ORIGINAL ARTICLE

# Are Secondary Variants of Juvenile Psychopathy More Reactively Violent and Less Psychosocially Mature Than Primary Variants?

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**Abstract** There is growing support for the disaggregation of psychopathy into primary and secondary variants. This study examines whether variants of psychopathy can be identified in a subsample ($n = 116$) of juvenile offenders with high scores on the Youth Version of the Psychopathy Checklist (PCL:YV). Model-based cluster analysis of offenders' scores on the PCL:YV and a measure of anxiety suggested a two-group solution. The derived clusters manifested expected differences across theoretically relevant constructs of abuse history, hostility, and psychiatric symptoms. Compared with low-anxious primary variants, high-anxious secondary variants manifested more institutional violence, greater psychosocial immaturity, and more instability in institutional violence over a 2-year period, but similar stability in PCL:YV scores.

Psychopathic personality disorder is defined by a constellation of characteristics that include an arrogant and deceitful interpersonal style, callous and deficient affective experience, and an impulsive and irresponsible lifestyle (Cleckley, 1941; Cooke & Michie, 2001; Hare, 2003). The common assumption is that psychopathy is a unitary construct; however, there is growing support for its disaggregation into primary and secondary variants (see Poythress & Skeem, 2005; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). In this study, we examine whether variants of psychopathy-like youth can be identified, and assess whether they differ in the malleability of their traits and behavior across time. Our use of the term *variants* as opposed to *subtypes* is for the purpose of identifying prototypes rather than discrete categories of youth, consistent with the most compelling data suggesting that psychopathic traits are dimensional rather than a categorical taxon (adults, Edens, Marcus, Lilienfeld, & Poythress, 2006; Guay, Ruscio, Knight, & Hare, 2007; youth, Murrie et al., 2007) (cf. adults, Harris, Rice, & Quinsey, 1994; youth, Vasey, Kotov, Frick, & Loney, 2005).

Karpman (1941, 1948a, b) theorized that secondary psychopathy results from unresolved emotional conflict—chiefly hostility—produced by exposure to parental abuse, rejection, or overindulgence. This hostility disrupts the functioning of an otherwise intact conscience, giving the appearance of a "psychopathic façade" (Karpman, 1948b, p. 523). Primary psychopathy, in contrast, theoretically results from a "constitutional" deficit that is manifested in

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part by a lack of conscience (Karpman, 1948a, pp. 478, 485). Although modern science indicates that genes and environment interact to influence personality development, Karpman (1941) highlighted the prominence of psychosocial factors in the development of secondary psychopathy relative to the primary variant.

Trait anxiety—or fearlessness (Lykken, 1995)—also appears to be a key distinction between primary and secondary variants. Several theorists describe secondary psychopaths as highly anxious and socially withdrawn, whereas low levels of anxiety and social dominance characterize primary psychopaths (Blackburn, 1975, 1979; Karpman, 1941, 1948b; Lykken, 1995). Several studies employing various clustering strategies with adult psychopathic offenders also support the importance of anxiety for distinguishing between psychopathy variants (e.g., Swogger & Kosson, 2007; Vassileva, Kosson, Abramowitz, & Conrod, 2005; Vincent, Vitacco, Grisso, & Corrado, 2003). Skeem et al. applied model-based cluster analysis (MBC) to Psychopathy Checklist-Revised (PCL-R) and trait anxiety scores of 123 violent adult male inmates scoring in the psychopathic range (PCL-R $\geq$ 29; Hare, 2003) and identified a two-cluster solution that generally paralleled theoretical conceptualizations of primary and secondary psychopathies (Skeem, Johansson, Andershed, Kerr, & Louden, 2007). Relative to the low-anxious primary variant ($n = 74$), the high-anxious secondary variant ($n = 49$) manifested more social withdrawal, irritability, lack of assertiveness, and symptoms of major mental disorder. Similarly, Hicks, Markon, Patrick, Krueger, and Newman (2004) identified psychopathy variants in a sample of 96 adult male inmates scoring in the psychopathic range (PCL-R $\geq$ 30) by applying MBC to scores on a self-report measure of 11 general personality dimensions. The first cluster ($n = 30$)—labeled "emotionally stable psychopaths"—was more fearless, less anxious, and less reactive to stress compared with the second cluster ($n = 66$) that more closely resembled secondary psychopathy.

Given the multidimensional structure of most measures of psychopathy, it is possible that variants of psychopathy are characterized by different score configurations across the various scales. The two traditional scales or factors of interpersonal-emotional detachment (Factor 1) and antisocial deviance (Factor 2; Harpur, Hare, & Hakstian, 1989) have more recently been disaggregated into four facets: arrogant and deceitful interpersonal style (Factor 1), deficient affective experience (Factor 1), impulsive and irresponsible behavioral style (Factor 2), and criminal/antisocial behavior (Factor 2; Cooke & Michie, 2001; Cooke, Michie, Hart, & Clark, 2004; Hare, 2003). In theory, primary psychopaths manifest marked Factor 1 traits, whereas secondary psychopaths manifest greater Factor 2 traits of impulsivity, hostility, and behavioral deviance

(Cleckley, 1976; Karpman, 1941, 1948a; Mealey, 1995). There is only mixed support for this distinction—secondary variants occasionally display higher Factor 2 scores than primary variants, with less consistent findings for Factor 1 (Hicks et al., 2004; Vassileva et al., 2005) (cf. Poythress et al., 2010; Skeem et al., 2007).

