, an  $\text{Exp}(B)$  of 1.40 indicates that a one unit increase in the total score would result, on average, in a 40% increase in the likelihood of a new offense, given a case has survived this long.

#### 3.3.1. Total scores

Initially, we conducted a series of Cox regressions including the PCL-13 or PCL-20 total score and its interaction term with gender to test the significance of the prediction for the three categories of recidivism. The interaction term with gender was significant for both non-violent and violent recidivism, suggesting that the PCL:YV differentially predicted recidivism for girls and boys. To ease interpretation of the results, we report the regression equations here separately for girls and boys.

For boys, PCL-13 scores significantly predicted any,  $\beta=.04$ ,  $\text{Exp}[B]=1.04$ ;  $\chi^2[1]=6.64$ ,  $p<.01$ , non-violent,  $\beta=.04$ ,  $\text{Exp}[B]=1.04$ ;  $\chi^2[1]=6.21$ ,  $p=.01$ , and violent recidivism,  $\beta=.04$ ,  $\text{Exp}[B]=1.04$ ;  $\chi^2[1]=3.67$ ,  $p=.05$ . PCL-20 scores also significantly predicted any,  $\beta=.04$ ,  $\text{Exp}[B]=1.04$ ;  $\chi^2[1]=11.71$ ,  $p<.001$ , non-violent,  $\beta=.04$ ,  $\text{Exp}[B]=1.05$ ;  $\chi^2[1]=12.70$ ,  $p<.001$ , and violent recidivism,  $\beta=.04$ ,  $\text{Exp}[B]=1.04$ ;  $\chi^2[1]=6.90$ ,  $p<.01$ . The hazard functions demonstrated that total scores did not differ in the strength of these predictions, with a one unit increase in PCL:YV total scores increasing the likelihood of re-offending by 4% to 5%, given a case has survived this long.

For girls, neither total score significantly predicted any of the three categories of recidivism. For PCL-13 scores, regression results were as follows: any recidivism,  $\beta=.02$ ,  $\text{Exp}[B]=1.02$ ;  $\chi^2[1]=.54$ ,  $p=n.s.$ , non-violent recidivism,  $\beta=-.03$ ,  $\text{Exp}[B]=.97$ ;  $\chi^2[1]=.44$ ,  $p=n.s.$ , and violent recidivism,  $\beta=-.03$ ,  $\text{Exp}[B]=.97$ ;  $\chi^2[1]=.14$ ,  $p=n.s.$  For PCL-20 scores, regression results were as follows: any recidivism,  $\beta=.02$ ,  $\text{Exp}[B]=1.02$ ;  $\chi^2[1]=.35$ ,  $p=n.s.$ , non-violent recidivism,  $\beta=-.02$ ,  $\text{Exp}[B]=.98$ ;  $\chi^2[1]=.36$ ,  $p=n.s.$ , and violent recidivism,  $\beta=-.05$ ,  $\text{Exp}[B]=.95$ ;  $\chi^2[1]=.75$ ,  $p=n.s.$  It is interesting to note that not only were the PCL:YV total scores non-significant predictors for girls, the negative Beta values suggest that the relation between total scores and non-violent or violent recidivism was opposite to that for boys (i.e., PCL:YV scores were negatively related to recidivism).

#### 3.3.2. Parsing factors of the PCL:YV

In order to examine the unique contribution of the individual factors of psychopathy to the prediction of recidivism, we followed up the total score analyses with another set of Cox regressions which entered the individual factors and the interaction between factors (seen as representing a broader psychopathy construct) separately. Following procedures similar to [Skeem and Mulvey \(2001\)](#) and [Corrado et al. \(2004\)](#), a sequential stepwise technique with the forward stepping procedure (based on likelihood ratio statistics) was used to examine the significance of each factor and the interaction of factors. The criterion for both entry and removal was set at .05. Since no factors or interaction terms significantly predicted recidivism for girls in any case, results are presented for boys only.<sup>6</sup>

Beginning with boys, regressions for the three-factor model entered the three-factor scores at the first step and the interaction term at the last step. For any recidivism, only Factor 3 ( $\beta=.14$ ,  $p<.001$ ,  $\text{Exp}[B]=1.15$ ) was left in the equation resulting in a significant model overall,  $\chi^2[1]=14.79$ ,  $p<.001$ . This pattern held for non-violent,  $\beta=.14$ ,  $\text{Exp}[B]=1.15$ ;  $\chi^2[1]=13.65$ ,  $p<.001$ , and violent recidivism,  $\beta=.12$ ,  $\text{Exp}[B]=1.13$ ;  $\chi^2[1]=6.33$ ,  $p<.01$ . The exclusion of interaction terms in these models implies that it does not add significant information to behavioral characteristics alone. To determine whether the order of entry had any impact on this finding, new models were conducted entering the interaction term first and the factors last. This procedure did not change the results.

