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The Developmental Course of Psychopathic Features: Investigating stability, change, and long-term outcomes

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Abstract

This multi-cohort study delineates developmental trajectories of psychopathic features across childhood and adolescence (ages 7–16) and investigates associations with adult outcomes (ages ~23–34). Although most youth demonstrated consistently low levels of psychopathic features, approximately 10%–15% followed a chronically high trajectory. A similar number (~14%) displayed initially high levels that decreased over time, while others (~10%–20%) followed an increasing pattern. Boys in the chronically high trajectory exhibited the most deleterious adult outcomes and some evidence suggested that youth in the decreasing subgroup experienced fewer maladaptive outcomes than those in the increasing and high groups. Findings revealed substantial malleability in the developmental course of psychopathic features and suggest that unique pathways may exert considerable influence on future engagement in antisocial and criminal behaviors.

Keywords

Psychopathy; Psychopathology; Aggression; Antisocial

Psychopathy is characterized by features of callousness, shallow affect, a lack of remorse, and irresponsibility (Hare, 2003). Well researched in adult populations, evidence suggests that adult psychopathy is associated with chronic and severe forms of criminal behavior (Kahn, Byrd & Pardini, 2012; Neumann & Hare, 2008). Researchers have also focused on extending the construct of psychopathy downwardly to children and adolescents. Notably,

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this area of investigation, has a number of important implications, perhaps most consequentially for early intervention and prevention efforts.

To date, research into these characteristics among youth often focuses on distinct facets of psychopathy (e.g., interpersonal/affective features; impulsive/irresponsible lifestyle). However, there is also a noted absence of agreement in the field regarding the makeup of these subfactors (Lilienfeld, Watts, Francis Smith, Berg, & Latzman, 2014). Although investigations that target these underlying components are no doubt important, considerable evidence shows it is the overarching construct of psychopathy that acts to confer the greatest risks. Children with high overall psychopathy scores tend exhibit the most severe and violent forms of delinquent behavior (Lynam, Miller, Vachon, Loeber, & Stouthamer-Loeber, 2009), the worst treatment outcomes (Spain, Douglas, Poythress, & Epstein, 2004), and are at increased risk for displaying psychopathic personality features into adulthood (Lynam et al., 2009). Evidence also indicates that the facets that make up the higher-order construct share a common genetic underpinning (Bezdjian, Raine, Baker, & Lynam, 2011; Forsman, Lichtenstein, Andershed, & Larsson, 2008).

Early identification of psychopathic features in youth is considered essential for improving our understanding of the causal mechanisms that underlie adult psychopathy. However, several critical questions have yet to be addressed and significantly limit our current knowledge. First, debate surrounding the issue of stability vs. malleability of psychopathy is hampered by the lack of existing studies focused on delineating the developmental course of this construct. This is compounded by the paucity of research to have considered both, intra- and inter-individual sources of change. Further, knowledge into the prospective association between the developmental course of psychopathic features across early development with subsequent adult outcomes is extremely limited.

Stability of Psychopathic Features across Development

Psychopathy has traditionally been conceptualized to represent a stable personality construct (Dadds, Fraser, Frost, & Hawes, 2005; Frick, Bodin, & Barry, 2000; Lynam et al., 2005). However, few studies have prospectively examined the stability of psychopathy or its underlying dimensions (Hare, 2003). Further, among studies that have reported moderate-to-high degrees of stability in this construct during childhood and adolescence (Dadds et al., 2005; Frick et al., 2003; Obradovi, Pardini, Long, & Loeber, 2007) and into adulthood (Lynam et al., 2007; Lynam et al., 2009), the overwhelming focus has been on the assessment of rank-order and mean-level estimates of stability. Although important, investigations focused on these aspects of stability can also serve to mask evidence of change that occurs at the *within*-person level. Thus, to date, this area of research is constrained by a notable lack of studies focused on within-person change. Indeed, this concern is far from limited to psychopathy research, as recent calls have advocated for prospective studies across sub-disciplines to more fully consider change over time *within*-persons (see, Curran & Bauer, 2011; Curran, Howard, Bainter, Lane, & McGinley, 2013).

