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Understanding desisting and persisting forms of delinquency: the unique contributions of disruptive behavior disorders and interpersonal callousness

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Abstract

Background—While associations between conduct disorder (CD), oppositional defiant disorder (ODD), attention deficit hyperactivity disorder (ADHD), and interpersonal callousness (IC) symptoms and delinquency onset are well established, less is known about whether these characteristics differentiate desisting and persisting delinquency. The current study examined whether childhood and adolescent CD, ODD, ADHD, and IC symptoms uniquely distinguished boys who exhibited persisting versus desisting delinquency from adolescence into adulthood.

Methods—Participants were 503 boys (57% African American) repeatedly assessed from ages 7 to 25. Associations between childhood and adolescent CD, ODD, ADHD, and IC symptoms and desisting and persisting delinquency were examined independently and after controlling for their co-occurrence and multiple covariates.

Results—Conduct disorder and IC symptoms in childhood and adolescence were higher among boys whose delinquency persisted into adulthood relative to those boys whose delinquency desisted across time. After controlling for the overlap between symptoms of ADHD, ODD, CD and IC, only adolescent CD and IC symptoms emerged as unique predictors of the differentiation between persisters and desisters. Moreover, adolescent CD and IC symptoms continued to contribute unique variance even after childhood levels of these characteristics were accounted for.

Conclusions—Boys with elevated levels of CD and IC symptoms in childhood and adolescence are at risk for exhibiting a pattern of delinquency that persists from adolescence into adulthood. Intervention efforts designed to prevent chronic delinquency should target youth with co-occurring CD and IC symptoms in childhood and adolescence.

Keywords

Delinquency persistence; conduct disorder; interpersonal callousness; longitudinal

Introduction

Delinquency rises and peaks during adolescence, then greatly dissipates for most individuals by adulthood (Farrington, 1986). However, it is unclear why some adolescents continue exhibiting delinquent behavior into adulthood (i.e. persisters) while others desist from

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delinquency (i.e. desisters) over time. There is some suggestion that symptoms of conduct disorder (CD), oppositional defiant disorder (ODD), and attention deficit hyperactivity disorder (ADHD) are precursors to serious and chronic delinquency (Broidy et al., 2003). Recently researchers have focused on features of interpersonal callousness (IC), which are consistent with the interpersonal and affective dimensions of adult psychopathy, as a robust predictor of delinquency (Frick et al., 2003; Lynam, 1997). However, the extent to which childhood and adolescent CD, ODD, ADHD, and IC symptoms distinguish between persisting and desisting delinquency remains unclear.

Disruptive behavior disorders and the desistance/persistence of delinquency

Research has shown a developmental progression of problem behavior such that children with elevated ADHD symptoms are more likely to develop ODD symptoms, and the presence of ODD symptoms in turn increases risk for developing CD symptoms (Loeber, Green, Keenan, & Lahey, 1995). While ADHD and ODD symptoms have been associated with delinquency engagement over time, these associations are often reduced to nonsignificance after controlling for co-occurring CD symptoms (Broidy et al., 2003). However, one limitation of the existing research is that ODD and CD symptoms are frequently combined into a single construct (Broidy et al., 2003), making it unclear whether they uniquely predict future delinquency. In addition, we are unaware of any studies that have examined which facets of disruptive behavior disorder (DBD) symptoms, including CD, ODD and ADHD, distinguish between desisting and persisting delinquency after accounting for their co-occurrence.

IC and the desistance/persistence of delinquency

Investigators have begun examining whether features traditionally associated with adult psychopathy can be applied to youth (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Frick, Bodin, & Barry, 2000; Lynam, 1997). While psychopathy is a complex construct characterized by a constellation of interpersonal, affective, and behavioral characteristics, downward extensions to youth have focused primarily on the interpersonal and affective facets of the disorder (e.g. lack of guilt, manipulative and deceitful behavior). These features are particularly relevant because they are not adequately represented among DBD symptoms (Dadds, Fraser, Frost, & Hawes, 2005; Pardini, Obradović, & Loeber, 2006). Moreover, these characteristics are presumed to be indicative of the most severe and habitual adult offenders (Cleckley, 1976).

Consistent with the adult literature, features of IC have been associated with a particularly severe subgroup of delinquent youth (Frick et al., 2003; Pardini, 2006). Longitudinal research has shown IC symptoms predict increasing levels of delinquency over time in childhood, even after controlling for initial conduct problems (Dadds et al., 2005; Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005). In addition, features of IC in adolescence have been shown to predict future arrests and convictions (Lynam, Miller, Vachon, Loeber, & Stouthamer- Loeber, 2009), antisocial personality problems (Pardini & Loeber, 2008) and psychopathic features in adulthood (Burke, Loeber, & Lahey, 2007; Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007). However, the extent to which IC symptoms uniquely predict the differentiation between persisting and desisting delinquency into adulthood above and beyond co-occurring DBD symptoms has not been investigated.

Developmental considerations

There has been repeated suggestion that the utility of DBD and IC symptoms may vary throughout childhood and adolescence. Researchers have proposed that childhood-onset CD puts youth at particularly high risk for chronic delinquency, while adolescentonset is more normative and transient, reflecting a ‘maturity gap’ and contextual influences (Moffitt, 1993;

Moffitt & Caspi, 2001). While childhood manifestations of DBD and IC symptoms are associated with future delinquency (Lahey, Loeber, Burke, & Applegate, 2005; Loeber, Farrington, Stouthamer-Loeber, & White, 2008), not all youth with these symptoms in childhood continue to engage in delinquency (Loeber et al., 2008). In addition, elevated DBD and IC symptoms in adolescence have proven useful in predicting continued delinquency (Burke et al., 2007; Loeber, Burke, & Lahey, 2002). However, the value added of adolescent DBD and IC symptoms is rarely assessed after controlling for earlier manifestations of these characteristics, leaving questions about their incremental predictive utility unanswered.