Given that secondary psychopathy may convey greater emotional instability and impulsivity than the primary variant, those with secondary psychopathy may be more aggressive and violent (Blackburn, 1987; Mealey, 1995; Sadeh & Verona, 2008). In their review, Skeem et al. (2003) theorized that primary variants are more likely to display instrumental aggression (i.e., to achieve some goal, like obtaining money), whereas secondary variants are more prone to reactive aggression (i.e., an angry response to perceived provocation). In their study, Hicks et al. (2004) found that high-anxious secondary variants—labeled "aggressive psychopaths"—had more extensive histories of violence and criminality and displayed greater aggression, reactive hostility, and impulsiveness than primary variants. Similarly, Falkenbach, Poythress, and Creevy (2008) found that secondary variants reported more hostile reactive aggression than primary variants, who reported more instrumental and mixed aggression. Prospective studies are needed to evaluate whether these differences translate into differential risk for future violence.

Are these variants visible among youth? One self-report study provides some preliminary evidence that this is the case. In a recent study of 132 juvenile offenders with high scores on a self-report measure of psychopathy, Vaughn, Edens, Howard, and Smith (2009) found two variants. The secondary variant manifested greater psychiatric symptoms (e.g., anxiety, depression, suicidal ideation, ADHD diagnosis), trauma history, drug use, and delinquent behavior than the primary variant. The question of whether psychopathic variants are visible among youth raises a larger question about how often youth with high scores on measures of psychopathy actually mature into psychopathic adults (see Edens, Skeem, Cruise, & Cauffman, 2001; Seagrave & Grisso, 2002). This question has been addressed by a handful of longitudinal studies that yield mixed results (Blonigen, Hicks, Krueger, Patrick, & Iacono, 2006; Cauffman, Skeem, & Dmitrieva, 2006; Frick, Kimonis, Dandreaux, & Farell, 2003; Loney, Taylor, Butler, & Iacono, 2007; Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007). It is possible that heterogeneity in the stability of scores on psychopathy measures is based partially on psychopathic variants, with primary variants displaying more stable psychopathic traits and behaviors across time than secondary variants. Karpman (1948a, b) theorized that secondary psychopathy is more likely than primary psychopathy to change in response to environmental influences like treatment because it (hypothetically)

is an emotionally conditioned reaction to adverse environmental circumstances (see also Mealey, 1995). Disaggregating youth into primary and secondary variants may reveal individuals with more and less stable psychopathic traits and related antisocial behaviors.

## The Present Study

In this study, we address three gaps in knowledge about potential variants of psychopathy among youth. *First*, we examine whether hypothesized variants can be identified among juvenile offenders with high scores on the PCL:YV. Although we hypothesize that the main distinction between variants will be anxiety, the literature suggests that secondary variants will also be distinguished by greater PCL:YV Factor 2 scores, more pronounced abuse histories, and greater psychiatric symptoms, compared with primary variants. *Second*, we assess whether secondary psychopathy predicts violent behavior in general, and reactive violence in particular, more strongly than primary psychopathy. *Third*, we test whether the psychopathic traits and related behavior of secondary variants is less stable across time compared with primary variants. Relative to primary variants, we expect secondary variants to show less psychosocial maturity and manifest greater change in PCL:YV scores and violent behavior across time.

## Method

### Participants

Participants for the full sample included male offenders between the ages of 14 and 17 who were incarcerated in either secure juvenile or adult correctional facilities in a northeastern state. Recruitment was targeted at obtaining roughly equal numbers of non-psychopathic and psychopathic youth (see Skeem & Cauffman, 2003), as guided by PCL:YV threshold scores used in past research (e.g., Forth, Kosson, & Hare, 2003). Eleven percent of youth and 4% of parents invited to participate refused. Participants were predominantly African-American and Caucasian (see Table 1). According to institutional records, they had an average of four prior offenses, and had spent an average of 6 months incarcerated.

Given our interest in identifying *variants of juvenile psychopathy* and not variants of juvenile offenders generally, analyses were conducted with a subsample of 116 youth scoring in the psychopathic range on the PCL:YV ($\geq$27; median = 30.5). Our focus on youth with high PCL:YV scores (rather than all youthful offenders) also permitted a comparison of the findings against prior studies of adult (Hicks et al., 2004; Skeem et al., 2007) and juvenile variants of psychopathy (Vaughn et al., 2009). Furthermore, given that a score of 27 falls within the standard error of measurement from the traditional psychopathy cut off score of 30 (Forth et al., 2003), our results are informative even if one adopts a taxonic view. The remaining youth with scores below 27 ($n = 84$) were used as a non-psychopathic comparison group. The characteristics of the full sample ($N = 200$), clustering subsample ($n = 116$), and comparison subsample ($n = 84$) are provided in Table 1.

### Procedure

A baseline interview was conducted in the correctional facility and 1- and 2-year follow-up interviews were conducted at either correctional facilities or in the community.