Although research assessing *within-person* change in psychopathy remains sparse, studies utilizing more person-oriented methodologies (e.g., growth curve and trajectory-based

approaches) have provided evidence suggesting there is considerable malleability in this construct. Findings from these studies have demonstrated significant within-person heterogeneity across childhood and adolescence (Byrd, Hawes, Loeber, & Pardini, 2016; Pardini & Loeber, 2008), as well as important differences in group-based developmental trajectories (Fontaine, McCrory, Boivin, Moffitt, & Viding, 2011; Baskin-Sommers, Waller, Fish, & Hyde, 2015; Salihovic, Özedemir, & Kerr, 2013). These more recent studies highlight the importance of differentiating between individuals who exhibit psychopathic features that remain persistent and chronic in course, compared to those who display substantive change in such features across development. Yet, investigations to date have typically focused on relatively short temporal windows, and we are aware of no longitudinal investigations that have examined how such differences in the earlier developmental course of psychopathy may be linked to adult outcomes.

Predicting Adult Outcomes

Enhancing our understanding of the potential links between early manifestations of psychopathy and prospective adulthood outcomes has important implications for policy, as well as for early intervention and prevention efforts. Although accumulating evidence suggests early manifestations of psychopathy may be an antecedent to deleterious outcomes (Lynam et al., 2009; Salekin, 2008), other research has demonstrated inconsistent (Vincent, Odgers, McCormick, & Corrado, 2008) and unsupportive (Edens & Cahill, 2007) findings. To date however, investigations into the long-term predictive value of early features of psychopathy are noticeably lacking. Further, the limited studies that have investigated long-term outcomes often suffer from significant limitations including the use of follow-back designs, short follow-up windows, and small sample sizes (Salekin, 2008). Finally, no study has prospectively examined associations between group-based trajectories of psychopathy in youth and subsequent outcomes in adulthood.

Current Study

The current study provides a comprehensive investigation into the developmental course of early psychopathy. We follow two large cohorts of boys ($n = 1,011$) from childhood into adulthood. The stability of early features of psychopathy is examined across childhood and adolescence to provide insight about continuity and change in these features. Group-based trajectories are delineated to better characterize important developmental pathways. Prospective associations between these distinct pathways and deleterious adult outcomes, including violence, criminal offending, psychopathy, and antisocial behaviors are examined.

Method

Design and Participants

Data were collected as part of the Pittsburgh Youth Study¹, a longitudinal investigation aimed at understanding the development of delinquency, substance use, and mental health

¹Pittsburgh Youth Study data is available to the research community as part of the University of Michigan Interuniversity Consortium for Political and Social Research (<https://www.icpsr.umich.edu/icpsrweb/NACJD/studies/36453>)

problems in boys (Loeber, Farrington, Stouthamer-Loeber, & Van Kammen, 1998)². The sample consists of three cohorts of boys recruited from the Pittsburgh Public Schools in the 1st, 4th, and 7th grades. A screening assessment was conducted using parent, teacher, and youth reports of externalizing behavior problems to create a risk index. Boys who were rated in the top 30% of the risk index, as well as a randomly selected equal number of boys from the remaining 70%, were selected for longitudinal follow-up. The resulting sample is 1,517 boys across three cohorts (youngest, $n = 503$; middle, $n = 508$; oldest, $n = 506$). Due to the limited availability of teacherreport assessments for the oldest cohort, the current study is focused on the youngest and middle PYS cohorts. All procedures were reviewed and approved by the Institutional Review Board at the University of Pittsburgh. At each assessment, the participant's parent or guardian signed an informed consent, and the child was provided with an opportunity to assent or decline participation. For more details about the sample selection procedures, see Loeber et al. (1998).

