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Conduct Disorder and Psychosocial Outcomes at Age 30: Early Adult Psychopathology as a Potential Mediator

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Abstract

Conduct disorder (CD) is associated with a number of adverse psychosocial outcomes in adulthood. There is consistent evidence that CD is predictive of antisocial behavior, but mixed evidence that CD is predictive of other externalizing and internalizing disorders. Further, externalizing and internalizing disorders are often associated with similar psychosocial outcomes as CD. However, relatively little work has examined whether forms of psychopathology (e.g., externalizing and/or internalizing disorders) mediate the relationship between youth CD and adult psychosocial outcomes. The present study examined associations between youth CD and adult psychosocial outcomes and sought to identify forms of psychopathology that may potentially mediate this relationship. Participants completed self-report measures of psychosocial functioning and semi-structured diagnostic interviews during adolescence and young adulthood. Analyses found that most domains of adult psychosocial functioning were associated with youth CD. Adult antisocial behavior was the only form of psychopathology predicted by CD. Adult antisocial behavior appeared to mediate the relationship between CD and marital status, life satisfaction, and being in jail and partially mediated the relationship between CD and family support and global functioning. These data suggest that reducing the progression to adult antisocial behavior may improve multiple psychosocial outcomes among those with a history of CD.

Keywords

Conduct disorder; Psychosocial functioning; Comorbidity

Conduct disorder (CD) is characterized by aggressive, destructive, and deceptive behavior that emerges early in childhood/adolescence and is relatively persistent over the course of development (Moffitt 1993). Prospective studies find increased risk for later adverse psychosocial outcomes among individuals with CD. However, relatively few studies have examined potential mechanisms through which CD impacts psychosocial outcomes (Rutter et al. 2006). One potential mechanism may involve indirect effects through other forms of psychopathology.

Recent work (Masten et al. 2004; Roisman et al. 2004) has identified several important domains of functioning in adulthood, many of which have been examined in the context of CD. For example, longitudinal investigations find earlier mortality, lower educational attainment, greater unemployment, increased criminality, and increased sexual risk taking behavior in individuals with a history of CD relative to those without a history of CD (Bardone et al. 1998; Fergusson and Horwood 1998; Fergusson et al. 2005; Laub and Vaillant 2000; Ramrakha et al. 2007). Surprisingly, less attention has been paid to other domains, such as interpersonal (e.g., intimate relationship formation; marriage dissolution; parenthood; family and peer relations; Whisman et al. 2007; Zoccolillo et al. 1992) and global (e.g., life satisfaction; coping; global functioning) functioning in adulthood, despite CD being associated with impairment in these domains during childhood and adolescence (Rutter 1994; Rutter et al. 2006).

The consistency in finding CD as a risk factor for psychosocial impairment is impressive considering the differing recruitment methods (e.g., recruiting persistent delinquents vs. birth cohorts), ages of participants at study entry, and potential confounding effects examined. Across studies, investigators often examine the influence of the same outcome earlier in development, socio-demographic factors (e.g., parental education), family characteristics (e.g., family intactness, harsh family discipline), and/or individual factors (e.g., sex, IQ). However, with few exceptions (e.g., Bardone et al. 1998), studies have not investigated the independent role of comorbid psychopathology across developmental periods. Thus, while studies can speak to whether CD is prospectively associated with specific adult outcomes after adjusting for a number of factors, it remains unknown whether these associations are due specifically to CD, or psychopathology in general, as many forms of psychopathology are highly comorbid with CD (Angold et al. 1999).

In addition to considering the role of comorbid psychopathology during childhood and adolescence, it is important to examine the role of psychopathology in early adulthood on psychosocial outcomes. Previous work finds that the impaired functioning observed in individuals with a history of CD is also found in individuals with a history of other forms of psychopathology, including major depression (Lewinsohn et al. 2003) and substance use disorders (SUD; Rohde et al. 2007). Some work suggests that CD predicts these forms of psychopathology and may suggest that the associations between CD and functional outcomes are due to the emergence of later disorders.

There have been a number of investigations of the relationship between CD in youth and adult psychopathology. The most consistent finding is that youth CD is associated with antisocial personality disorder (APD; Hill 2003; Robins and Price 1991; Simonoff et al. 2004). This is, perhaps, a circular issue as a diagnosis of CD is required for a diagnosis of APD (APA 1994). Some recent studies have attempted to avoid this circularity by examining adult antisocial behavior (AAB). This cluster of symptoms is similar to that of APD, but does not require a youth onset of CD. Importantly, recent work finds that AAB is predicted by youth behavior problems (Keyes et al. 2007), and in this study this relationship was mediated by shared genetic variance across behavior problems in youth and AAB in adulthood.

CD and AAB are also associated with other forms of externalizing disorders, particularly SUD (McGue et al. 2006). Despite this overlap, there have been positive (e.g., King et al. 2004; Pardini et al. 2007) and negative (e.g., Costello et al. 2003) findings concerning the prospective relationships between CD and SUD.

Similarly, inconsistent results have been reported concerning the relationship between youth CD and subsequent depressive and anxiety disorders. The mixed findings may be partially due to methodological differences. For example, studies use very different temporal designs, including purely cross-sectional, retrospective designs (Goodwin and Hamilton 2003; Hetttema

et al. 2003); prospective designs with variable follow-up lengths, ranging from one year to 18 years (Burke et al. 2005; Costello et al. 2003; Ezpeleta et al. 2006; Harrington et al. 1991; Marmorstein and Iacono 2003); and one study employed a follow-back design (Kim-Cohen et al. 2003). Studies also differed with respect to their definitions of CD (e.g., with vs. without ODD; Angold et al. 1999; Kim-Cohen et al. 2003; with vs. without ADHD; Biederman et al. 2008); consideration of heterogeneity in the relationship between CD and internalizing disorders (e.g., Chen and Simons-Morton 2009); and inclusion of different numbers and types of confounding variables, including demographic, family context, and individual difference factors. In light of these numerous methodological considerations, it is unclear if CD is prospectively associated with internalizing disorders. More generally, it is unclear whether forms of psychopathology, other than AAB, are predicted by youth CD, which may mediate the relationship between CD and adult psychosocial outcomes.