**Table 1** A comparison of the characteristics of the full sample, the clustering subsample (PCL:YV $\geq$ 27), and the non-psychopathic comparison subsample

| Variable | General sample ($N = 200$) | Comparison subsample ($n = 84$) | Clustering sample ($n = 116$) | Primary cluster ($n = 77$) | Secondary cluster ($n = 39$) |
|---|---|---|---|---|---|
| Ethnicity (% White/Black/Hispanic) | 35/42/13 | 29/44/17 | 40/41/11 | 35/47/12 | 49/28/10 |
| Age at baseline | 15.82 (.87) | 15.85 (.83) | 15.79 (.91) | 15.84 (.86) | 15.69 (1.00) |
| Mean number of prior offenses (record) | 3.55 (3.05) | 3.36 (2.34) | 3.68 (3.45) | 3.71 (3.89) | 3.63 (2.40) |
| Type of current offense (record; % person) | 29 | 29 | 30 | 38 | 25 |
| IQ | 88.84 (13.18) | 89.13 (13.86) | 88.63 (12.73) | 90.11 (11.65) | 85.77 (14.33) |
| PCL:YV interpersonal | 4.40 (1.96) | 3.06 (1.62)[a] | 5.36 (1.58)[b] | 5.14 (1.68)[c] | 5.79 (1.28)[d] |
| PCL:YV affective | 4.75 (2.04) | 3.35 (1.69)[a] | 5.76 (1.65)[b] | 5.78 (1.68) | 5.72 (1.59) |
| PCL:YV lifestyle | 6.96 (1.59) | 5.94 (1.22)[a] | 7.69 (1.42)[b] | 7.68 (1.46) | 7.72 (1.34) |
| PCL:YV behavioral | 8.34 (1.70) | 7.48 (1.93)[a] | 8.96 (1.18)[b] | 9.08 (1.14) | 8.72 (1.23) |

*Note*. There were no significant differences among groups, except on PCL:YV scores. Superscripts indicate a significant difference between the comparison subsample and the clustering sample ([a,b]) or between the primary cluster and the secondary cluster ([c,d])

*PCL:YV* Psychopathy Checklist: Youth Version

The average time between the baseline and 1-year interviews was 373 ($SD = 50$) days and between 1- and 2-year follow-ups was 430 ($SD = 76$) days. Eighty-four percent of youth were retained to 1- and 2-year follow-ups, although the non-psychopathic comparison group was significantly more likely to drop out of the study by year one (25%) compared with primary (9.1%) and secondary variants (5.1%), $\chi^2 (2, 200) = 11.68$, $p < .01$, $\phi = .24$. There was no significant difference between variants in dropout rates. Forty-six percent and 33% of youth were securely confined at 1- and 2-year follow-ups, respectively. At the one—but not two—year follow-up, more primary than secondary variants were interviewed in the community (48.5 vs. 24.3%; $\chi^2 (1, 103) = 5.78$, $p < .05$, $\phi = .24$). Incarceration status was unassociated with PCL:YV scores or institutional violence at either follow-up.

## Measures

**Psychopathy.** The Psychopathy Checklist: Youth Version (PCL:YV; Forth et al., 2003) was used to assess psychopathy at each time point. The original semistructured interview guide was adapted for use in this study and reviewed with the lead author of the PCL:YV, Adelle Forth. Interviewers ($n = 17$) completed extensive training that included 8 h of didactic and experiential exercises; viewing, rating, and discussing six videotaped PCL:YV interviews—and achieving ratings falling within five points of the criterion total score; observing, rating, and discussing two "live" interviews; and participating in monthly meetings to discuss cases and scoring issues and three "refresher" trainings to maintain consistency and reliability in scoring. File information was coded from the youths' institutional file for those residing in the community at follow-up. PCL:YV facet scores were moderately correlated in the present sample ($r = .21–.33$).

**Anxiety.** The Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985) is a 37-item self-report checklist (yes/no) administered at baseline. The RCMAS consists of three subscales: Physiological Anxiety (10 items; "Often I have trouble getting my breath"), Worry/Oversensitivity (11 items; "I worry a lot of the time"), and Social Concerns/Concentration (7 items; "Others seem to do things easier than I can"), and a 9-item Lie scale ("I am always good") that was not included in analyses. The total score is internally consistent ($\alpha = .83$ in this study; $\alpha = .85$ in Reynolds & Richmond, 1985) and possesses moderate test–retest reliability over a 9-month period ($r = .63$; Reynolds, 1981).

**Childhood Abuse.** The Child Abuse and Trauma Scale (CATS; Sanders & Giolas, 1991) is a 38-item self-

report measure administered at baseline to assess physical abuse/punishment, verbal/psychological abuse, sexual abuse, neglect, and a negative home environment. Youth rated the frequency with which particular events occurred during their childhood (e.g., "Did your parents ridicule you?") on a 5-point scale from "never" (0) to "always" (4). The CATS has demonstrated 6–8-week test–retest reliability ($.89$, $p < .001$) and adequate internal consistency (total score $\alpha = .88$ in this study; $\alpha = .90$ in Sanders & Becker-Lausen, 1995).

**Mental Health.** The 53-item self-report Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was administered at each time point. Youth rate the extent to which they have been bothered in the past week by various symptoms on a 5-point scale (0, "not at all" to 4, "extremely"). Several studies demonstrate the reliability, validity, and utility of the BSI as an index of general psychological distress in adolescent populations (Boulet & Boss, 1991; Handal, Gist, Gilner, & Searight, 1993; Piersma, Boes, & Reaume, 1994a, b). This study used the 6-item depression ($\alpha = .77$) and 5-item hostility scales ($\alpha = .77$), in addition to the BSI total score ($\alpha = .94$) as an indicator of global psychological distress.