Youth mean age at screening by cohort were: $M_{\text{youngest}} = 6.96$, $SD_{\text{youngest}} = 0.55$ and $M_{\text{middle}} = 10.25$, $SD_{\text{middle}} = 0.79$. The racial/ethnic composition of each cohort was primarily Caucasian (40.6%–42.7%) and African-American (52.4%–55.7%), with a small percent of Hispanic (0.2%),

Asian (0.4%–1.0%), or mixed race/ethnicity (2.4%–3.8%) participants. Boys in the screening sample did not differ from the follow-up sample in terms of race, California Achievement Test reading scores, single parent household, and parent education.

Procedures

The current study uses data collected at 1-year intervals beginning at the screening assessment for both cohorts. The youngest cohort provides data analyzed across 9 annual assessment points (~ages 7–15), while data include 4 annual assessments for the middle cohort (~ages 10–13). Further information regarding data collection procedures are described in detail elsewhere (Loeber et al., 1998). Adult outcomes examined in the current study were collected when participants were in their mid-to-late 20's ($M_{\text{youngest}} = 28.36$, $SD_{\text{youngest}} = 0.68$ and $M_{\text{middle}} = 23.53$, $SD_{\text{middle}} = 0.85$), with the exception of official records data which was collected when participants were all in their 30's ($M_{\text{youngest}} = 31.01$, $SD_{\text{youngest}} = 0.75$; $M_{\text{middle}} = 34.31$, $SD_{\text{middle}} = 0.90$).

Measures

Youth Psychopathic Features.—Annual assessments of psychopathic features in youth were collected using a short-form of the teacher-reported Childhood Psychopathy Scale (CPSSF; Hawes et al., 2018; Lynam, 1997; Lynam et al., 2009). The CPS, which was originally constructed using items from the Childhood Behavior Checklist (CBCL; Achenbach, 1991) and the Common-Language Q-sort (CCQ; Caspi et al., 1992), was developed to serve as a relatively pure measure of personality and therefore does not include items that tap into more overt antisocial behaviors (Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007). The original CPS has demonstrated associations with other

²As per requirements by the Journal of Research in Personality, we note that this study was not pre-registered.

measures commonly used to assess psychopathy, including the Antisocial Process Screening Device (ASPD; Frick & Hare, 2001) (r 's = 0.57–0.61; Bijttebier & Decoene, 2009), the Triarchic Psychopathy Measure (TriPM; Patrick et al., 2009) (r = 0.38; Drislane, Patrick, & Aarsal, 2014), the Inventory of Callous- Unemotional Traits (ICU; Frick, 2004) (r = 0.49; Roose, Bijttebier, Claes, Decoene, & Frick, 2009) and the PCL-R across an 11-year span (r = 0.31; Lynam et al., 2007). The current study used a shortened, 14-item shortened version of the CPS (Hawes et al., 2018), consisting of items from the standard CBCL Teacher Report Form (TRF; Achenbach & Edelbrock, 1986). This shortened version has previously demonstrated evidence of strong internal consistency across childhood and adolescence, as well as evidence of longitudinal measurement invariance and measurement equivalency across race (see Hawes et al., 2018). All items were rated on a 3-point scale from 0 (not true) to 2 (very true). Internal consistency in the current study remained high across each follow-up assessment (α 's range = 0.93–0.96).

Adult Arrest Records.—Official criminal records were used to assess adult arrests (i.e., that occurred between age 18 and February, 2012). As of this date, the mean age of individuals in the youngest and middle cohorts was 31 and 34, respectively. Official criminal records were gathered using information from the Pennsylvania (PA) State Police and the Federal Bureau of Investigation for charges that occurred out of PA. Total adult arrests were examined using a negative binomial model due to the count nature of this outcome. To examine associations with violent offending a dichotomous (0=no violent arrest, 1=any violent arrest) variable was used, which indicated if a participant had ever been arrested for a violent offense (e.g., murder, homicide, rape, robbery, aggravated assault) as an adult. Finally, to provide an examination of group differences in arrest at different points in time (as opposed to across the entire follow-up period), arrests were also binned into 3 separate age periods, each spanning 5-years (ages 18–22, 23–27, and 28–32). We limited this comparison to the 18–32 age range, as few individuals in the youngest cohort had arrest data available beyond the age of 32. A dichotomous (0 = no, 1 = yes) variable was used to indicate if any arrest occurred during these age periods. The mean number of total adult arrests was 3.26 (SD = 4.22) for the youngest cohort and 3.82 (SD = 4.92) for the middle cohort. The prevalence of violent offenses in the youngest and middle cohorts was 37% and 42%.