This study examines associations between CD and psychosocial outcomes, through adulthood in a large community sample that has been assessed longitudinally. To maintain coherence with the existing literature, we focus on educational and occupational, interpersonal, health, and global functioning. Additionally, we focus on identifying forms of psychopathology in early adulthood that may mediate the relationship between youth CD and psychosocial outcomes after including other forms of psychopathology. We include externalizing and internalizing disorders before age 18 and after age 18 to examine differences in associations with adult functioning based on temporal proximity between psychopathology and outcomes. We focus on psychopathology before and after age 18 as this is a typically used heuristic for youth and emerging adulthood phases of development. In sum, we expect to find that associations between CD and adult functioning will be at least partially mediated by AAB. However, due to the conflicting state of the literature on the associations between CD and SUD, MDD, and anxiety disorders, we plan on examining whether these are plausible mediators.

Methods

Participants

The present study uses data from the Oregon Adolescent Depression Project (OADP) (Lewinsohn et al. 1993), a longitudinal study of a large cohort of high school students who were assessed twice during adolescence, a third time when the average age was 24, and a fourth time when the average age was 30. Participants were randomly selected from nine high schools in western Oregon. A total of 1,709 adolescents (ages 14–18; mean age 16.6, $SD=1.2$) completed the initial (T_1) assessments between 1987 and 1989. The participation rate at T_1 was 61%. Approximately one year later, 1,507 of the adolescents (88%) returned for a second evaluation (T_2). Differences between the sample and the larger population from which it was selected, and between participants and those who declined to participate or dropped out of the study before T_2 , were small (Lewinsohn et al. 1993). However, individuals with a history of disruptive behavior disorder at T_1 were more likely to drop-out of the study (16.8% vs. 6.0%, $\chi^2[1, N=1,709]=31.22, p<0.001$).

For the third assessment, all adolescents with a history of a depressive disorder by T_2 ($n=360$) or a history of non-mood disorders ($n=284$), and a random sample of adolescents with no history of psychopathology by T_2 ($n=457$) were invited to participate in a third (T_3) evaluation. All non-white T_2 participants were retained in the T_3 sample to maximize ethnic diversity. This strategy reduces the number of participants necessary to follow-up and reduces study costs and does so by maximizing representativeness of the study population. Of the 1,101 T_2 participants selected for a T_3 interview, 941 (85%) completed the age 24 evaluation. The T_2 diagnostic groups did not differ on the rate of participation at T_3 . At age 30, all T_3 participants were asked to complete another interview assessment (mean age=30.45, $SD=0.70$, range=28–34). Of the 941 who participated in the T_3 assessment, 816 (87%) completed the T_4 assessment.

Differences between those who participated in T₃, but not T₄, and those who participated in T₃ and T₄ were small (Olino et al. 2008). The reference sample for the current study includes participants who completed the T₄ follow-up; due to missing data, *ns* ranged from 752–816 for individual outcome variables.

Measures

Diagnostic Measures—At T₁ and T₂, participants were interviewed with a version of the Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS; Orvaschel et al. 1982), which combined features of the Epidemiologic and Present Episode versions, and included additional items to derive *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition revised (DSM-III-R; American Psychiatric Association 1987) diagnoses. Follow-up assessments at T₂ and T₃ were jointly administered with the Longitudinal Interval Follow-Up Evaluation (LIFE; Keller et al. 1987). The K-SADS/LIFE procedure provided information regarding the onset and course of disorders since the previous interview. The T₄ interview consisted of a joint administration of the LIFE and the Structured Clinical Interview for DSM-IV (SCID; First et al. 1996) to probe for new or continuing episodes since T₃. Diagnoses were based on DSM-III-R criteria for T₁ and T₂ and *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) (American Psychiatric Association 1994) criteria for T₃ and T₄. Based on audiotaped interviews (*ns* ranged from 124–233 across T₁–T₄), the interrater reliability (indexed by kappa) for conduct disorder at T₁ was 0.71 (however, there were too few cases to compute reliability for T₂, T₃, and T₄). The interrater reliability for depressive disorders (MDD or dysthymia) was 0.82 at T₁; 1.00 at T₂; 0.86 at T₃; and 0.81 at T₄. The interrater reliability for anxiety disorders was 0.76 at T₁; 0.80 at T₂; 0.87 at T₃; and 0.76 at T₄. The aggregate anxiety disorder diagnostic category included generalized anxiety disorder; overanxious disorder; post-traumatic stress disorder; panic disorder; agoraphobia; social phobia; simple phobia; obsessive-compulsive disorder; and separation anxiety disorder. The interrater reliability for substance use disorder (SUD) was 0.82 at T₁; 0.96 at T₂; 0.81 at T₃; and 0.84 at T₄. SUD included alcohol abuse or dependence and sedative/hypnotic/anxiolytic, cannabis, stimulant, opioid, cocaine, and hallucinogen/PCP abuse or dependence, and polydrug dependence. Due to low base rates of ADHD and ODD interrater reliability could only be formally assessed at T₁. The interrater reliability for ADHD was 0.89 and for ODD was 0.77.

At T₃, APD was assessed using the Personality Disorder Examination (PDE) (Loranger 1988) and at T₄, APD symptoms were assessed using the International Personality Disorder Examination (IPDE) (Loranger et al. 1994) to diagnose AAB. The IPDE is the updated version of the PDE and they share a number of features, including established interrater reliability, temporal stability, and minimal state effects (Loranger et al. 1991). The IPDE has an extensive scoring manual, which defines the scope and meaning of each item. The APD module included prompts to assess symptoms of APD that were present beginning at age 15 and AAB diagnoses did not require the presence of CD before age 18. In the cases selected for purposes of assessing interrater reliability, there were too few cases to compute kappa values. Based on audiotaped interviews, the interrater reliability (indexed by intra-class correlations) for adult antisocial behavior dimensional scores were 0.69 at T₃ and 0.68 at T₄.