Current study

The primary goal of this study was to examine childhood and adolescent DBD and IC symptoms as unique predictors of desisting and persisting delinquency in an ethnically diverse sample of boys assessed prospectively from childhood into adulthood. In addition, the extent to which DBD and IC symptoms in adolescence can help determine which youth will become persisters versus desisters after controlling for symptom levels in childhood was evaluated. The extensive developmental span covered by this study and its prospective design allows for the first known empirical investigation to address these aims.

Method

Participants

Participants were part of the Pittsburgh Youth Study (PYS), an ongoing longitudinal study of boys recruited from Pittsburgh public schools (Loeber, Farrington, Stouthamer-Loeber, & van Kaemmen, 1998). This study focused on the youngest cohort of boys selected from a representative pool of 1,165 first graders in 1987–1988. A screening assessment using parent, teacher, and youth reports of externalizing behavior problems was initially conducted and those rated in the top 30% on behavior problems ($n = 256$), as well as a roughly equal number of boys randomly selected from the remainder ($n = 247$), were selected for longitudinal follow-up. Thus, the follow-up sample consisted of 503 first grade boys (M age = 7.43, $SD = 0.56$), 57% African American and 43% Caucasian. Further demographic information can be found in Loeber et al. (1998).

Procedure

Following the initial screening assessment, the youngest cohort was assessed biannually for the first 4 years and then annually for the next 9 years, roughly spanning the ages of 7–20. Participants were recently reassessed in adulthood when they were approximately 25 years old. Predictor variables for the current study were obtained during the first (childhood) and seventh (adolescence) follow-up assessments, when the boys were approximately 7 ($M = 7.43$, $SD = 0.56$) and 15 ($M = 15.04$, $SD = 0.57$) years of age, respectively. These were chosen because they were the only assessments where structured diagnostic interviews were administered. In addition, boys reported on their engagement in delinquency during each annual assessment from early ($M = 13.99$, $SD = 0.57$) to late ($M = 20.05$, $SD = 0.62$) adolescence. During the adulthood assessment at age 25 ($M = 25.76$, $SD = 0.96$), participants were asked about delinquent acts committed during the past 5 years. Official records of criminal convictions were obtained for all participants from early adolescence through adulthood using juvenile, state and federal records. Procedures were reviewed and approved by the Institution Review Board at the University of Pittsburgh. Written informed consent was obtained from parents and/or youth prior to each assessment.

Measures

Control variables—Given consistent associations between desisting/persisting delinquency and many child, family, peer and neighborhood factors (Loeber et al., 2008), several additional variables were assessed. Demographic characteristics were examined in childhood while child, family, peer and neighborhood characteristics were assessed in both childhood and adolescence. For those characteristics that were assessed using multiple informants, the average of the total scores was used.

Demographics—The child's age and race (Caucasian = 0 vs. African American = 1) were assessed using a parent-report demographic questionnaire (Loeber et al., 1998). Parents also provided information on their education and occupation, which was used to calculate socio economic status (SES) using the Hollingshead Index (Hollingshead, 1975). If a child had a male and female parent/caretaker present, the scores were averaged; if a child only had one parent/caretaker, that score was used.

Academic achievement—Parents and teachers reported on the youth's performance in reading, math, writing and spelling. Performance was rated on a 4- point scale ranging from 'failing' to 'above average'. Ratings of all subjects were averaged across both parent and teacher report.

Physical punishment—One item from the Discipline Scale (Loeber et al., 1998) was used to examine the use of physical punishment. Both the child and their parent responded using a 3-point Likert rating scale (1 = *almost never* to 3 = *often*). Because very few participants endorsed 'often' using physical punishment (<5%), this item was dichotomized by combining the categories of 'sometimes' or 'often'.

Parental supervision—Four items from the Supervision/Involvement scale (Loeber et al., 1998) were used to assess parental supervision (e.g. 'Do you know who your son's companions are when he is not at home?'). Youth and their parents responded using a 3-point rating scale (1 = *almost never* to 3 = *almost always*).

Peer delinquency—Youth were administered the Peer Delinquency Scale (PDS; Loeber et al., 1998) to assess the number of the participants' friends who engage in various delinquent behaviors. Participants rated how many of their friends engaged in a specific delinquent act (e.g. theft, vandalism, assault) in the past 6 months using a 5-point scale (0 = *none of them* to 4 = *all of them*).

Neighborhood impression—Parents reported on the prevalence of abandoned buildings, unemployment, racial tension, and various criminal activities in their neighborhood using a 17-item scale (Loeber et al., 1998). These items weresummedtogether to create a total score.

Primary predictor variables—*CD, ODD, and ADHD symptoms.* Parents reported on CD, ODD, and ADHD symptoms in the past year using the Revised Diagnostic Interview Schedule for Children, Parent Version (DISC-P; Costello, 1987) during childhood and adolescence. In adolescence, the boys also provided information on their past year CD symptoms using the Diagnostic Interview Schedule for Children, Child Version (DISC-C; Costello, Edelbrock, Dulcan, Kalas, & Klaric, 1987). Because the DISC-P and DISC-C assessments used criteria from *DSM-III* and *DSM-III-R*, the scoring was modified to account for changes in diagnostic criteria made from *DSM-III* and *DSM-III-R* to *DSM-IV* (American Psychiatric Association, 2000). Specifically, the ODD symptom of 'often swears or uses obscene language' was eliminated and two additional CD symptoms assessing curfew violations and threatening others were added using supplemental questions from the

DISC-P. Only one item was added to child-reported CD symptoms (i.e. threatening others) because youth were not questioned about curfew violations. Because substantial revisions were made to the ADHD criteria between *DSM-III-R* and *DSM-IV*, we were unable to approximate *DSM-IV* symptoms and only the 14 symptoms associated with *DSM-III-R* ADHD diagnosis were used.