Adult Psychopathy.—The Self-Report Psychopathy Scale III (SRP; Paulhus, Hemphill, & Hare, *in press*) and the Psychopathy Checklist: Screening Version (PCL: SV; Hart et al., 1995) were used to assess psychopathy in the current study. The SRP was administered to the youngest cohort, while the PCL: SV was used to assess psychopathy among those in the middle cohort. The SRP is designed to assess features of psychopathy as construed by the PCL-R and has demonstrated strong correlations with other measures of psychopathy (Salekin, 2008). It is scored on a 5-point Likert scale, with scores ranging from 1 (“disagree strongly”) to 5 (“agree strongly”). As the overt antisociality subscale of the SRP was not included in the larger PYS project (Byrd, Kahn, & Pardini, 2013), the SRP total score in the current study is based on three SRP subscales (i.e., interpersonal manipulation, callous affect, and erratic lifestyle), each of which consist of 16 items that are summed so that higher scores indicated increased levels of psychopathic features. The Psychopathy

Checklist: Screening Version (Hart et al., 1995) is a 12-item instrument designed to measure the construct of psychopathy. PCL: SV items are scored on a three-point scale (0, 1, 2), with total scores that range from 0 to 24. Internal consistency was strong for the SRP-III total score for the youngest cohort ($\alpha = .92$), as well as for the PCL: SV total score among the middle cohort ($\alpha = .86$).

Adult Aggression.—The nine-item Physical Aggression scale of the Buss–Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992) and the eight-item Aggressive Behavior scale of the Young Adult Self-Report (YASR; Achenbach, 1997; Achenbach, Bernstein, & Dumenci, 2005) were used to assess adult aggression. The BPAQ was administered to the youngest cohort, while the YASR was completed by those in the middle cohort. Items on the BPAQ are rated on a 5-point scale 1 (“*never or hardly applies to me*”) to 5 (“*very often applies to me*”) and YASR items are rated on a 3-point Likert-type scale (0 = *not true*, 1 = *sometimes true*, 2 = *very true*). Internal consistency was acceptable for the BPAQ Physical Aggression subscale for the youngest cohort ($\alpha = .78$), and for the YASR Aggression subscale for the middle cohort ($\alpha = .72$).

Data Analysis Plan

Growth Mixture Modeling (GMM) was used to delineate trajectories of early psychopathy separately across each cohort. GMM combines aspects of latent growth curve and finite mixture modeling and assumes there are latent subpopulations of individuals who follow similar developmental patterns of change (Muthén, 2004). All GMM’s were estimated using maximum likelihood estimation with robust standard errors (MLR) and were run using Mplus 7.2 (Muthén & Muthén, 1998–2012). Preliminary unconditional growth curves were modeled to examine between- and within-person variability estimates and to determine the highest polynomial (i.e., quadratic, cubic) necessary to accurately describe change in psychopathy across development. Growth curve model fit was assessed using the Comparative Fit Index (CFI) and the root mean square error of approximation (RMSEA). These analyses indicated that inclusion of a quadratic term significantly improved model fit for the youngest cohort, but not the middle cohort. Therefore, a quadratic slope factor was included in the final GMM’s for the youngest cohort, with a linear slope factor specified for the middle cohort GMM.

A series of GMM models were examined, beginning with a more restrictive model wherein only growth factor means were allowed to vary across class, while factor variances were constrained to zero (i.e., a latent class growth model). Subsequently, we examined a less constrained model, wherein growth factor variances and covariances were estimated (constrained to equality across classes). A successive number of latent classes were specified across models for both cohorts. The optimal number of latent trajectories were determined by iteratively increasing the number of latent classes and investigating a number of recommended model selection criteria, including the sample adjusted Bayesian Information Criterion, Akaike Information Criterion (AIC), Bootstrapped Likelihood Ratio Test (BLRT), classification accuracy, parsimony, and interpretability (Muthén, 2004; Nylund, Asparouhov, & Muthén, 2008). An overview of criteria used to select the optimal number of trajectory classes is provided in Table 1. To find the optimal number of trajectory classes, the variances

and covariances of the continuous latent variables were free to vary or constrained to zero when necessary for model estimation (Muthén, 2004). These, along with additional GMM parameters estimates of primary interest for each latent trajectory class are presented in Table 2.