Participant interviews at T₃ and T₄ were conducted by telephone, which generally yields comparable results to face-to-face interviews (Rohde et al. 1997; Sobin et al. 1993). Most interviewers had advanced degrees in a mental health field and several years of clinical experience.

Age of onset for all incidences or episodes of psychopathology was assessed during the diagnostic interviews. Onset ages were used to construct variables reflecting specific forms of psychopathology before and after age 18 to be used in the analyses.

Psychosocial Constructs at T₄—Categorical measures included current marital status (never married; divorce or separation; and currently married); ever being a parent (yes/no); and incarceration (whether participant had ever spent any time in jail, yes/no).

Continuous Measures Consisted of Global Level of Functioning (DSM-III-R/-IV GAF); number of years of school completed; number of weeks unemployed in past year (based on a six-point scale); annual household income; and structured instruments assessing: quality of relationship with family members ($\alpha=0.88$; 10 items) (Procidano and Heller 1983); quality of relationship with friends ($\alpha=0.88$; 10 items) (Rohde et al. 1990); coping ($\alpha=0.77$; 17 items) (Andrews and Withey 1976); physical health ($\alpha=0.50$; 4 items assessing self-rated health, number of times received treatment in past year, treatment for illness or injury in past year, chronic medical problems distress); life satisfaction ($\alpha=0.89$; 15 items; higher scores reflect lower levels of satisfaction) (Campbell et al. 1976); and risky sexual behavior (nine items assessing risky sexual behavior in the past 12 months, including multiple sex partners of the opposite or same sex, sex with injection drug user, sex with person not well known, and inconsistent condom use; $\alpha=0.61$) (Rahdert 1991).

Data Analysis

Original recruitment was based on high school attendance, which often reflects similar demographic characteristics. As these may be of particular importance for externalizing disorders, analyses were conducted by nesting individuals within school. This was implemented using TWOLEVEL procedure in Mplus 5.21 (Muthen and Muthen 1998–2009). Caucasian OADP participants with no history of psychopathology through T₂ were undersampled in the T₃ follow-up. The random selection of white and psychiatrically healthy participants is adjusted for in the analyses by using sampling weights. All regression, survival, and mediation analyses were conducted using Mplus 5.21 (Muthen and Muthen 1998–2009).

Data analysis was conducted in four phases, with each phase corresponding to one component of a mediation analysis (Baron and Kenny 1986). We also evaluated the significance of the indirect pathways (i.e., the joint path from the predictor to the mediating variable and from the mediating variable to the outcome) as recommended by MacKinnon et al. (2002). The first phase focused on examining associations between CD and psychosocial outcomes at age 30. These associations were examined when including multiple sets of covariates. The first block regressed psychosocial outcomes on CD. The second block included CD and gender. The third block included CD, gender, and the same outcome assessed at the T₂ assessment (when available). The fourth block included CD, gender, the same outcome assessed at the T₂ assessment, AAB, and depressive, anxiety, substance use, attention-deficit/hyperactivity, and oppositional-defiant disorder with an onset before age 18. This model building approach sought to identify significant associations after accounting for known sex differences in CD, stability of constructs over time, and the effects of psychopathology in general during childhood and adolescence for each block, respectively. These analyses identified the direct associations between CD and psychosocial outcomes to be probed in mediation analyses.

The second phase focused on examining associations between CD and potential mediators of the association between CD and psychosocial outcomes at age 30, namely psychopathology after age 18. For this phase, age of onset of each form of psychopathology after age 18, including AAB, depressive, anxiety, and substance use disorders, served as the dependent variables in separate survival analysis models. The first block included only CD. The second block included CD and gender. The third block included CD, gender, and the presence of the same disorder before age 18. The fourth block included CD, gender, and the presence of AAB, depressive, anxiety, substance use, attention-deficit/hyperactivity, and oppositional-defiant disorder before age 18. This model building approach sought to identify significant associations after accounting for known sex differences in CD, homotypic continuity of disorder over time,

and the effects of psychopathology in general during childhood and adolescence, across each block, respectively. These analyses served to identify forms of psychopathology that may serve as mediators of the relationship between CD and psychosocial outcomes.

The third phase examined associations between psychosocial outcomes at age 30 and psychopathology after age 18. These models included all covariates in the final models of those used in phase one, but did not include CD. However, only psychosocial outcomes that were associated with CD in the final model in phase one and only forms of psychopathology that were associated with CD in the final model in phase two were examined in this phase. These analyses identified psychosocial outcomes that may be predicted by the mediating variables.

The fourth phase examined the full mediation model when all components of the mediation model were supported. Formal tests of mediation examined the significance of the joint path (i.e., CD predicting psychopathology after age 18 and psychopathology after age 18 predicting psychosocial outcomes at age 30). This was done by specifying the components of the joint path using the MODEL CONSTRAINT command in Mplus. This method provided a regression weight, standard error, and *t*-value to assess the significance of the indirect effect. For the mediation models, the associations between CD and potential mediators were estimated as logistic regression models (as opposed to survival models in Phase 2 of the data analysis). This approach is adequately powered to identify significant joint paths for small effects between the predictor and mediator and mediator and outcome (Fritz and MacKinnon 2007). Lastly, we examined mediation models with the inclusion of all AAB, SUD, MDD, and anxiety disorders after age 18 to identify any associations that may be better accounted for by psychopathology other than the mediator(s).

Results

Lifetime CD and Adolescent Demographics and Covariates

Table 1 displays demographic and descriptive information for independent variables used in the regression and survival models. Basic comparisons between individuals with and without CD are naïve to sampling procedures, including both oversampling and nesting observations within school. The comparisons find that CD was, unsurprisingly, more prevalent in boys than girls. Youth with CD have higher rates of SUD, MDD, oppositional defiant disorder (ODD), and attention deficit/hyperactivity disorder (ADHD) before age 18 than youth without CD. No differences in racial minority status and CD were found [$\chi^2(1)=0.84, p = n.s.$].