For the adolescent assessment, parent and youth ratings of CD symptoms were combined by counting a symptom as present if endorsed by either informant. The total number of CD, ODD and ADHD symptoms were then summed to create total symptom scores in childhood and adolescence. The internal consistencies for the childhood and adolescent assessments were modest to high: CD (α = .55 and α = .68,), ODD (α = .71 and α = .85), and ADHD (α = .85 and α = .88), respectively.

Interpersonal callousness—Interpersonal callousness was measured using eight items from an extended version of the Child Behavior Checklist (CBC-L; Achenbach, 1991) and the Teacher Report Form (Achenbach & Edelbrock, 1986). This scale was previously validated using a confirmatory factor analysis within the PYS screening sample and the follow-up sample across all three cohorts (Pardini et al., 2006). Parents and teachers reported on the same eight items assessing an interpersonal style characterized by deceitfulness, a lack of remorse or guilt, manipulation, superficial charm, grandiosity, and an inability to accept responsibility after misbehaving. All items were rated on a 3-point scale from 0 (*not true*) to 2 (*very true*). Items were combined across the two informants by taking the higher of the two ratings and then summing them to create a total score. The IC scale has shown evidence of longitudinal invariance and high temporal stability in the PYS sample (Obradović, Pardini, Long, & Loeber, 2007) and correlates highly with the interpersonal and affective facets of psychopathy measured using the Child Psychopathy Scale (Pardini & Loeber, 2008). The reliability alpha for this construct in childhood and adolescent assessments was good (α = .86 and α = .91, respectively).

Delinquency—Information on delinquency was gathered using a combination of self-report and official criminal record information from early adolescence into adulthood. Participants' self-reported delinquency was assessed using the 40-item Self-Reported Delinquency Scale (SRD; Elliott, Huizinga, & Ageton, 1985). Information about convictions was derived from four sources: Allegheny County Juvenile Court Records, Pennsylvania Juvenile Court Judges' Commission, Pennsylvania Police Repository, and the Federal Bureau of Investigation. The current study focused on moderate (e.g. larceny, simple assault) and serious (e.g. breaking and entering, robbery, homicide) delinquency utilizing a classification method from Loeber et al. (2008).

The time between adolescence and adulthood was divided into three developmental blocks: early adolescence (average ages 13–16), late adolescence (average ages 17–19) and early adulthood (average ages 20–25). Participants were classified into one of three groups using information on the prevalence of moderate/serious delinquency during these time blocks. Delinquency during each block was coded as 1 if the participant reported and/or was convicted of a moderate/serious delinquent act (1 or more) and 0 if no moderate/serious delinquency was present. *Nondelinquents* did not engage in moderate/serious delinquency in any of the three developmental blocks. *Desisters* were participants who (a) committed at least one act of moderate/serious delinquency in either early or late adolescence and (b) subsequently ceased to commit moderate/serious delinquency in early adulthood. *Persisters* included those participants that (a) committed at least one moderate/serious delinquent act in early and/or late adolescence and (b) continued to commit at least one moderate/serious delinquent act in early adulthood.

Missing data

Participant retention was high for each of the assessments, ranging from 84.9% to 92.6%. Boys with complete data were compared to participants with missing data in terms of age, race, and family SES as well as primary predictors. Missingness was unrelated to all variables including delinquency group classification with one exception; boys with missing data were more likely to be African American ($\chi^2 = 5.07$, $p < .05$) than those with complete data.

A total of 49 participants were excluded from analyses because they were classified as adult onset delinquents ($n = 22$) or were deceased ($n = 10$; cause of death was available for 8 of the 10 deceased participants; 4 were gun homicides, 1 suicide, 1 drug over dose, 1 accident unrelated to delinquency, and 2 unknown.). In addition, participants classified as desisters who had been incarcerated for more than half of the adulthood phase or were not assessed in adulthood ($n = 17$) were excluded because it was unclear whether a lack of opportunity or information lead to their desister classification.

Excluded participants were compared to participants included in the primary analyses in terms of age, race, and familySESas well as primary predictors. Adult onset delinquents were equivalent to all other participants on all control and predictor variables. Individuals identified as deceased demonstrated higher CD ($t = 2.38$, $p < .05$) and IC ($t = 2.00$, $p < .05$) symptoms in childhood as well as elevated IC symptoms in adolescence ($t = 2.21$, $p < .05$). Those individuals that were excluded due to prolonged incarceration and/or lack of self-report data did not differ from other participants on any control or predictor variables other than age and race; they were significantly more likely to be older ($t = 3.41$, $p < .01$) and African American ($\chi^2 = 4.40$, $p < .05$).