Analyses of the four-factor model with the interaction term entered at the last step indicated Factor 3 ( $\beta=.16$ ,  $p<.001$ ,  $\text{Exp}[B]=1.17$ ), Factor 4 ( $\beta=.14$ ,  $p<.01$ ,  $\text{Exp}[B]=1.15$ ), and the interaction term ( $\beta=0$ ,  $p<.05$ ,  $\text{Exp}[B]=1.00$ ) were significant predictors of any

<sup>6</sup> We also conducted hierarchical Cox regressions entering each factor one at a time to determine whether or not Factors 1 and 2 were significant predictors prior to adding Factors 3 and 4 and the interaction term. Results indicated that Factors 1 and 2 were not significant predictors for boys or girls at any step for any type of recidivism. Since the hierarchical procedure had no bearing on the results, only the forward stepwise regressions are presented here.

recidivism,  $\chi^2[2]=20.92, p<.01$ . For non-violent recidivism, both Factor 3 ( $\beta=.10, p<.05, \text{Exp}[B]=1.10$ ) and Factor 4 ( $\beta=.12, p<.01, \text{Exp}[B]=1.13$ ) were still significant predictors,  $\chi^2[2]=22.08, p<.001$ , but the interaction term was not. For violent recidivism, only Factor 4 was significant,  $\beta=.15, p<.01, \text{Exp}[B]=1.16$ ;  $\chi^2[1]=8.74, p<.01$ . Reversing the order of entry to enter the interaction term first did not affect the models.

#### 4. Discussion

This prospective study contributes to the literature by providing a detailed analysis of the long-term predictability of psychopathic traits in adolescent offenders. The PCL:YV was predictive of both non-violent and violent recidivism among adolescent males. Both the three and four-factor models significantly predicted the time to first violent and non-violent re-offenses for boys; however, this association primarily was due to the deviant lifestyle features or both the lifestyle and antisocial behavior features of psychopathy. As a result of the inclusion of antisocial traits, the PCL-20 seemed to lead to stronger predictions than the PCL-13 for both non-violent and violent recidivism among boys.

Surprisingly, results of this study differ from results previously reported for the male adolescents in this sample in some meaningful ways. Corrado et al. (2004) found the most predictive feature for time to first arrest was the interaction between all facets of psychopathy. This discrepancy may be a result of different follow-up intervals and sample sizes. This study included an additional 40 male youths who had not been released at the time of Corrado et al.'s analyses, and extended the follow-up period by approximately two years. The base-rates reported here were increased from 6% for any re-offending to 15% for violent re-offending. It appears that the relative importance of the construct of psychopathy in the prediction of risk for violence and recidivism may diminish over time during adolescent development, while the importance of antisocial and deviant lifestyle behaviors remains stable.

Conversely, the PCL:YV did not significantly predict any type of recidivism or the time to re-offending for girls and, if anything, there was a trend for higher PCL scores among girls to be associated with lower risk. Ostensibly, one explanation for the reverse relation between PCL:YV scores and female re-offending is that the findings were somehow contaminated by excluding the more serious female offenders who may still have been incarcerated. However, the girls from this sample who were still incarcerated at the end of the follow-up period did not have significantly higher average PCL:YV scores than the girls who had been released. So, there is no strong evidence that the excluded girls were substantially different.

##### 4.1. Methodological limitations

Results must be interpreted in light of the study's limitations. Of primary importance is the fact that re-offense information relied solely on official arrest records. Fortunately, we are fairly confident in the accuracy of the Provincial Registry Sheets used in this study given they track all movements of youths in British Columbia. However, a host of evidence indicates that self-reports of antisocial behavior generally result in a higher incidence and more valid recording of antisocial behavior than official reports (e.g., Farrington & West, 1993; Monahan et al., 2001). Given the high base-rate of general recidivism for boys in this sample, it is unlikely that self-report information would have had a huge impact on the results for general recidivism, albeit self-reports may have resulted in a higher prevalence of violent recidivism.

In all likelihood, the lack of self-reported re-offense data is particularly damaging to our results for girls. That is, females are less likely than males to engage in physical forms of aggression, and when they do engage in aggression they are more likely to engage in relationally as opposed to physically aggressive acts (for a review see Odgers & Moretti, 2002). Females are also more likely to engage in violence within intimate contexts, especially assaults against a partner or family member and are less likely to cause injuries that result in medical attention (Newhill, Mulvey, & Lidz, 1995). The reliance on official offending data, therefore, may not allow for the formation of prediction models for alternative, yet equally harmful, forms of violence in which females are more likely to be involved. In the end, the base-rate for violent recidivism was so low among the girls in this sample that any findings related to violence are tenuous at best.