Phase 1: Influence of Lifetime CD on Psychosocial Adjustment in Adulthood

We examined the associations between lifetime CD diagnosis and developmental outcomes in multilevel hierarchical linear, logistic, or multinomial logistic regression models, depending on the scaling of the dependent variables. Associations shown in Table 2 are between lifetime CD diagnosis and the dependent variables. The first block examined unadjusted associations between CD and T_4 outcomes. The second block examined associations between CD and outcomes when adjusted for participant sex. The third block examined the association between CD and outcomes when adjusting for covariates in block 2 and the same construct at T_2 . The fourth block examined the association between CD and outcomes when adjusting for covariates in block 3 and psychopathology before age 18.

In block 1, CD was associated with fewer years of education completed, lower levels of income, greater probability of never being married and divorced/separated, lower levels of family and peer support, life satisfaction, coping skills, and global functioning, and increased probability of incarceration. After adjusting for participant gender (block 2), CD was associated with fewer years of education completed, more recent unemployment, lower levels of income, greater

probability of never being married and divorced/separated (compared to being currently married), lower levels of family and peer support, greater physical health problems, lower levels of life satisfaction, coping skills, and global functioning, and increased probability of incarceration. After further adjusting for the same measure of functioning in adolescence (block 3), CD was associated with fewer years of education completed, greater probability of never being married and divorced, lower levels of family and peer support, greater physical health problems, and lower levels of global functioning. After for adjusting for other forms of psychopathology before age 18 (block 4), CD was associated with fewer years of education completed, lower levels of income, greater probability of never being married, lower levels of family and peer support, lower levels of life satisfaction, coping skills, and global functioning, and increased probability of incarceration.

Phase 2: Influence of Lifetime CD on Psychopathology in Adulthood

We examined the associations between CD and psychopathology with an onset after age 18 using Cox proportional hazards models that were nested within the school attended at T₁ and weighted as a function of being included in the sample at T₃. We relied on survival analysis as there was some variability in length of follow-up through T₄. We focused on AAB, SUD, MDD, and anxiety disorder as the diagnostic outcomes and as potential mediators. For each disorder, models were estimated in hierarchical fashion, with the first block examining unadjusted associations between CD and each individual disorder after age 18. The second block examined associations between CD and psychopathology when adjusted for participant sex. The third block examined the association between CD and psychopathology when adjusting for covariates in block 2 and the same disorder before age 18. The fourth block examined the association between CD and psychopathology when adjusting for covariates in block 3 and psychopathology before age 18.

In block 1, we found that CD was significantly associated with AAB and SUD, but not MDD or anxiety disorder after age 18 (Table 3). In block 2, we found that CD was significantly associated with AAB, SUD, and MDD, but not anxiety disorder after age 18 when adjusting for gender. In block 3, we found that CD was significantly associated with AAB, but not SUD, MDD, or anxiety disorder after age 18 when further adjusting for the target disorder before age 18. In block 4, we found that CD was significantly associated with AAB, but not SUD, MDD, or anxiety disorder after age 18 when further adjusting for the full complement of disorders listed and ADHD and ODD disorder before age 18.

Phase 3: Psychopathology After Age 18 and Psychosocial Outcomes at Age 30

As CD was only predictive of AAB after age 18, models were estimated examining associations between AAB after age 18 and psychosocial outcomes at age 30. The set of outcomes examined included years of school completed, annual household income, current marital status, family and peer support, life satisfaction, coping skills, global functioning, and spending time in jail, which were predicted by CD in the final block of models in Phase 1 (above and Table 1). For models investigated here, all covariates from the last block in Phase 1 were included, except for CD.

These models found that AAB after age 18 was associated with years of school completed ($B=-1.13$, $SE=0.29$, $t=-3.79$, $p<0.001$), household income ($B=-1.63$, $SE=0.70$, $t=2.34$, $p<0.05$), marital status (never married vs. currently married: $OR=6.39$ [95% $CI=0.67-60.89$], $t=1.61$, $p>0.10$; divorced/separated vs. currently married: $OR=14.15$ [95% $CI=2.53-79.16$], $t=3.02$, $p<0.01$), family support ($B=-2.91$, $SE=0.94$, $t=-3.09$, $p<0.01$), life satisfaction ($B=8.31$, $SE=3.64$, $t=2.28$, $p<0.05$), GAF ($B=-10.99$, $SE=2.65$, $t=-4.14$, $p<0.001$), and being in jail ($OR=31.20$ [95% $CI=11.89-81.92$], $t=6.99$, $p<0.001$). However, AAB after age 18 was

not associated with peer support ($B=-1.37$, $SE=0.74$, $t=-1.85$, $p=0.07$) or coping ($B=-4.48$, $SE=2.45$, $t=-1.83$, $p=0.07$).

Phase 4: Mediators of the Relationship Between CD and Psychosocial Outcomes at Age 30

We conducted formal tests of mediation for the seven outcomes (years of school completed, household income, marital status, family support, life satisfaction, GAF, and being in jail) that satisfied Baron and Kenny's (1986) criteria for mediation. Models included the indirect path in Mplus with AAB as a categorical mediator. Regression parameters for the direct path from CD to the outcomes at age 30, AAB to the outcomes at age 30, and the joint path are displayed in Table 4. All models had highly significant associations between CD and AAB after age 18 (results available from the corresponding author).

The analyses revealed that the joint path significant for years of school completed, marital status, family support, life satisfaction, and being in jail, but not household income (which was significant at the level of a trend). Full mediation was supported for two outcomes, marital status and life satisfaction, as the association between CD and outcomes was no longer significant when both CD and AAB were included in the model. Results of analyses for years of school completed, family support, and being in jail were consistent with partial mediation as the direct association between CD and outcomes were reduced, but remained significant.

Lastly, we included MDD, anxiety disorder, and SUD after age 18 as additional covariates in the mediation models (Table 4). When including these additional covariates in the model, full mediation was supported for three outcomes, marital status, life satisfaction, and being in jail. Partial mediation was found for the joint path predicting family support, life satisfaction, and global functioning. However, the joint path was no longer significantly associated with the number of years in school.