Prospective Associations with Adult Outcomes.—After GMM trajectory groups were established, we implemented a recently developed 3-step procedure in Mplus, to model trajectory group differences on distal outcomes assessed in adulthood. This procedure first estimates the GMM trajectories without outcomes included in the model. Subsequently, the probability of class membership is used to statistically adjust for classification uncertainty when modeling trajectory group differences on distal outcomes. Therefore, estimates obtained using this procedure account for the probabilistic classification of cases (Asparouhov & Muthén, 2013). These models were used to investigate differences among the trajectories for several adult outcomes including aggression, delinquency, criminal offending, and violence.

Results

GMM Trajectories

Initial examination of the unconditional growth curve models revealed overall good model fit for both, the youngest ($\chi^2(36) = 62.93$, $p = .004$; CFI = .97, RMSEA = .03) and middle cohorts ($\chi^2(5) = 9.79$, $p = .08$; CFI = .98, RMSEA = .04). For both cohorts, the mean estimated intercept (youngest cohort $M = 4.24$, $SE = 0.23$; middle cohort $M = 6.08$, $SE = 0.28$) and linear slope (youngest cohort $M = 0.86$, $SE = 0.10$; middle cohort $M = 0.17$, $SE = 0.07$) were significant in the positive direction, whereas the negative quadratic slope factor for the youngest cohort ($M = -0.08$; $SE = .01$) was also significant. We also note that for the youngest cohort, statistically significant variance estimates were found for the intercept ($\delta^2 = 15.92$, $p < .001$), linear slope ($\delta^2 = 1.39$, $p = .003$), and quadratic slope ($\delta^2 = 0.02$, $p = .002$). For the middle cohort, the intercept variance estimate was also found to be significant ($\delta^2 = 23.52$, $p < .001$), however the variance estimate for the linear slope was not ($\delta^2 = .40$, $p < .54$).

Based on substantive interpretation, parsimony, and in accord with prior research (e.g., Fontaine et al., 2011), a 4-class model was identified as providing the best fit for the youngest and middle cohorts. When estimating these models, it was necessary to constrain the slope factor variances to zero across classes (see Table 1). For the youngest cohort, estimation of 5-class model resulted in a non-significant BLRT ($p = .08$), as well as a relatively small subgroup ($< 5\%$, $n = 27$). Although BLRT remained significant across all models conducted for the middle cohort, examination of the 5-class model revealed inclusion of a markedly small subgroup ($< 3\%$, $n = 9$), leading to our choice of the 4-class model. For both, the youngest and middle cohorts this resulted in “Low” (youngest cohort $n = 245$; 49%; middle cohort $n = 313$; 62%), “Decreasing” (youngest cohort $n = 70$; 14%; middle cohort $n = 75$; 14%), “Increasing” (youngest cohort $n = 115$; 23%; middle cohort $n = 60$; 12%), and “High” (youngest cohort $n = 74$; 14%; middle cohort $n = 61$; 12%) trajectory groups (see Figure 1). Across cohorts, these trajectory groups reveal considerable

heterogeneity in the early developmental course of psychopathy, with increasing and decreasing patterns having considerable overlap with “late-onset” and “developmentally limited” conceptualizations.

Prospective Associations with Adult Outcomes

Subsequent to delineating trajectories of early psychopathy, we then turned our focus toward examining the relationship between these identified subgroups and several theoretically relevant outcomes assessed prospectively in adulthood. The primary findings are outlined below and comparisons across all groups are provided in Table 3.