Data analysis

All analyses were performed with two dependent variables; first, the extent to which predictors distinguished delinquents (i.e. persisters/desisters combined) from nondelinquents and second, the degree to which predictors differentiated persisters and desisters. Initial analyses examined the bivariate associations between childhood and adolescent CD, ODD, ADHD, and IC symptoms and the two delinquency outcomes. Next, multivariate logistic regressions were used to examine the unique contributions of CD, ODD, ADHD, and IC symptoms in distinguishing delinquency groups. This was done separately for childhood and adolescent predictors. Finally, childhood and adolescent predictors were entered together into a final multivariate logistic regression to assess the incremental predictive utility of adolescent CD, ODD, ADHD, and IC symptoms after accounting for childhood symptoms. Predictor variables were converted to *z*-scores prior to analyses to allow for a direct comparison of observed effects.

The multivariate regression models outlined above were first run controlling for standard demographic variables (i.e. age, race, SES). Next, these multivariate regression models were re-run to determine if the findings remained after accounting for the previously described child, family, peer, and neighborhood control variables. Prior to analyses, these control variables were examined in bivariate logistic regressions predicting the two delinquency outcomes. Only variables that significantly predicted the delinquency outcomes were included in multivariate logistic models.

Results

Results for all primary predictor variables are presented here. Due to space constraints, detailed results for all covariates are available upon request.

Descriptive statistics

Descriptive statistics and correlations for demographic variables and primary predictor variables are presented in Table 1. Approximately 44% of participants were classified as nondelinquents, with 34% characterized as desisters and 22% categorized as persisters. All primary predictors in childhood and adolescence demonstrated positive significant correlations ranging between .19 and .70. Concurrently assessed DBD and IC symptoms demonstrated moderate to high positive associations (r = .39–.70). In contrast, cross-time correlations between like variables were low to moderate, with ADHD symptoms demonstrating the strongest homotypic continuity (r = .45), followed by ODD (r = .34), CD (r = .28), and IC symptoms (r = .27).

Childhood predictors

Results of bivariate analyses are presented in Table 2. Childhood CD and IC symptoms were significantly higher in delinquents relative to nondelinquents. Moreover, CD and IC symptoms in childhood were significantly greater in persisters compared to desisters. After accounting for control variables and co-occurring DBD and IC symptoms in childhood, only CD symptoms distinguished between delinquency groups, such that CD symptoms were significantly higher in delinquents relative to nondelinquents (Table 3). However, neither CD nor IC symptoms differentiated between persisters and desisters in either multivariate model. Unexpectedly, ADHD symptoms were lower in persisters relative to desisters, but this was only after accounting for significant child, family, peer and neighborhood factors.

Adolescent predictors

In bivariate analyses, CD, ODD, ADHD, and IC symptoms in adolescence were higher in delinquents relative to nondelinquents, and higher CD, ODD, and IC symptoms differentiated persisters from desisters (Table 2). In the multivariate analyses accounting for control variables and concurrent DBD and IC symptoms in adolescence, CD symptoms were higher in delinquents relative to nondelinquents (Table 4). In addition, higher CD and IC symptoms in adolescence differentiated persisters from desisters even after controlling for co-occurring symptoms and all control variables. ADHD symptoms were lower in delinquents relative to nondelinquents after controlling for co-occurring DBD and IC symptoms and control variables. Significant associations between adolescent symptoms and the distinction between delinquency groups remained significant even after accounting for childhood manifestations of these characteristics (Table 5). However, after controlling for significant child, family, peer, and neighborhood factors, associations between adolescent CD and IC and delinquency groups were reduced to trend level significance.

Discussion

The current study is the first to examine childhood and adolescent DBD and IC symptoms as predictors of desisting and persisting delinquency into adulthood, both independently and after controlling for their co-occurrence. Boys with elevated levels of CD and IC symptoms in childhood and adolescence were at heightened risk for moderate/serious delinquency that persisted from adolescence into adulthood. After accounting for control variables and co-occurring symptoms, only manifestations of CD and IC in adolescence uniquely predicted the distinction between persisters and desisters. Importantly, these findings remained significant after controlling for childhood symptoms.

Childhood predictors

As expected, CD and IC symptoms in childhood were significantly higher in delinquents relative to nondelinquents (Lahey et al., 2005); moreover, CD and IC symptoms were higher

in boys whose delinquency persisted into adulthood relative to boys who desisted. These results are in line with the theoretical consensus that childhood manifestations of these characteristics demarcate a subgroup of youth most at risk for a severe and stable pattern of delinquency (Frick & White, 2008; Moffitt, 1993). Furthermore, these findings indicate that assessing the number of CD and IC symptoms in childhood provides valuable prognostic information. Specifically, childhood CD and IC symptoms not only predicted which youth would engage in delinquency in adolescence, they also delineated youth at heightened risk for delinquency that persisted into adulthood.

After accounting for the co-occurrence of childhood DBD and IC symptoms, only CD symptoms significantly differentiated between delinquents and nondelinquents. This suggests that the association between IC and future delinquency may be primarily accounted for by co-occurring DBD symptoms. Though there is some evidence for the incremental predictive utility of childhood features of IC, these effects are small and often overshadowed by the robust predictive utility of CD symptoms (Dadds et al., 2005; Pardini et al., 2006). At the same time, empirical studies have found that children demonstrating the highest rates of self-reported delinquency and police contacts have heightened levels of both CD and IC symptoms (Frick et al., 2005; Rowe et al., 2010). This implies that the co-occurrence of these characteristics may put children at higher risk for severe and recalcitrant delinquency.

Childhood ADHD and ODD symptoms were unrelated to later delinquency. Though research has demonstrated relations between early ADHD and ODD symptoms and later delinquency (Broidy et al., 2003), the follow-up periods among these studies were shorter than in the current investigation. Moreover, associations between childhood ADHD and ODD symptoms and later delinquency are thought to be indirect and best conceptualized as a developmental progression, mediated through the presence of CD symptoms (Loeber et al., 1995).