Discussion

Previous reports document psychosocial impairments in adults with a youth onset of CD. Some of these studies consider the role of family, contextual, and individual factors as additional influences on outcomes in adulthood. However, few such studies have examined the potential role of psychopathology in early adulthood in explaining the association between CD and adult outcomes. The present study examined associations between youth CD and psychosocial outcomes at age 30 and sought to address whether psychopathology in early adulthood mediated these relationships.

We found that the associations between CD and marital status and life satisfaction were mediated by AAB. When further adjusted for other forms of psychopathology during early adulthood, the association between CD and being in jail was mediated by AAB. These data suggest that disrupting the maintenance of conduct problems and/or development of AAB might reduce likelihood of marital dissolution and increase levels of life satisfaction. Further, in the context of the mediation role of AAB, SUD was a significant predictor of being in jail (result available from the corresponding author). Thus, development of intervention and prevention strategies towards reducing continuity of conduct problems, including SUD, is crucial (Harley et al. 2008).

The associations between CD and years of school completed, family support, global functioning, and incarceration were partially mediated by AAB. When further adjusted for other forms of psychopathology during early adulthood, only years of school completed was no longer predicted by the mediated path. For these outcomes, the data suggest that CD exerts influences on these outcomes, above and beyond the effects of later AAB. The impairment associated with these domains of functioning may be partially ameliorated by efforts at

reducing the development of AAB, however, additional strategies will be necessary to mitigate the persistent influence of CD on these outcomes.

Overall, the patterns of associations between CD and age 30 outcomes were consistent with previous literature. However, there were some exceptions. In particular, health outcomes, here indexed by physical health and risky sexual behaviors, were not associated with CD. Discrepancies in findings may be attributable to different assessment frames. The present work focused on outcomes at age 30 while other focused on similar outcomes assessed between ages 21–25 (Bardone et al. 1998; Fergusson et al. 2005; Ramrakha et al. 2007). These discrepancies parallel normative data on risk-taking behaviors, including those relevant to sexual behaviors. Psychosocial maturity tends to increase rapidly beginning at approximately age 25 and nearing adult levels by approximately age 30 (Steinberg 2008). Thus, differences between youth with and without a history of CD in this domain of functioning may diminish within this time period. Alternatively, power to detect associations may have been reduced due to low measurement reliability.

In building the foundation for the mediation analyses, we examined the direct associations between CD and adult psychosocial functioning. This work focused on the specificity of associations when considering the impact of additional forms of youth psychopathology. CD was no longer associated with unemployment or physical health when other forms of youth psychopathology were included in the model. Thus, separate strategies will be required to enhance these outcomes in youth, which may be nonspecific across multiple forms of psychopathology.

We also investigated the associations between CD and multiple forms of psychopathology in early adulthood. Unsurprisingly, we found that CD was a robust predictor of AAB that remained significant after adjusting for gender and multiple forms of psychopathology before age 18. The literature on the association between CD and later SUD, MDD, and anxiety disorder has been mixed (Angold et al. 1999; Biederman et al. 2008; Burke et al. 2005; Chen and Simons-Morton 2009; Costello et al. 2003; Ezpeleta et al. 2006; Goodwin and Hamilton 2003; Harrington et al. 1991; Hettema et al. 2003; Kim-Cohen et al. 2003; King et al. 2004; Marmorstein and Iacono 2003; McGue et al. 2006; Pardini et al. 2007). Naïve analyses found significant associations between CD and SUD and analyses adjusted for gender found that CD was associated with MDD after age 18. However, these associations were no longer significant after accounting for the effect of the same disorder before age 18. This suggests that heterotypic continuity between CD and SUD, MDD, and anxiety disorder is better accounted for by homotypic continuity. This conclusion must be tempered by considering the specified age intervals. That is, heterotypic continuity between CD and other disorders was not found when specifying disorders before and after age 18. Different patterns may be identified if earlier (or later) developmental phases are examined.

Taken together, the present study suggests that prevention of AAB may reduce some of the impact of CD on adult functioning. This is consistent with evidence examining differences between life-course persistent, adolescent limited, and, a relatively newly articulated, childhood limited trajectory of youth conduct problems (Moffitt 2006). Some evidence suggests that outcomes of youth with desisting conduct problems have better outcomes than those who's conduct problems persist, despite having similar ages of onset. Thus, it is important to continue to examine mechanisms of conduct problem persistence (Rutter et al. 2006), involving multiple components, including context, family, and individual factors.

The strengths of this study include assessing a large cohort of adolescents using a prospective design, semi-structured diagnostic interviews, assessing developmentally relevant outcomes in a number of domains through adulthood, and focusing on associations for CD, specifically,

rather than a hybrid CD-externalizing or CD-internalizing category. However, our results should be considered in light of some limitations. First, relatively few cases of CD were identified in the OADP and participant recruitment occurred during high school. Thus, severe cases of early-onset CD may have been missed because the individuals were not enrolled in public school. Indeed, individuals with disruptive behavior disorders at T₁ were more likely to drop out of the longitudinal study than individuals without disruptive behavior disorders. Thus, the magnitude of associations may be biased due to this selective attrition. However, other large epidemiological samples find similar rates of CD in the community when retrospectively assessed for CD (Goldstein et al. 2006). Second, we relied on a diagnostic definition of CD. A number of studies demonstrate that constructs similar to CD are best conceptualized on a continuum (Marcus et al. 2004, 2006, Murrie et al. 2007; although some find otherwise, e.g., Skilling et al. 2001) and argue that dimensional measures of CD are more valid and powerful. Thus, we may have compromised our ability to identify some associations. Third, all diagnostic, psychosocial, and health outcomes were assessed via self-report. Thus, method variance may account for some of the findings. A number of studies have investigated differential agreement between parent and youth reports of psychopathology and suggest that parent (and teacher) reports may be more valid than youth reports for externalizing disorders, while youth reports are more valid for internalizing disorders. Thus, future work should complement youth self-report measures with those from additional informants. However, a previous report from the OADP suggests that there was good concordance between parent reported and adolescent reported diagnoses of interest (Cantwell et al. 1997). Fourth, some outcomes demonstrated relatively modest internal consistency. Thus, we had reduced power to detect associations with some outcomes. Fifth, additional covariates from previous work in the area (e.g., conflict with authority figures; family intactness; parental discipline; intellectual functioning) could be added to the models for increased predictive power. Sixth, the present study did not examine the potential role of age and gender as moderators of the relationship between youth CD and later outcomes. Our focus on mediation was due to examining how different forms of psychopathology at various developmental phases are associated with adverse outcomes. In contrast, studies of moderation, including age, gender, and comorbid psychopathology, may be highly informative in future studies to identify individuals at with enhanced or attenuated associations between CD and later outcomes.