**Psychosocial Maturity.** Several self-report measures were used to assess various aspects of psychosocial maturity at each time point. The Weinberger Adjustment Inventory (Weinberger & Schwartz, 1990) assesses *social perspective* ($\alpha = .78$, "before I do something, I think about how it will affect the people around me"), *impulse control* ($\alpha = .73$, "I do things without giving them enough thought" [Reversed]), and *suppression of aggression* ($\alpha = .79$, "I lose my temper and 'let people have it' when I'm angry" [R]). The Future Outlook Inventory (Cauffman & Woolard, 1999) assesses *future perspective* ($\alpha = .73$, "I will keep working at difficult, boring tasks if I know they will help me get ahead later"). The Psychosocial Maturity Inventory (PSMI Form D; Greenberger & Bond, 1976) assesses *responsibility* ($\alpha = .84$, self-reliance, identity, and work orientation; e.g., "I hate to admit it, but I give up on my work when things go wrong" [R]). Each of these measures has demonstrated good reliability and convergent/divergent validity (for a review, see Farrell & Sullivan, 2000; Josselson, Greenberger, & McConochie, 1975).

**Institutional Violence.** The occurrence of institutional violence was assessed at every time point (up to 1 month, 1 month to 1 year, 1–2 years) using both record review and self-report—an abbreviated (5-item) version of the Self-Report of Offending measure (Huizinga, Esbensen, & Weiher, 1991) in which youth reported whether or not

(yes/no) they engaged in violent behaviors against other inmates or staff.[1] A summary measure was created to capture whether or not violence occurred during the full 2-year follow-up, inclusive. While addressing study aims pertaining to violence, we control for the number of months youth spent incarcerated (i.e., time at risk for institutional violence).

**Instrumental Versus Reactive Violence.** The Aggressive Incident Coding Scheme (AICS; Cornell, 1996) was used to code the extent to which the participant's most serious violent incident(s) (up to three) in the institution were *instrumental* or *reactive*. Separate AICS ratings, based on the description of the violent incident provided by the youth and in the institutional records, were combined to classify participants with one or more violent incidents occurring during the full 2-year study period as either instrumental or reactive.

## Results

Correlations among the main study variables are reported in Table 2. To determine whether homogeneous subgroups of youth with high scores on the PCL:YV could be identified, MBC (Banfield & Raftery, 1993) was used. To determine whether the resulting clusters were valid, MANOVAs/ANOVAs were used on theoretically relevant variables that were not used in the cluster analysis (Aim 1). To address whether variants differed in the likelihood and quality of violence (reactive versus instrumental) across the study period (Aim 2), $\chi^2$ analyses were used. To test whether variants differed in the stability of their traits and behavior (Aim 3), we conducted MANOVAs to compare them on psychosocial maturity, and growth curve modeling to compare them on the stability of PCL:YV scores and violent offending across time.

### Aim 1: Can Subgroups of Youth with High PCL:YV Scores Be Identified, and Do They Resemble Primary and Secondary Variants of Psychopathy?

MBC (Banfield & Raftery, 1993) was performed using the *mclust* library (Fraley & Raftery, 2008) in SPLUS 7.0 (Insightful Corporation, 1988–2005), and the expectation maximization algorithm. MBC reduces some of the

uncertainties inherent in traditional cluster analyses by testing the relative fit of ten models that vary in their assumptions about the structure of the data, namely whether the clusters have equal or variable volume, shape, and orientation in space. For each model the number of clusters is varied from one to nine—the default routine generates and tests 90 different cluster solutions, maximizing the likelihood of finding the underlying data structure(s). Fit criteria, assignment of each participant to a cluster, and an average vector and covariance matrix of the clustering variables, are generated for each cluster solution. The clustering variables were Z-scores on the four scales of the PCL:YV and three scales of the RCMAS. Clustering was performed on the psychopathic subsample ($n = 116$).

The top three best-fitting models all specified diagonal orientation and equal volume. A two-cluster model with equal shape had the best fit (BIC = −2285), followed by a two-cluster solution with variable shape (BIC = −2287), and a three-cluster solution with equal shape (BIC = −2296). Since a two-point difference in BIC provides only weak support for the better fitting model (2–6 points indicates positive support and 6–10 points indicates strong support; Raftery, 1995, p. 139), both of the two-cluster solutions were tested for stability and external validity. Ultimately, the two-cluster solution with equal shape was selected because it was better fitting, more stable across data subsamples and variable sets, and manifested the most coherent pattern of differences across theoretically relevant variables not used to derive clusters. For this two cluster solution, the average classification certainty (posterior probability) that an individual was correctly assigned to a cluster was high (99.96%) and 75% of the sample had a fairly high ($\geq 99.2\%$) probability of correct assignment to a cluster. Thus, the cluster solution appears dependable, and the number of clusters is compatible with the notion that there may be primary and secondary variants of psychopathy. Figure 1 compares the two clusters, as well as non-psychopathic comparison, across the seven variables used to derive them. One group ($n = 39$)—labeled "secondary"—obtained significantly higher anxiety scores than the other group ($n = 74$)—labeled "primary." Contrary to expectations, the high-anxious secondary cluster scored significantly higher than the low-anxious primary cluster on the PCL:YV interpersonal facet, with no significant differences on the remaining PCL:YV facets.