Adolescent predictors

In adolescence, ADHD, ODD, CD, and IC symptoms were significantly higher in delinquents relative to nondelinquents, providing further evidence for adolescent DBD and IC symptoms as significant risk factors for delinquency engagement (Broidy et al., 2003; Pardini et al., 2006). In addition, ODD, CD, and IC symptoms in adolescence were significantly higher in persisters relative to desisters. After controlling for their co-occurrence, adolescent CD symptoms uniquely predicted the distinction between delinquents and nondelinquents as well as persisters and desisters. This suggests that the number of CD symptoms exhibited by delinquent adolescents helps to delineate who will continue engaging in delinquency into adulthood. This is consistent with research indicating that dimensional approaches to assessing problem behavior have distinct advantages over categorical approaches when it comes to predicting future developmental outcomes (Pardini, Frick, & Moffitt, 2010). It is also in line with studies demonstrating that while CD symptoms overlap with delinquent behaviors, these behaviors tend to provide unique prognostic information above and beyond measures of delinquency (Burke, Loeber, Mutchka, & Lahey, 2002).

Adolescent IC symptoms were significantly higher in persisters relative to desisters even after accounting for co-occurring DBD symptoms. This bolsters emerging evidence that adolescent IC is associated with a heightened proclivity for reoffending (Forth, Kosson, & Hare, 2003; Frick et al., 2005) and may differentiate persisting and desisting delinquency (Loeber, Pardini, Stouthamer-Loeber, & Raine, 2007; Loeber et al., 2008). This is particularly relevant to the debate surrounding the addition of a specific subtype of CD encompassing features of IC, namely callous–unemotional (CU) traits. Though the current study did not examine CU traits specifically, nor did it assess these features as a subtype of

CD as proposed in the DSM-V (Frick & Moffitt, 2010), it does point to the importance of IC as a unique predictor of chronic and severe delinquency, particularly in adolescence.

Importantly, boys with higher CD and IC symptoms in adolescence were significantly more likely to exhibit persistent delinquency even after accounting for these symptoms in childhood. While these associations were reduced to trend level significance after accounting for all control variables, current results highlight the importance of adolescent CD and IC symptoms as unique predictors, further opposing ideas that adolescent manifestations of these characteristics may be largely normative and benign. Though several investigations have challenged the idea that CD and IC symptoms in adolescence are transient (Broidy et al., 2003; Loeber et al., 2007; Pardini et al., 2006), definitive conclusions about the utility of adolescent CD and IC symptoms are often limited by failure to account for earlier manifestations of these same characteristics. Thus, the current study builds upon previous work by providing evidence for the incremental predictive utility of adolescent CD and IC symptoms exceeding childhood symptoms.

As expected, positive associations between ODD and ADHD symptoms and delinquency were nonsignificant after controlling for co-occurring CD and IC symptoms (Broidy et al., 2003). However, ADHD symptoms were significantly higher in nondelinquents/desisters relative to delinquents/persisters after accounting for control variables and co-occurring DBD and IC symptoms. While it is possible that this reflects a statistical artifact resulting from the high degree of covariance between DBD and IC symptoms, potential issues with multicollinearity were explored and no problems were indicated. Though the negative association between ADHD symptoms and delinquency should be interpreted cautiously, one potential explanation is offered. Specifically, longitudinal studies show that boys with ADHD symptoms are at risk for social rejection and internalizing problems, even after controlling for co-occurring ODD/CD symptoms (Pardini & Fite, 2010). This suggests that boys with ADHD symptoms without co-occurring ODD/CD symptoms may be socially isolated and timid and less likely to affiliate with deviant peers and engage in risky behaviors such as delinquency.

Limitations

The current study focused on a community sample of at-risk boys, limiting generalizability to girls and clinical populations. The findings are also restricted to moderate/serious delinquency and may not generalize to drug-related crimes or more minor forms of delinquency. In addition, delinquency was only measured through age 25, which precludes the notion that desistance may occur later in life. Lastly, the current study used a specific definition of desistance/persistence based upon observed data as opposed to exploratory and probabilistic techniques like trajectory modeling. While it is possible that trajectory modelingmayproduce different results, our approach is consistent with past research (e.g. Moffitt, Caspi, Harrington, & Milne, 2002), including prior studies by our research group (e.g. Loeber et al., 2007 e.g. Loeber et al., 2008) and reflects an alternative way to define desistance/persistence, as currently there is no ‘gold standard’.

Also noteworthy, the measurement of IC in the current study is not directly comparable to more prominent measures of this construct, such as the CU traits scale from the Antisocial Processes Screening Device (Frick & Hare, 2001). Because items indexing IC were obtained post hoc from archival data, none of the items adequately assessed lack of empathy or shallow affect. However, item selection for the current measure was based upon relatedness to previously validated measures of interpersonal and affective features of psychopathy in youth (Frick et al., 2000; Lynam, 1997). Moreover, the IC construct has been validated using all three cohorts of the PYS (Pardini & Loeber, 2008; Pardini et al., 2006), showing structural and metric invariance across childhood and adolescence (Obradović et al., 2007).

Importantly, IC predicts persistent delinquency in adolescence (Loeber et al., 2008; Pardini et al., 2006) as well as psychopathic traits (Burke et al., 2007) and antisocial personality problems in adulthood (Pardini & Loeber, 2008).