Overall, the present study suggests that some of the continued psychosocial impairment seen in adults with a history is (at least) partially accounted for by later AAB. Thus, interventions that seek to reduce conduct problems over the course of development may improve a number of these outcomes. Further, in addition to examinations of the mechanisms relating CD to adult outcomes, it is also important to consider factors that may moderate the relationship between CD and adult outcomes, including onset of CD and gender (Webster-Stratton 1996).

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References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd ed., rev.. Washington: American Psychiatric Association; 1987.
- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed., rev.. Washington: American Psychiatric Association; 1994.
- Andrews, FM.; Withey, SB. Social indicators of well-being: Americans' perceptions of life quality. New York: Plenum Press; 1976.

- Angold A, Costello EJ, Erkanli A. Comorbidity. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 1999;40:57–87.
- Bardone A, Moffitt T, Caspi A, Dickson N, Stanton W, Silva P. Adult physical health outcomes of adolescent girls with conduct disorder, depression, and anxiety. *Journal of the American Academy of Child & Adolescent Psychiatry* 1998;37:594–601. [PubMed: 9628079]
- Baron RM, Kenny DA. The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology* 1986;51:1173–1182. [PubMed: 3806354]
- Biederman J, Petty CR, Dolan C, Hughes S, Mick E, Monuteaux MC, et al. The long-term longitudinal course of oppositional defiant disorder and conduct disorder in ADHD boys: findings from a controlled 10-year prospective longitudinal follow-up study. *Psychological Medicine* 2008;38:1027–1036. [PubMed: 18205967]
- Burke J, Loeber R, Lahey B, Rathouz P. Developmental transitions among affective and behavioral disorders in adolescent boys. *Journal of Child Psychology and Psychiatry* 2005;46:1200–1210. [PubMed: 16238667]
- Campbell, A.; Converse, PE.; Rodgers, WL. *The quality of American life: Perceptions, evaluations, and satisfactions*. New York: Russell Sage Foundation; 1976.
- Cantwell D, Lewinsohn P, Rohde P, Seeley J. Correspondence between adolescent report and parent report of psychiatric diagnostic data. *Journal of Amer Academy of Child & Adolescent Psychiatry* 1997;36:610–619.
- Chen R, Simons-Morton B. Concurrent changes in conduct problems and depressive symptoms in early adolescents: a developmental person-centered approach. *Development and Psychopathology* 2009;21:285–307. [PubMed: 19144234]
- Costello EJ, Mustillo S, Erkanli A, Keeler G, Angold A. Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry* 2003;60:837–844. [PubMed: 12912767]
- Ezpeleta L, Domenech JM, Angold A. A comparison of pure and comorbid CD/ODD and depression. *Journal of Child Psychology and Psychiatry* 2006;47:704–712. [PubMed: 16790005]
- Fergusson D, Horwood L. Early conduct problems and later life opportunities. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 1998;39:1097–1108.
- Fergusson D, Horwood J, Ridder E. Show me the child at seven: the consequences of conduct problems in childhood for psychosocial functioning in adulthood. *Journal of Child Psychology and Psychiatry* 2005;46:837–849. [PubMed: 16033632]
- First, MB.; Gibbon, M.; Spitzer, RL.; Williams, JBW. *Structured Clinical Interview for DSMIV Axis I disorders: Nonpatient edition (SCID-I, Version 2.0)*. New York: Biometrics Research, New York State Psychiatric Institute; 1996.
- Fritz MS, MacKinnon DP. Required sample size to detect the mediated effect. *Psychological Science* 2007;18:233–239. [PubMed: 17444920]
- Goldstein RB, Grant BF, Ruan WJ, Smith SM, Saha TD. Antisocial Personality Disorder with childhood- vs adolescence-onset conduct disorder: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *The Journal of Nervous and Mental Disease* 2006;194:667. [PubMed: 16971818]
- Goodwin RD, Hamilton SP. Lifetime comorbidity of antisocial personality disorder and anxiety disorders among adults in the community. *Psychiatry Research* 2003;117:159–166. [PubMed: 12606017]
- Harley M, Murtagh A, Cannon M. Conduct disorder: psychiatry's greatest opportunity for prevention. *Psychological Medicine* 2008;38:929–931. [PubMed: 18237454]
- Harrington R, Fudge H, Rutter M, Pickles A, Hill J. Adult outcomes of childhood and adolescent depression: II. Links with antisocial disorders. *Journal of the American Academy of Child & Adolescent Psychiatry* 1991;30:434–439. [PubMed: 2055880]
- Hettema J, Prescott C, Kendler K. The effects of anxiety, substance use and conduct disorders on risk of major depressive disorder. *Psychological Medicine* 2003;33:1423–1432. [PubMed: 14672251]
- Hill J. Early identification of individuals at risk for antisocial personality disorder. *The British Journal of Psychiatry* 2003;182:s11–s14.