Adult Criminal Offending

Across both cohorts, individuals following Decreasing, Increasing, and High trajectories demonstrated more total adult arrests compared to individuals in the Low subgroup, with effects generally in the moderate to large range (d 's ranging from .23 to .86). For the youngest cohort, individuals in the High and Increasing trajectory groups had more total arrests in adulthood relative to those in the Decreasing group (High vs. Decreasing $d = .72$; Increasing vs. Decreasing $d = .31$). Alternatively, among the middle cohort, there were no differences in the total number of adult arrests between the High and Decreasing trajectories ($d = .03$); however, both of these groups demonstrated more arrests than the Increasing subgroup (High vs. Increasing $d = .42$; Decreasing vs. Increasing $d = .43$). With regards to arrests for violent offenses, as with total arrests, individuals in the Low subgroup were significantly less likely to have been arrested for a violent offense than any other trajectory group, across both cohorts. In addition, for the youngest cohort, those in the High trajectory group were significantly more likely to have been arrested for a violent offense than individuals in either the Decreasing or Increasing subgroup.

When separating arrests into distinct age bins (18–22, 23–27, 28–32), across both cohorts, individuals in the Low subgroup remained significantly less likely to be arrested as an adult compared to persons in any of the other trajectory groups. Overall, those in the High trajectory group had a higher likelihood of being arrested across the first 2 age bins (ages 18–22 and 23–27) than individuals who followed a decreasing pattern of psychopathy during early development. Interestingly however, once individuals neared their 30's, few differences were recognized between the Decreasing, Increasing, and High trajectory groups (see Table S1).

Adult Psychopathy

Across both cohorts, adult psychopathy was consistently higher among those following a High trajectory of early psychopathy, compared to participants following a Low (youngest cohort $d = .78$; middle cohort $d = .46$) or Decreasing trajectory (youngest cohort $d = .37$; middle cohort $d = .16$). No significant differences in levels of adult psychopathy were found between individuals following High or Increasing trajectories of early psychopathy, for either cohort. In addition, among the middle cohort, there were no differences between the Low and Decreasing trajectory groups' adult psychopathy scores.

Adult Aggression

For both cohorts, relative to the Low trajectory group, adulthood aggression was found to be higher among those in the High (youngest cohort $d = .93$; middle cohort $d = .31$) and Increasing (youngest cohort $d = .37$; middle cohort $d = .42$) subgroups. In the youngest cohort, those in the High trajectory group also demonstrated higher levels of aggression in adulthood than individuals in either the Decreasing ($d = .66$) or Increasing ($d = .33$) subgroups. In addition, no differences in adult aggression were found between individuals in the Decreasing and Low trajectory groups for the middle cohort.

Discussion

Findings from this study provide evidence of significant heterogeneity in the developmental pathways of psychopathy during childhood and adolescence. Individuals following a persistently high trajectory had the most consistent associations with negative adult outcomes. Importantly, individuals demonstrating levels of psychopathy that began low and increased over time displayed similar associations with several outcomes as those following a stable high course, particularly among the youngest cohort. Alternatively, individuals exhibiting a decreasing pattern of psychopathy displayed relatively lower scores across several of these outcomes than the stable high subgroup. Further, this decreasing subgroup was, in some instances, no different on these outcomes than the Low trajectory group. These findings reveal that not only does psychopathy appear to be malleable among some people, but that change over time in these features has important implications for subsequent outcomes in adulthood.

Assessing Continuity and Change

Psychopathy is often considered to represent an immutable facet of personality psychopathology (see Edens, 2006 for a discussion). Although psychopathy has been described by some as early emerging and stable in course (Cleckley, 1976; Hare, 1986; Lykken, 1996), there is also evidence - empirical and theoretical- to suggest there may be diverging pathways in the developmental course of psychopathy. Indeed, an extensive body of research shows adolescence to be a period during which youth undergo marked changes in their neurobiological functioning and socio-emotional development; notably, even general personality traits have been shown to only exhibit moderate levels of stability across the period (Roberts & DelVecchio, 2000; Salihovic, Özdemir, & Kerr, 2014). In addition, researchers have also expressed that some core features of psychopathy may parallel temporary characteristics that appear as part of normal adolescent development (e.g., later development of cognitive processes necessary for empathic understanding; Seagrave & Grisso, 2002). Thus, there is reason to believe that these factors may contribute to heterogeneity in the developmental course of psychopathy; a supposition that is provided some support from the findings of this study.