Clinical implications

The current study broadens our understanding of DBD and IC symptoms and their associations with delinquency by extending this link to the differentiation between desisters and persisters in adulthood. Specifically, results point to elevated CD and IC symptoms as consistent predictors of the distinction between delinquents and nondelinquents as well as persisters and desisters. Furthermore, current results bridge a gap in the extant literature by examining the *unique* predictive utility of these characteristics in both childhood and adolescence. Interestingly, only adolescent CD and IC symptoms offered unique prognostic information in the distinction between persisters and desisters and associations remained significant after accounting for DBD and IC symptoms in childhood. These findings have significant implications for intervention programs designed to target youth at risk for protracted engagement in moderate/serious delinquency. Empirical research has demonstrated the effectiveness of early family/parenting interventions as well as more child focused treatments in the reduction of delinquency in youth (Piquero, Farrington, Welsh, Tremblay, & Jennings, 2009; Piquero, Jennings, & Farrington, 2010). The current study underscores the importance of directing such intervention efforts toward youth demonstrating elevated CD and IC symptoms in childhood and adolescence.

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References

Achenbach, TM. Manual for child behavior checklist/4- 18 and 1991 profile. Burlington: Department of Psychiatry, University of Vermont; 1991.

Achenbach, TM.; Edelbrock, C. Manual for the teacher's report form and teacher version of the child behavior profile. Burlington: Department of Psychiatry, University of Vermont; 1986.

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4. Washington, DC: Author; 2000. text rev

Blair RJ, Peschardt KS, Budhani S, Mitchell DG, Pine DS. The development of psychopathy. Journal of Child Psychology and Psychiatry. 2006; 47:262–276. [PubMed: 16492259]

Broidy LM, Nagin DS, Tremblay RE, Bates JE, Brame B, Dodge KA, Vitaro F. Developmental trajectories of childhood disruptive behaviors and adolescent delinquency: A six-site, cross-national study. Developmental Psychology. 2003; 39:222–245. [PubMed: 12661883]

Burke JD, Loeber R, Lahey BB. Adolescent conduct disorder and interpersonal callousness as predictors of psychopathy in young adults. Journal of Clinical Child and Adolescent Psychology. 2007; 36:334–346. [PubMed: 17658978]

Burke JD, Loeber R, Mutchka JS, Lahey BB. A question for DSM-V: Which better predicts persistent conduct disorder – Delinquent acts or conduct symptoms? Criminal Behavior and Mental Health. 2002; 12:37–52.

Cleckley, HM. The mask of sanity. St. Louis, MO: Mosby; 1976.

Costello, A. The diagnostic interview schedule for children, parent version. Worcester: University of Massachusetts Medical Center; 1987. (rev. ed.)

Costello, A.; Edelbrock, C.; Dulcan, MK.; Kalas, R.; Klaric, SH. The diagnostic interview schedule for children, child version. Worcester: University of Massachusetts Medical Center; 1987. (rev. ed.)

Dadds MR, Fraser J, Frost A, Hawes DJ. Disentangling the underlying dimensions of psychopathy and conduct problems in childhood: A community study. Journal of Consulting and Clinical Psychology. 2005; 73:400–410. [PubMed: 15982138]

Elliott, DS.; Huizinga, D.; Ageton, S. Explaining delinquency and drug abuse. Beverly Hills, CA: Sage; 1985.

Farrington, DP. Age and Crime. In: Morris, MTN., editor. Crime and justice. 7. Chicago: University of Chicago Press; 1986. p. 189-250.

Forth, AE.; Kosson, DS.; Hare, RDT. The hare psychopathy checklist: Youth version: Technical manual. North Tonawanda: Multi-Health Systems; 2003.

Frick PJ, Bodin SD, Barry CT. Psychopathic traits and conduct problems in community and clinicreferred samples of children: Further development of the psychopathy screening device. Psychological Assessment. 2000; 12:382–393. [PubMed: 11147105]

Frick PJ, Cornell AH, Bodin SD, Dane HE, Barry CT, Loney BR. Callous-unemotional traits and developmental pathways to severe conduct problems. Developmental Psychology. 2003; 39:246–260. [PubMed: 12661884]

Frick, PJ.; Hare, RD. The psychopathy screening device. Toronto, Ontario, Canada: Multi Health Systems; 2001.

Frick, PJ.; Moffitt, TE. A proposal to the DSM-V childhood disorders and the ADHD and disruptive behavior disorders work groups to include a specifier to the diagnosis of conduct disorder based on the presence of callous-unemotional traits. Washington DC: American Psychiatric Association; 2010.

Frick PJ, Stickle TR, Dandreaux DM, Farrell JM, Kimonis ER. Callous-unemotional traits in predicting the severity and stability of conduct problems and delinquency. Journal of Abnormal Child Psychology. 2005; 33:471–487. [PubMed: 16118993]

Frick PJ, White SF. Research Review: The importance of callous-unemotional traits for developmental models of aggressive and antisocial behavior. Journal of Child Psychology and Psychiatry. 2008; 49:359–375. [PubMed: 18221345]

Hollingshead, MS. Four factor index of social status. New Haven, CT: Yale University; 1975.

Lahey BB, Loeber R, Burke JD, Applegate B. Predicting future antisocial personality disorder in males from a clinical assessment in childhood. Journal of Consulting and Clinical Psychology. 2005; 73:389–399. [PubMed: 15982137]

Loeber R, Burke JD, Lahey BB. What are adolescent antecedents to antisocial personality disorder? Criminal Behavior and Mental Health. 2002; 12:24–36.