- Keller MB, Lavori PW, Friedman B, Nielsen E, Endicott J, McDonald-Scott P, et al. The longitudinal interval follow-up evaluation. A comprehensive method for assessing outcome in prospective longitudinal studies. *Archives of General Psychiatry* 1987;44:540–548. [PubMed: 3579500]
- Keyes MA, Iacono WG, McGue M. Early onset problem behavior, young adult psychopathology, and contextual risk. *Twin Research and Human Genetics* 2007;10:45–53. [PubMed: 17539364]
- Kim-Cohen J, Caspi A, Moffitt TE, Harrington HL, Milne BS, Poulton R. Prior juvenile diagnoses in adults with mental disorder: developmental follow-back of a prospective-longitudinal cohort. *Archives of General Psychiatry* 2003;60:709–717. [PubMed: 12860775]
- King SM, Iacono WG, McGue M. Childhood externalizing and internalizing psychopathology in the prediction of early substance use. *Addiction* 2004;99:1548–1559. [PubMed: 15585046]
- Laub JH, Vaillant GE. Delinquency and mortality: a 50-year follow-up study of 1,000 delinquent and non-delinquent boys. *American Journal of Psychiatry* 2000;157:96–102. [PubMed: 10618019]
- Lewinsohn PM, Hops H, Roberts RE, Seeley JR, Andrews JA. Adolescent psychopathology. I. Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Psychology* 1993;102:133–144. 44, 540–548. [PubMed: 8436689]
- Lewinsohn PM, Rohde P, Seeley JR, Klein DN, Gotlib IH. Psychosocial functioning of young adults who have experienced and recovered from major depressive disorder during adolescence. *Journal of Abnormal Psychology* 2003;112:353–363. [PubMed: 12943014]
- Loranger, AW. Personality disorder examination (PDE) manual. Yonkers: DV Communications; 1988.
- Loranger AW, Lenzenweger MF, Gartner AF, Susman VL, Herzig J, Zammit GK, et al. Trait-state artifacts and the diagnosis of personality disorders. *Archives of General Psychiatry* 1991;48:720–728. [PubMed: 1883255]
- Loranger AW, Sartorius N, Andreoli A, Berger P, Buchheim P, Channabasavanna SM, et al. The International Personality Disorder Examination: The World Health Organization/Alcohol, Drug Abuse, and Mental Health Administration international pilot study of personality disorders. *Archives of General Psychiatry* 1994;51:215–224. [PubMed: 8122958]
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Shee V. A comparison of methods to test mediation and other intervening variable effects. *Psychological Methods* 2002;7:83–104. [PubMed: 11928892]
- Marcus DK, John SL, Edens JF. A taxometric analysis of psychopathic personality. *Journal of Abnormal Psychology* 2004;113:626–635. [PubMed: 15535794]
- Marcus DK, Lilienfeld SO, Edens JF, Poythress NG. Is antisocial personality disorder continuous or categorical? A taxometric analysis. *Psychological Medicine* 2006;36:1571–1581. [PubMed: 16836795]
- Marmorstein NR, Iacono WG. Major depression and conduct disorder in a twin sample: gender, functioning, and risk for future psychopathology. *Journal of the American Academy of Child & Adolescent Psychiatry* 2003;42:225–233. [PubMed: 12544183]
- Masten AS, Burt K, Roisman GI, Obradović J, Long JD, Tellegen A. Resources and resilience in the transition to adulthood: continuity and change. *Development and Psychopathology* 2004;16:1071–1094. [PubMed: 15704828]
- McGue M, Iacono WG, Krueger R. The association of early adolescent problem behavior and adult psychopathology: a multivariate behavioral genetic perspective. *Behavior Genetics* 2006;36:591–602. [PubMed: 16557361]
- Moffitt TE. Adolescence-limited and life-course-persistent antisocial behavior: a developmental taxonomy. *Psychological Review* 1993;100:674–701. [PubMed: 8255953]
- Moffitt, TE. A review of research on the taxonomy of life-course persistent versus adolescence-limited antisocial behavior. In: Cullen, FT.; Wright, JP.; Blevins, KR., editors. *Taking stock: The status of criminological theory*. New Brunswick: Transaction Publishers; 2006. p. 277–311.
- Murrie D, Marcus D, Douglas K, Lee Z, Salekin R, Vincent G. Youth with psychopathy features are not a discrete class: a taxometric analysis. *Journal of Child Psychology and Psychiatry* 2007;48:714–723. [PubMed: 17593152]
- Muthén, LK.; Muthén, BO. *Mplus User's Guide*. 5th ed.. Los Angeles: Muthén & Muthén; 1998–2009.