Next, the clusters were compared on variables external to the cluster analysis to determine whether they were 'externally valid.' Results of MANOVA indicated significant differences across measures of abuse and psychiatric symptoms (baseline, Hotelling's $T^2 = .45$, $F(8,384) = 10.86$, $p < .001$, $\eta^2 = .19$; 1-year follow-up, Hotelling's $T^2 = .23$, $F(6,312) = 5.93$, $p < .001$, $\eta^2 = .10$; 2-year follow-up, Hotelling's $T^2 = .09$, $F(6,288) = 2.09$, $p = .05$,

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[1] Violence was defined as a physical act intended to harm someone and included the following acts: physically attacking; beating up, mugging, or seriously threatening; raping; attacking with a weapon, or forcibly robbing someone. Based on the assumption that violence is typically under-reported, youth were coded as having been involved in violence if *either* their self-report, a review of their records, or both indicated that they had been violent.

**Table 2** Correlations between clustering variables and external validation variables

| Variables | PCL:YV inter-personal | Affective | Lifestyle | Behavioral | RCMAS physio. | Worry | Social concerns |
|---|---|---|---|---|---|---|---|
| Total abuse | .03 | .00 | −.04 | .11 | .33*** | .29*** | .39*** |
| Psychological distress | .06 | .01 | .03 | .07 | .70*** | .68*** | .65*** |
| Depression | −.01 | .01 | −.04 | .05 | .56*** | .61*** | .57*** |
| Hostility | .14[a] | .16* | .18* | .25*** | .60*** | .44*** | .47*** |
| Social Perspective | −.04 | −.18** | −.13[b] | −.23*** | .01 | .14[a] | −.04 |
| Future perspective | −.02 | −.15* | −.16* | −.04 | .03 | .18* | .01 |
| Responsibility (PSMI) | −.06 | −.02 | −.11 | −.04 | −.51*** | −.46*** | −.55*** |
| Impulse control | −.14[a] | −.12 | −.17* | −.15* | −.42*** | −.46*** | −.55*** |
| Suppression of aggression | −.23*** | −.26*** | −.16* | −.32*** | −.33*** | −.26*** | −.28*** |
| Violence (month 1) | .06 | .18* | −.01 | .22** | .15* | .13 | .17* |
| Violence (year 1) | .15[a] | .05 | .10 | .18* | .31*** | .26*** | .27*** |
| Violence (year 2) | .00 | −.11 | .09 | .13 | .16* | .08 | −.06 |
| Reactive-instrumental violence | .03 | .11 | .16* | .26*** | .09 | .02 | .00 |

[a] $p < .06$; [b] $p < .07$; * $p < .05$; ** $p < .01$; *** $p < .001$

$\eta^2 = .04$). Post hoc comparisons with Bonferroni corrections revealed that secondary (S) variants scored significantly higher than primary (P) variants on abuse history (mean difference = 16.2, $SE = 4.6$, $p < .001$, 95% CI = 7.2–25.2), hostility (mean difference = .80, $SE = .2$, $p < .001$, 95% CI = .4–2.2), depression (mean difference = 1.0, $SE = .1$, $p < .001$, 95% CI = .7–1.4), and global psychological distress (mean difference = .9, $SE = .1$, $p < .001$, 95% CI = .6–1.2) at each time point



**Fig. 1** Z-scores for primary, secondary, and non-psychopathic comparison youth on psychopathy and anxiety factor scores. *Behavioral* PCL:YV antisocial behavior facet, *A-Physio* RCMAS physiological anxiety, *A-Worry* RCMAS worry/oversensitivity, *A-Concerns* RCMAS social concerns/concentration. * $p < .05$; *** $p < .001$. Primary and secondary variants differed significantly on the PCL:YV Interpersonal facet ($t(114) = -2.13$, $p < .05$, Cohen's $d = .40$), and the RCMAS Physiological ($t(114) = 8.64$, Cohen's $d = 1.62$), Worry/oversensitivity ($t(114) = 15.77$, Cohen's $d = 2.95$), and social concerns/concentration factors ($t(114) = 8.69$, Cohen's $d = 1.63$), all $p < .001$

(mean differences reported here are for baseline measures; also see Fig. 2).

## Aim 2: Do Primary and Secondary Variants Differ in Their Likelihood and Quality of Violence?

A $\chi^2$ analysis indicated that secondary variants engaged in significantly more institutional violence during the 2-year study period than primary variants, $\chi^2(1,110) = 7.27$, $p < .01$, $\phi = .26$, even after controlling for time at risk ($\chi^2(2, N = 89) = 8.45$, $p < .05$; Nagelkerke $R^2 = .14$; OR = .26, $p < .05$; 95% CI = .07–.98). Correcting for months at risk in the institution, the monthly rate of violence was 5.45% for secondary variants compared with 3.52% for primary variants. Put simply, 92% of secondary variants, 69.4% of primary variants, and 57.5% of non-psychopathic comparison youth engaged in institutional violence, respectively, across the 2-year period. The violent incidents of secondary variants were more reactive (82%) than those of the primary variants (54%), $\chi^2(1, 112) = 8.20$, $p < .01$, $\phi = .27$, although there were no significant differences in instrumental violent incidents.

## Aim 3: Do Primary and Secondary Variants Show Differences in Maturity and in Stability of Psychopathic Traits and Violence?