Loeber, R.; Farrington, DP.; Stouthamer-Loeber, M.; van Kammen, WB. Antisocial behavior and mental health problems: Explanatory factors in childhood and adolescence. Mahwah, NJ: Lawrence Earlbaum Associates; 1998.

Loeber, R.; Farrington, DP.; Stouthamer-Loeber, M.; White, HR. Violence and serious theft: Development and prediction from childhood to adulthood. New York: Routledge; 2008.

Loeber R, Green SM, Keenan K, Lahey BB. Which boys will fare worse? Early predictors of the onset of conduct disorder in a six-year longitudinal study. Journal of the American Academy of Child and Adolescent Psychiatry. 1995; 34:499–509. [PubMed: 7751264]

Loeber R, Pardini DA, Stouthamer-Loeber M, Raine A. Do cognitive, physiological, and psychosocial risk and promotive factors predict desistance from delinquency in males? Developmental Psychopathology. 2007; 19:867–887.

Lynam DR. Pursuing the psychopath: Capturing the fledgling psychopath in a nomological net. Journal of Abnormal Psychology. 1997; 106:425–438. [PubMed: 9241944]

Lynam DR, Caspi A, Moffitt TE, Loeber R, Stouthamer-Loeber M. Longitudinal evidence that psychopathy scores in early adolescence predict adult psychopathy. Journal of Abnormal Psychology. 2007; 116:155–165. [PubMed: 17324026]

Lynam DR, Miller DJ, Vachon D, Loeber R, Stouthamer-Loeber M. Psychopathy in adolescence predicts official reports of offending in adulthood. Youth Violence and Juvenile Justice. 2009; 7:189–207. [PubMed: 22661910]

Moffitt TE. Adolescence-limited and life-course-persistent antisocial behavior: A developmental taxonomy. Psychological Review. 1993; 100:674–701. [PubMed: 8255953]

Moffitt TE, Caspi A. Childhood predictors differentiate life-course persistent and adolescence-limited antisocial pathways among males and females. Development and Psychopathology. 2001; 13:355–375. [PubMed: 11393651]

Moffitt TE, Caspi A, Harrington H, Milne BJ. Males on the life-course-persistent and adolescence-limited antisocial pathways: follow-up at age 26 years. Development and Psychopathology. 2002; 14:179–207. [PubMed: 11893092]

Obradović J, Pardini DA, Long JD, Loeber R. Measuring interpersonal callousness in boys from childhood to adolescence: An examination of longitudinal invariance and temporal stability. Journal of Clinical Child and Adolescent Psychology. 2007; 36:276–292. [PubMed: 17658974]

Pardini DA. The callousness pathway to severe violent delinquency. Aggressive Behavior. 2006; 32:590–598.

Pardini DA, Fite PJ. Symptoms of conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder, and callous-unemotional traits as unique predictors of psychosocial maladjustment in boys: Advancing an evidence base for DSM-V. Journal of the American Academy of Child and Adolescent Psychiatry. 2010; 49:1134–1144. [PubMed: 20970701]

Pardini DA, Frick PJ, Moffitt TE. Building an evidence base for DSM-5 conceptualizations of oppositional defiant disorder and conduct disorder: Introduction to the special section. Journal of Abnormal Psychology. 2010; 119:683– 688. [PubMed: 21090874]

Pardini DA, Loeber R. Interpersonal callousness trajectories across adolescence early social influences and adult outcomes. Criminal Justice and Behavior. 2008; 35:173–196. [PubMed: 21394215]

Pardini DA, Obradović J, Loeber R. Interpersonal callousness, hyperactivity/impulsivity, inattention, and conduct problems as precursors to delinquency persistence in boys: A comparison of three grade-based cohorts. Journal of Clinical Child and Adolescent Psychology. 2006; 35:46–59. [PubMed: 16390302]

Piquero A, Farrington DP, Welsh B, Tremblay RE, Jennings WJ. Effects of early family/parent training programs on antisocial behavior and delinquency. Journal of Experimental Criminology. 2009; 5:83–120.

Piquero AR, Jennings WJ, Farrington DP. On the malleability of self-control: Theoretical and policy implications regarding a general theory of crime. Justice Quarterly. 2010; 27:803–834.

Rowe R, Maughan B, Moran P, Ford T, Briskman J, Goodman R. The role of callous and unemotional traits in the diagnosis of conduct disorder. Journal of Child Psychology and Psychiatry. 2010; 51:688–695. [PubMed: 20039995]

Key Points

- Boys with increased levels of CD and IC symptoms in childhood and adolescence were at heightened risk for moderate/serious delinquency that persisted from adolescence into adulthood relative to youth who desisted from delinquency over time.
- Only adolescent CD and IC symptoms offered unique prognostic information in the distinction between persisters and desisters.
- Boys with elevated CD and IC symptoms in adolescence were significantly more likely to exhibit persistent delinquency even after accounting for earlier manifestations of these symptoms in childhood.
- Intervention efforts designed to prevent severe and persistent delinquency should target youth with cooccurring CD and IC symptoms in childhood and adolescence.