Trajectory analyses demonstrated evidence of important individual differences in the early developmental course of psychopathy in this study. A relatively small group of boys in both cohorts followed persistently high trajectories. However, more than half of boys who were initially at high levels exhibited a decreasing pattern of psychopathy across development and

no longer presented with these features in later adolescence. Alternatively, approximately 10%–20% of boys in this study displayed increases in psychopathy across development. These findings converge with results from other recent studies that also point to unique developmental pathways of psychopathy across development (Byrd, Hawes, Loeber, & Pardini, 2016; Fontaine, McCrory, Boivin, Moffitt, & Viding, 2011). This has important implications, as malleability in the etiology and course of these features connotes potential viability for intervention and treatment efforts.

Prediction of Adult Outcomes

Early features of psychopathy have been linked to violence, aggression, and severe forms of delinquency (Frick and White, 2008; Lynam et al., 2009). Extending this previous work, the current study places these findings in a developmental context by examining how distinct patterns of psychopathy across earlier development are related to adulthood functioning. Results consistently indicated that youth exhibiting chronically high levels of psychopathy were most likely to experience deleterious outcomes (e.g., adult psychopathy, criminal offending, aggressive behaviors). However, those following an increasing course in their levels of psychopathy across the study period did exhibit several associations with outcomes that mirrored that of the chronically high group. This pattern was noticeably different than that of youth who experienced reductions in their levels of psychopathy, as overall, they demonstrated fewer negative adult outcomes than youth in the chronically High trajectory group. Interestingly, these findings also provide some evidence to suggest that poorer outcomes experienced by those in the chronically high group, relative to those following increasing and decreasing pathways, may begin to dissipate as individuals' transition out of early adulthood. However, additional research is needed in this area prior to drawing more firm conclusions.

Strengths, Limitations, and Future Directions

Despite numerous strengths, we acknowledge several study limitations. The study consisted of a community sample of males; results should be replicated in high-risk (i.e., juvenile offenders) and more representative (i.e., including females) samples. Youth psychopathy was assessed using a shortened version of the CPS and included a relatively small number of items tapping the interpersonal, affective, and impulsive features of the original CPS, potentially limiting a more nuanced delineation into the multifaceted nature of psychopathy. Future studies should continue to evaluate the psychometric properties of this shortened version of the CPS, examine its associations with other measures used to assess features of psychopathy in youth, and examine associations with a broader range of study outcomes. Future research should also focus on assessing specific dimensions of psychopathy (e.g., callous-unemotional traits) to determine whether similar estimates of stability and change are observed among these dimensions.

The current results provide evidence of important systematic changes underlying the development of early features of psychopathy across childhood to adolescence. While this may seem intuitive, continued references to psychopathy as a trait and a growing emphasis on the neurobiological underpinnings of this construct may lead some to conclude that meaningful behavioral change among youth exhibiting features of psychopathy is unlikely.

As reported here, there are children and adolescents who exhibit reductions in psychopathic personality over time, and this change reduces their risk for exhibiting deleterious behaviors in young adulthood. This stresses the importance of continued research aimed at identifying the developmental factors that may help to foster reductions in features of psychopathy during childhood and adolescence³.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Highlights

- Multi-cohort, longitudinal investigation delineated trajectories of youth psychopathy
- Findings revealed substantial malleability in developmental course of psychopathy
- Chronically high trajectory exhibited most deleterious outcomes in later adulthood
- Unique pathways exert considerable influence on future antisocial and criminal behaviors

Fig 1.
Trajectories of Early Psychopathy across Childhood and Middle Adolescence

Table 1:

Model fit of GMMs for trajectories of early psychopathy.