**Psychosocial Maturity.** MANOVA revealed that variants differed significantly on the combination of maturity scales at baseline (Hotelling's $T^2 = .32$, $F(10,382) = 6.17$, $p < .001$, $\eta^2 = .14$), 1-year (Hotelling's $T^2 = .23$, $F(10,302) = 3.43$, $p < .001$, $\eta^2 = .10$), and 2-year follow-ups (Hotelling's $T^2 = .20$, $F(10,282) = 2.78$,
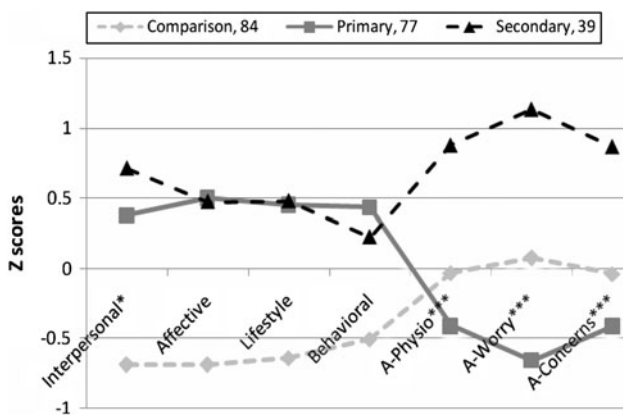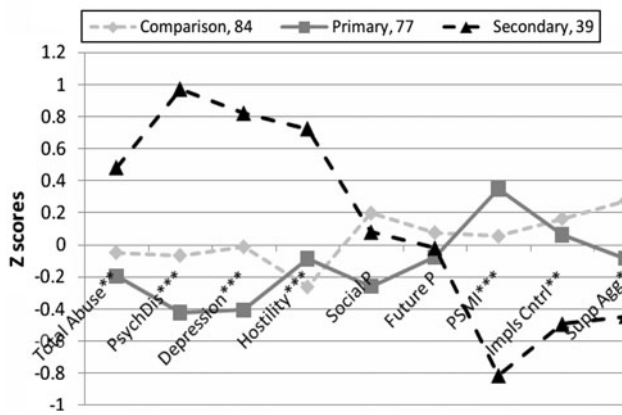
**Fig. 2** Z-scores for primary, secondary, and comparison youth on criterion variables. *PsychDis* global psychological distress, *P* perspective, *PSMI* psychosocial maturity inventory (responsibility), *Impls Cntrl* impulse control, *Supp Agg* suppression of aggression. * $p < .05$; ** $p < .01$; *** $p < .001$; Z-scores are based on the full sample. Secondary variants scored significantly higher than primary variants on each variable: abuse ($F(2,197) = 6.49$, $p < .01$, $\eta^2 = .06$), hostility ($F(2,197) = 15.22$, $p < .001$, $\eta^2 = .13$), depression ($F(2,197) = 24.15$, $p < .001$, $\eta^2 = .20$), and global psychological distress ($F(2,197) = 34.15$, $p < .001$, $\eta^2 = .26$). Similar results were obtained for 1- and 2-year follow-ups. Compared with secondary variants, primary variants had higher responsibility ($F(1,113) = 52.52$, $p < .001$, $\eta^2 = .32$) and impulse control scores ($F(1,113) = 8.47$, $p < .01$, $\eta^2 = .07$)



**Fig. 3** Growth curve model of PCL:YV scores by group
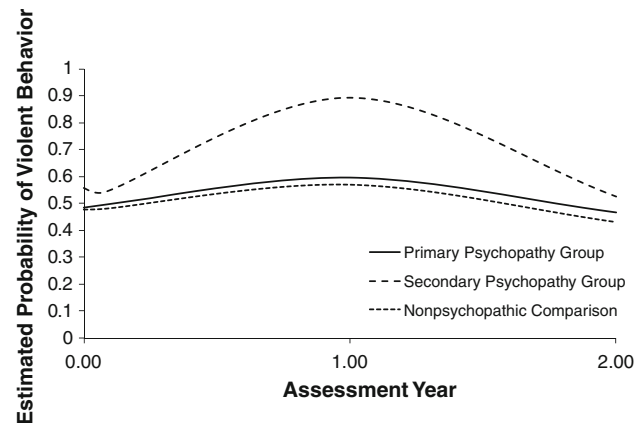


**Fig. 4** The estimated probability of violence across time by group

$p < .01$, $\eta^2 = .09$). Post hoc comparisons using the Bonferroni correction revealed that primary variants scored significantly higher than secondary variants on responsibility (mean difference = .52, $SE = .08$, $p < .001$, 95% CI = .36–.67) and impulse control (mean difference = .52, $SE = .18$, $p < .05$, 95% CI = .08–.95), with no significant differences on suppression of aggression and social and future perspective (mean differences reported here are for baseline measures; also see Fig. 2).