Table 1

Descriptive statistics and correlations for demographic variables and primary predictor variables

	1	2	3	4	5	6	7	8	9	10	11
Age											
SES	−.11*										
Race	.14**	−.24**									
Childhood symptoms											
ADHD	.03	−.13**	.05								
ODD	.04	−.09	−.12*	.64**							
CD	.07	−.16**	.04	.49**	.51**						
IC	.08	−.09*	.10*	.40**	.39**	.43**					
Adolescent symptoms											
ADHD	.08	−.18**	.12*	.45**	.32**	.28**	.29**				
ODD	.05	−.17**	.04	.36**	.34**	.28**	.28**	.70**			
CD	.03	−.19**	.08	.25**	.19**	.28**	.26**	.48**	.58**		
IC	−.02	−.17**	.18**	.28**	.20**	.25**	.27**	.55**	.55**	.45**	
Nondelinquents (n = 200)											
Mean	7.34	38.12	0.48	3.92	1.38	0.31	3.69	2.77	1.02	0.52	3.38
SD	0.54	12.91	0.50	3.38	1.67	0.68	3.29	3.33	1.80	0.91	3.90
Desisters (n = 156)											
Mean	7.48	33.88	0.55	4.46	1.56	0.53	4.28	3.53	1.71	1.53	4.91
SD	0.57	12.77	0.50	3.72	1.78	1.02	3.38	3.57	2.18	1.68	4.49
Persisters (n = 98)											
Mean	7.44	32.18	0.71	4.53	1.87	0.91	5.39	4.38	2.44	2.57	6.83
SD	0.55	13.22	0.45	3.50	1.87	1.34	3.87	3.99	2.49	2.20	4.49

ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; IC, interpersonal callousness.

*$p < .05$;

**$p < .01$.

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Table 2

Bivariate regressions: childhood and adolescent symptoms predicting delinquency groups

	Nondelinquent versus delinquent		Desister versus persister	
	OR	**95% CI**	**OR**	**95% CI**
Childhood symptoms				
ADHD	1.17	0.97–1.42	1.02	0.80–1.30
ODD	1.19	0.98–1.44	1.18	0.92–1.50
CD	1.57**	1.23–1.99	1.31*	1.05–1.64
IC	1.35**	1.12–1.65	1.35*	1.05–1.73
Adolescent symptoms				
ADHD	1.37**	1.11–1.69	1.25	0.96–1.61
ODD	1.68**	1.33–2.12	1.34*	1.04–1.72
CD	3.75**	2.63–5.34	1.65**	1.27–2.15
IC	1.76**	1.41–2.20	1.51**	1.16–1.95

ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; IC, interpersonal callousness; OR, odds ratio; CI, confidence interval.

* $p < .05$;

** $p < .01$.

Table 3

Multivariate regression: childhood symptoms predicting delinquency groups

	Nondelinquent versus delinquent		Desister versus persister	
	OR	**95% CI**	**OR**	**95% CI**
Childhood symptoms				
ADHD	0.89 (0.71)	0.68–1.16 (0.50–1.00)	0.71 (0.63*)	0.50–1.02 (0.43–0.93)
ODD	1.03 (1.01)	0.78–1.36 (0.72–1.41)	1.22 (1.24)	0.86–1.74 (0.85–1.82)
CD	1.45* (1.73**)	1.09–1.93 (1.19–2.50)	1.32 (1.28)	0.98–1.78 (0.93–1.76)
IC	1.17 (1.09)	0.93–1.47 (0.83–1.44)	1.24 (1.29)	0.93–1.66 (0.94–1.76)

Effects are after controlling for age, race and family SES. Effects listed in parentheses are after accounting for significant child, family, peer, and neighborhood factors; ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; IC, interpersonal callousness; OR, odds ratio; CI, confidence interval.

* $p < .05$;

** $p < .01$.

Table 4

Multivariate regression: adolescent symptoms predicting delinquency groups

	Nondelinquent versus delinquent		Desister versus persister	
	OR	**95% CI**	**OR**	**95% CI**
Adolescent symptoms				
ADHD	0.63* (0.61*)	0.44–0.91 (0.41–0.92)	0.78 (0.75)	0.51–1.18 (0.49–1.14)
ODD	1.14 (1.15)	0.76–1.71 (0.74–1.78)	1.06 (1.58)	0.70–1.63 (0.69–1.63)
CD	3.83** (2.48**)	2.49–5.91 (1.49–4.14)	1.62** (1.58*)	1.17–2.27 (1.07–2.35)
IC	1.36 (1.23)	1.00–1.86 (0.87–1.74)	1.47* (1.43*)	1.05–2.07 (1.02–2.02)

Effects are after controlling for age, race and family SES. Effects listed in parentheses are after accounting for significant child, family, peer and neighborhood factors. ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; IC, interpersonal callousness; OR, odds ratio; CI, confidence interval.

* $p < .05$;

** $p < .01$.

Table 5

Multivariate regression: adolescent symptoms predicting delinquency groups after controlling for childhood symptoms

	Nondelinquent versus delinquent		Desister versus persister	
	OR	**95% CI**	**OR**	**95% CI**
Adolescent symptoms				
ADHD	0.62* (0.62*)	0.41–0.91 (0.39–0.97)	0.90 (0.84)	0.58–1.41 (0.53–1.33)
ODD	1.16 (1.19)	0.76–1.76 (0.75–1.89)	0.97 (1.03)	0.61–1.53 (0.64–1.64)
CD	3.72** (2.46**)	2.41–5.74 (1.45–4.12)	1.64** (1.44†)	1.16–2.31 (0.94–2.19)
IC	1.34 (1.19)	0.97–1.83 (0.83–1.70)	1.48* (1.40†)	1.04–2.10 (0.97–2.01)

Effects are after controlling for age, race and family SES. Effects listed in parentheses are after accounting for significant child, family, peer and neighborhood factors; ADHD, attention deficit hyperactivity disorder; ODD, oppositional defiant disorder; CD, conduct disorder; IC, interpersonal callousness; OR, odds ratio; CI, confidence interval.

* $p < .05$;

** $p < .01$;

† $p < .10$.