	A_{BIC}	AIC	BLRT	Entropy
<i>Youngest Cohort</i>				
1-Class	24,555	24,536	-	-
2-Class	24,461	24,441	<0.001	0.80
3-Class	24,358	24,334	<0.001	0.81
4-Class	24,350	24,324	<0.001	0.81
5-Class	24,318	24,295	0.08	0.80
<i>Middle Cohort</i>				
1-Class	11,613	11,604	-	-
2-Class	11,554	11,532	<0.001	0.74
3-Class	11,493	11,479	<0.001	0.82
4-Class	11,408	11,392	<0.001	0.82
5-Class	11,287	11,276	<0.001	0.77

^ABIC = Sample size adjusted Bayesian Information Criterion. BIC is an index used to compare the fit of two or more models estimated from the same data set and smaller values are preferred. AIC = Akaike's Information Criterion. BLRT = Bayesian Likelihood Ratio Test Entropy values close to 1 indicate clear delineation of classes, *p*-values less than 0.05 indicate that the model is significantly better than a model with 1 fewer classes.

Table 2

Results from the final unconditional GMMs.

	Intercept $\bar{X}$	Linear Slope $\bar{X}$	Quadratic Slope $\bar{X}$	Intercept σ^2	Slope σ^2	Quadratic σ^2
<i>Youngest Cohort</i>						
Class-Low	1.76***	0.61***	-0.06***	3.44***	0.00	0.00
Class-Decreasing	10.49***	1.19	-0.24***	3.44***	0.00	0.00
Class-Increasing	3.42***	-0.49	0.23***	3.44***	0.00	0.00
Class-High	7.30***	2.54***	-0.20***	3.44***	0.00	0.00
<i>Middle Cohort</i>						
Class-Low	2.71***	0.062		4.74***	0.00	
Class-Decreasing	16.87***	-3.36***		4.74***	0.00	
Class-Increasing	3.37***	4.22***		4.74***	0.00	
Class-High	13.79***	0.50		4.74***	0.00	

*
Note: $p < .05$ **
 $p < .01$ Unstandardized estimates are reported. Quadratic slope not estimated for the middle cohort

Table 3

Early psychopathy trajectory group differences on adult outcomes.

	Low <i>Pr/M</i> (SE)	Decreasing <i>Pr/M</i> (SE)	Increasing <i>Pr/M</i> (SE)	High <i>Pr/M</i> (SE)	Omnibus χ^2
<i>Total Arrests</i> ¹					
Youngest	1.70 (0.18) _a	3.48 (0.37) _b	5.16 (0.64) _c	6.61 (0.61) _c	97.11 ***
Middle	2.38 (0.22) _a	6.83 (0.73) _c	4.47 (0.56) _b	6.62 (0.73) _c	68.29 ***
<i>Violent Arrests</i> ²					
Youngest	0.18 (0.02) _a	0.49 (0.04) _b	0.48 (0.06) _b	0.70 (0.05) _c	68.96 ***
Middle	0.27 (0.02) _a	0.65 (0.06) _b	0.59 (0.07) _b	0.70 (0.07) _b	54.11 ***
<i>Psychopathy</i>					
Youngest _(SRP)	149.17 (1.85) _a	162.97 (2.94) _b	168.11 (4.48) _{bc}	174. (4.05) _c	46.36 ***
Middle _(PCL)	2.73 (0.28) _a	5.11 (1.13) _{ab}	5.96 (0.88) _b	6.75 (1.45) _b	30.51 ***
<i>Aggression</i>					
Youngest _(Buss-Perry)	19.80 (0.40) _a	21.96 (0.59) _b	22.99 (0.99) _b	25.99 (0.82) _c	50.15 ***
Middle _(CBCL)	5.84 (0.34) _a	7.18 (0.69) _{ab}	9.12 (1.20) _b	9.03 (1.69) _b	14.56 ***

Groups that do not have a common subscripted letter are significantly different at $p < .05$ *
 $p < .05$ **
 $p < .01$;***
 $p < .001$.¹ Estimates represent exponentiated log mean values derived from negative binomial model.² *Pr* = predicted probability of event occurrence calculated for binary outcomes.