**Stability of PCL:YV Scores.** We compared average PCL:YV trajectories of the psychopathy variants and the comparison group within a multigroup growth curve analysis framework, controlling for the number of months youth were incarcerated during each reporting period. There were no significant differences between variants in their PCL:YV trajectories (see Fig. 3; comparison of intercepts, $\Delta\chi^2(1) = .66$, n.s.; comparison of slopes, $\Delta\chi^2(1) = .39$, n.s.). Both variants showed a significant decline in PCL:YV scores that decelerated over time (i.e., having a significant positive quadratic slope), and their linear slopes were significantly lower than the slope for the comparison group ($\Delta\chi^2(1) = 18.2$, $p < .001$). The comparison group also had a significantly lower intercept than the two variants ($\Delta\chi^2(1) = 151.1$, $p < .001$) and a significant increase in scores over time. The hypothesis that
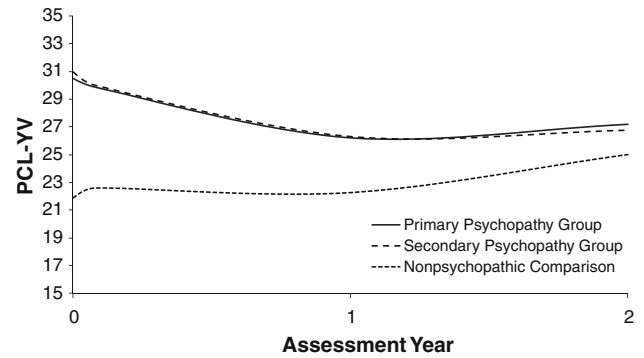
secondary variants would show less stability in PCL:YV scores was not supported.

**Stability of Violence.** We also compared average trajectories of institutional violence (coded as yes/no) over time across psychopathy variants and comparison youth using both linear and quadratic growth curve models—the quadratic model had a better fit ($\Delta\chi^2(1) = 3.85$, $p < .05$). The model used weighted least square estimation with the mean- and variance-adjusted $\chi^2$ statistic since violent offending was a binary variable. Figure 4 displays the estimated probability of violent offending by psychopathy variants, controlling for the number of months youth were incarcerated during each reporting period. Secondary variants followed a significantly different trajectory of violent offending than other groups ($\Delta\chi^2(3) = 9.95$, $p < .05$), characterized by significantly faster linear growth ($\Delta\chi^2(2) = 9.47$, $p < .01$), and greater quadratic decline over time ($\Delta\chi^2(2) = 9.37$, $p < .01$). Altogether, secondary variants displayed more time-related changes—reflecting malleability—in their trajectories of violent offending.

## Discussion

The results of this study are consistent with the notion that there are two variants of juvenile offenders with high scores on the PCL:YV, each with distinct correlates. Relative to low-anxious primary variants, secondary variants reported greater childhood abuse and manifested pronounced depression, hostility, and general psychological distress. Although primary and secondary variants did not differ significantly in their stability of PCL:YV scores over time, secondary variants were significantly more psychosocially immature and were at greater risk for institutional violence that is more reactive in quality. Secondary variants also showed greater variability in institutional violence over the 2-year study period compared with primary variants.

Before interpreting the results further, we acknowledge several limitations. First, the 2-year study period does not allow us to address the question of whether secondary variants are less likely to mature into psychopathic adults than primary variants. Second, although our recruitment strategy ensured an adequate sample of high psychopathy-scoring youth, results (e.g., on the relative prevalence of variants) may not generalize to more general samples of incarcerated youth. Third, measures of abuse and psychiatric symptoms were significantly correlated with anxiety (see Table 2), and all are based on self-report. This raises the possibility that tests of the cluster's external validity—whether the clusters differ on variables other than those used to generate the cluster solution—were not particularly risky. This concern is partially ameliorated by observations that (a) anxiety was unassociated with some key variables that were used as external validation criteria (e.g., quality of violence), and (b) the identified clusters did not differ on other variables that were associated with anxiety (e.g., future perspective). In our view, the results are not wholly attributable to negative affect, that is, shared variance between anxiety as a clustering variable and validation variables (e.g., hostility, depression, global psychological distress). With these limitations in mind, we offer our interpretation of the results.

## Variants with High PCL:YV Scores Can Be Identified and Appear Consistent with Primary and Secondary Psychopathy

Although psychopathic traits were used as clustering variables, the chief distinction between primary and secondary variants in this study was trait anxiety, consistent with theoretical conceptualizations (Blackburn, 1975; Karpman, 1948a, b). The robustness of this finding—across several studies using various methods and samples—suggests that anxiety is important for distinguishing between

psychopathy variants among adults and youth (e.g., Blackburn, 1975; Skeem et al., 2007; Vaughn et al., 2009).

To assess whether these variants were meaningful, we tested whether they differed in a theoretically coherent manner on several external criterion variables—they often did, lending some confidence that the variants actually exist. In keeping with past research focusing on psychopathological and purported etiological variables, our study suggests that secondary variants may be distinguished from primary variants based on their greater reported exposure to early abusive experiences and psychological distress, dysphoria, and anger (Poythress & Skeem, 2005; Skeem et al., 2003, 2007). Relative to secondary variants, primary variants are "emotionally stable" (Hicks et al., 2004). Our low scoring psychopathy youth (the comparison cases) fell midway between the variants, in terms of both emotional adjustment and reported exposure to past abuse.