Another limitation of this study is the small number of girls. While these findings represent one of the first glimpses into the predictive validity of the PCL:YV in a female sample, the fact remains that the analyses were under powered. Nonetheless, the observed relationship between PCL:YV scores and re-offending among girls did not achieve clinical levels of significance (an effect size that could have been detected given the distribution of PCL:YV scores and prevalence rates of re-offending) and the observed relationships were in the opposite direction to what would be expected. That is, 'high scoring' girls on the PCL:YV had lower rates of recidivism than their counterparts with lower scores. Future research with larger samples of girls followed prospectively is required to replicate this finding.

Researchers and clinicians should note that the published version of the PCL:YV (Forth et al., 2003) revised the coding of the antisocial items since the time of the current study. Given these items were the most powerful predictors of recidivism for boys, one can assume that the improvements in the latest PCL:YV will only increase the predictive value. However, research is needed to support this assumption.

##### 4.2. Research and clinical implications

The unique challenges that adolescents bring to forensic assessment due to the malleability of some antisocial traits prior to adulthood and the tendency to become "moving targets" within assessment contexts (Seagrave & Grisso, 2002), raises questions



regarding the downward extensions of violence risk prediction instruments. As many critics have noted, the downward extension of psychopathy may result in negative legal and clinical consequences for adolescents (Edens et al., 2001; Skeem & Cauffman, 2003). Within legal contexts, for example, measures of psychopathy have been used to support decisions to transfer juvenile offenders to adult court and to justify the imposition of longer sentences (Zinger & Forth, 1998).

While these concerns arise in general with adolescents, given the current research limitations with respect to female young offenders it is difficult to support the use of the PCL:YV with females for purposes other than research at this point. Aside from the inability of the PCL:YV to predict recidivism among girls in this sample, a recent meta-analysis by Edens et al. (2007) also indicated that there is wide variability in the findings with girls. Indeed, Vitale and Newman (2001) concluded that if clinicians use the PCL-R with females in order to predict specific outcomes (e.g., violent recidivism, institutional violence, successful interventions) "...they would be doing so without empirical evidence of the predictive power of the PCL-R in such domains" (p. 128). This study lends further support for the notion that use of the PCL:YV with female adolescents in legal or paralegal settings should be limited, if it is used at all.

There is reason to believe, based on theoretical (Odgers et al., 2005) and empirical grounds (Vitale & Newman, 2001), that females, particularly young females, may present unique challenges with respect to the nature of accurate violence risk assessments. For example, clinical judgments associated with future violence in men are often not relevant to violence risk among women (e.g., Lidz, Mulvey & Gardner, 1993). Authorities have speculated that structured risk assessment tools may need to include different violence risk factors for men and women (Monahan, 1996). Others have suggested that it may be necessary to adjust violence outcome measures in order to include the types and targets of violence that women are more likely to be involved in (e.g., violence within the home, against children) – violence which may be less likely to both result in injury and be detected by official police charge statistics (Newhill et al., 1995; Shaw & Dubois, 1995; Straus & Gelles, 1986).

Another potential cause of the PCL:YV's limited ability, or inability, to predict recidivism in females may be an interference of measurement bias. In other words, since this assessment tool was geared towards males, it simply may not be tapping into the same features of this construct in females. Recent evidence from the PCL-R female offender norm sample ( $n = 1218$ ) indicates that it can be assessed reliably among adult females with high rater-agreement (Hare, 2003) but a gender-related measurement variance is present. Specifically, item response theory (IRT) analyses showed many of the behavioral items to be less relevant indicators of the underlying trait among women than men (Bolt, Hare, Vitale, & Newman, 2004). Initial IRT findings with girls (Schrum & Salekin, 2006) imply that some of the PCL:YV item parameters differ from previously reported findings in boys (Vincent, 2002).

An added concern is that only the behavioral features of psychopathy predicted the time to all types of re-offending among males in this study, yet all features of psychopathy predicted re-offending in this sample when using a shorter follow-up period (Corrado et al., 2004; Vincent et al., 2003). Perhaps interpersonal and affective features of psychopathy are not stable across adolescence, resulting in diminishing associations with violence and antisocial behavior. Future studies should evaluate this finding further by mapping longer-term trajectories of crime among male adolescent offenders according to varying compositions of psychopathic traits.

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