Contrary to expectations, the two variants obtained largely similar scores on the PCL:YV—the secondary variant did not manifest greater Factor 2 scores and the primary variant did not manifest greater Factor 1 scores. This finding is in keeping with both Karpman's (1941, 1948a, b) observation that it is difficult to distinguish between the two variants based on their psychopathic traits and antisocial behavior, and the results of some—but not all—studies of adults (see section "Introduction"). Contrary to expectations, and prior research (see McHoskey, Worzel, & Szyarto, 1998), juvenile secondary variants obtained moderately higher scores than primary variants on the PCL:YV 'arrogant and deceitful interpersonal style' subscale. Although this scale cannot be reduced to narcissism, the literature on narcissism may help contextualize our results. Narcissism may be disaggregated into two forms: (a) overt narcissism, which is associated with grandiosity, exhibitionism, invulnerability, and entitlement, and (b) covert narcissism, which relates to feelings of inferiority and worthlessness, anxiety, and vulnerability (Wink, 1996). It is possible that primary and secondary psychopathies are distinctly associated with overt and covert narcissism, respectively (Skeem et al., 2003; Wink, 1996), which is not distinguished by the PCL measures. Future research that specifically assesses these forms of narcissism is needed to determine the extent to which the ADI facet of the PCL measures tap overt narcissism, covert narcissism, or both. Such research may shed light on limitations in the PCL measures' ability to distinguish between primary and secondary variants.

## Differences Between Primary and Secondary Variants in the Likelihood and Quality of Violence

This is the first prospective study of youth to indicate that the secondary variant is not only less emotionally stable

and more hostile than its primary counterpart, but is also more prone to institutional violence—particularly reactive violence. First, the secondary variant was more likely than the primary variant to become involved in institutional violence during the 2-year study period, even after controlling for the greater amount of time they spent institutionalized. These results are consistent with the secondary variants' "tendency to be upset by minor irritants…, to respond readily with aggressive action…, to view the world as populated by potential enemies…, [and] to be disinhibited and undercontrolled" (Hicks et al., 2004, p. 285). Karpman (1941, 1948a, b) theorized that the tendency to react with violence and hostility—characterizing secondary psychopathy—is rooted in parental abuse and rejection.

Second, in keeping with theoretical predictions (Karpman, 1941; Patrick & Zempolich, 1998; Skeem et al., 2003), violent incidents for the secondary variant were disproportionately reactive, defensive, and 'emotional.' This finding is consistent with Blackburn's description of the secondary psychopath as angry and moody, emotionally disturbed, and reactively hostile and his finding that secondary variants reported significantly more intense emotional reactions in anger-evoking situations than primary variants (Blackburn, 1998; Blackburn & Lee-Evans, 1985). This is also consistent with Karpman's (1948b) description of the secondary variant as "typically act[ing] out of such emotions as hatred or revenge, often in reaction to circumstances that exacerbate his or her neurotic conflict." For example, when describing the antisocial acts of one of his patients whom he classified as a secondary psychopath, Karpman (1941) described her aggressive behaviors as "invariably the medium of an emotional release" (p. 135). In contrast, Hicks et al. (2004) found that primary variants were more likely to describe themselves as planful and less likely to act without forethought than secondary variants.

## Differences Between Primary and Secondary Variants in Malleability: Maturity and Change in PCL:YV Scores and Violence

In this study, we explored whether secondary variants manifested more potential for change in traits and behavior than secondary variants. Compared with primary variants, we found that secondary variants were less psychosocially mature and manifested greater change in violent behavior—but not PCL:YV scores—over a 2-year period. These findings foster particular optimism for youth with psychopathic traits who appear most at-risk for violence.

We were unable, in this study, to assess the extent to which reductions in violent behavior related to protective factors, such as exposure to positive life events. However,

we were able to rule out the possibility that treatment services were strongly linked with these reductions. That is, results of our exploratory analyses confirmed that reductions in violent behavior were not attributable to the amount of treatment services that youth received. Analytic details are available upon request. Nevertheless, controlled studies are needed to address the validity of Karpman's (1948b) claim that secondary variants "are amenable to psychotherapeutic treatment and therefore offer a far more hopeful outlook than is currently given to the [primary] psychopathic cases" (p. 533). Although such 'disaggregating' investigations will be important, a growing body of evidence casts serious doubt on the premise that psychopathy cannot be effectively treated, whether the focus is on adults (Rogers, Jackson, Sewell, & Johansen, 2004; Salekin, 2002; Skeem, Monahan, & Mulvey, 2002) or youth (Caldwell, Skeem, Salekin, & Van Rybroek, 2006).

## Implications for Policy and Practice

These findings have important implications for both policy and practice. They contradict lay conceptions of primary psychopaths as violent 'superpredators' to be feared above all others. When considering the behaviors of the primary variant "there is less to indicate excessively violent rage than a relatively weak emotion breaking through even weaker restraints" (Cleckley, 1982, p. 263). The emotionally stable nature of the primary variant lies in stark contrast to the "hot-headedness" characterizing the secondary variant (Karpman, 1948b, pp. 527–528). Clinically, observed psychopathic traits may signal greater violence risk—at least within institutional settings—when they co-occur with emotional instability and distress than when they appear alone. If the goal is to decrease violence, the secondary variant is the most appropriate group to target with intervention efforts.

This study does not address the major controversy about juvenile psychopathy—whether apparently psychopathic youth will reliably mature into psychopathic adults. We have shown that youth with high scores on a measure of psychopathy can be disaggregated into variants that *look* like primary and secondary psychopathic adults. Whether these youth will mature into such adults is an open question for future research—particularly for secondary youth, who are marked by immaturity and unstable behavior. Given the great potential for the misuse of a psychopathy diagnosis in legal contexts (Edens et al., 2001), we believe that legal applications of juvenile psychopathy must await high-quality longitudinal research that addresses the major controversy in this field.

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