- Olino TM, Klein DN, Lewinsohn PM, Rohde P, Seeley JR. Longitudinal associations between depressive and anxiety disorders: a comparison of two trait models. *Psychological Medicine* 2008;38:353–363. [PubMed: 17803836]
- Orvaschel H, Puig-Antich J, Chambers W, Tabrizi MA, Johnson R. Retrospective assessment of prepubertal major depression with the Kiddie-SADS-E. *Journal of the American Academy of Child and Adolescent Psychiatry* 1982;21:392–397.
- Pardini D, White HR, Stouthamer-Loeber M. Early adolescent psychopathology as a predictor of alcohol use disorders by young adulthood. *Drug and Alcohol Dependence* 2007;88:S38–S49. [PubMed: 17257781]
- Procidano ME, Heller K. Measures of perceived social support from friends and from family: three validation studies. *American Journal of Community Psychology* 1983;11:1–24. [PubMed: 6837532]
- Rahdert, ER. The adolescent assessment/referral system manual (DHHS Publication no. ADM91–1735). Rockville: National Institute on Drug Abuse; 1991.
- Ramrakha S, Bell M, Paul C, Dickson N, Moffitt T, Caspi A. Childhood behavior problems linked to sexual risk taking in young adulthood: a birth cohort study. *Journal of the American Academy of Child & Adolescent Psychiatry* 2007;46:1272–1279. [PubMed: 17885568]
- Robins LN, Price RK. Adult disorders predicted by childhood conduct problems: results from the NIMH Epidemio-logic Catchment Area project. *Psychiatry: Journal for the Study of Interpersonal Processes* 1991;54:116–132.
- Rohde P, Lewinsohn PM, Tilson M, Seeley JR. Dimensionality of coping and its relation to depression. *Journal of Personality and Social Psychology* 1990;58:499–511. [PubMed: 2324939]
- Rohde P, Lewinsohn PM, Seeley JR. Comparability of telephone and face-to-face interviews in assessing axis I and II disorders. *American Journal of Psychiatry* 1997;154:1593–1598. [PubMed: 9356570]
- Rohde P, Lewinsohn PM, Seeley JR, Klein DN, Andrews JA, Small JW. Psychosocial functioning of adults who experienced substance use disorders as adolescents. *Psychology of Addictive Behaviors* 2007;21:155–164. [PubMed: 17563135]
- Roisman GI, Masten AS, Coatsworth D, Tellegen A. Salient and emerging developmental tasks in the transition to adulthood. *Child Development* 2004;75:123–133. [PubMed: 15015679]
- Rutter M. Family discord and conduct disorder: cause, consequence, or correlate?: Contexts of interparental conflict and child behavior. *Journal of Family Psychology* 1994;8:170–186.
- Rutter M, Kim-Cohen J, Maughan B. Continuities and discontinuities in psychopathology between childhood and adult life. *Journal of Child Psychology and Psychiatry* 2006;47:276–295. [PubMed: 16492260]
- Simonoff E, Elander J, Holmshaw J, Pickles A, Murray R, Rutter M. Predictors of antisocial personality: continuities from childhood to adult life. *The British Journal of Psychiatry* 2004;184:118–127. [PubMed: 14754823]
- Skilling TA, Quinsey VL, Craig WM. Evidence of a taxon underlying serious antisocial behavior in boys. *Criminal Justice and Behavior* 2001;28:450–470.
- Sobin C, Weissman MM, Goldstein RB, Adams P, Wickramaratne P, Warner V, et al. Diagnostic interviewing for family studies: comparing telephone and face-to-face methods for the diagnosis of lifetime psychiatric disorders. *Psychiatric Genetics* 1993;3:227–233.
- Steinberg L. A social neuroscience perspective on adolescent risk-taking. *Developmental Review* 2008;28:78–106. [PubMed: 18509515]
- Webster-Stratton C. Early-onset conduct problems: does gender make a difference? *Journal of Consulting and Clinical Psychology* 1996;64:540–551. [PubMed: 8698948]
- Whisman MA, Tolejko N, Chatav Y. Social consequences of personality disorders: probability and timing of marriage and probability of marital disruption. *Journal of Personality Disorders* 2007;21:690–695. [PubMed: 18072869]
- Zoccolillo M, Pickles A, Quinton D, Rutter M. The outcome of childhood conduct disorder: implications for defining adult personality disorder and conduct disorder. *Psychological Medicine* 1992;22:971–986. [PubMed: 1488492]

Table 1

Demographic and Covariate Descriptive Statistics

	Overall sample <i>n</i> =816	No CD <i>n</i> =775	CD <i>n</i> =41	χ^2
Male Sex	331 (40.6)	301 (39.6)	30 (73.2)	18.07***
Disorders Before Age 18				
AAB	3 (0.4)	3 (0.4)	0 (0.0)	0.16
SUD	157 (19.2)	131 (16.9)	26 (63.4)	54.21***
MDD	254 (31.1)	233 (30.1)	21 (51.2)	8.13**
Anxiety Disorder	124 (15.2)	121 (15.6)	3 (7.6)	2.08
ADHD	26 (3.2)	22 (2.8)	4 (9.8)	6.04*
ODD	28 (3.4)	24 (3.1)	4 (9.8)	5.21*

*
 $p < 0.05$;

**
 $p < 0.01$;

 $p < 0.001$;

AAB Adult Antisocial Behavior, SUD Substance Use Disorder, MDD Major Depressive Disorder, ADHD Attention Deficit/Hyperactivity Disorder, and ODD Oppositional Defiant Disorder

Table 2**Hierarchical Regression Models of Psychosocial Outcomes at Age 30 and CD**

	Block 1	Block 2	Block 3	Block 4
Academic/Occupational				
Yrs. of School	−1.19 (0.18)***	−1.21 (0.16)***	−1.19 (0.16)***	−0.78 (0.21)***
Recent Unempl.	0.05 (0.03)	0.06 (0.03)*	–	0.04 (0.03)
Annual HH. Income	−1.63 (0.32)***	−1.67 (0.37)***	–	−1.39 (0.44)**
Interpersonal				
Marital Status^a				
Never vs. Current	2.54 (1.48–4.38)**	2.46 (1.38–4.37)**	2.46 (1.38–4.38)**	2.37 (1.22–4.61)*
Div./Sep. vs. Current	2.38 (1.28–4.43)**	2.65 (1.39–5.06)**	2.71 (1.42–5.19)**	2.09 (0.94–4.63)
Ever Parent ^a	0.84 (0.34–2.07)	0.94 (0.35–2.52)	0.84 (0.31–2.25)	0.64 (0.22–1.84)
Family Support	−1.79 (0.43)***	−1.71 (0.47)***	−1.71 (0.46)***	−1.75 (0.46)***
Friend Support	−1.46 (0.34)***	−1.15 (0.29)***	−1.15 (0.37)**	−1.09 (0.46)*
Health				
Physical Health	0.19 (0.17)	0.41 (0.16)*	0.36 (0.16)*	0.32 (0.17)
Risky Sex. Beh.	0.78 (0.49)	0.79 (0.49)	–	0.68 (0.50)
Additional Outcomes				
Life Satisfaction	4.53 (1.79)*	4.54 (1.91)*	–	4.25 (1.97)*
Coping Skills	−3.48 (1.47)*	−3.47 (1.53)*	−2.85 (1.61)	−2.59 (1.18)*
Global Functioning	−8.96 (1.45)***	−9.34 (1.59)*	−8.69 (1.93)***	−7.37 (1.51)***
Incarceration ^a	11.59 (4.24–31.68)***	9.65 (3.91–23.82)***	–	7.16 (2.59–19.76)***

*
 $p < 0.05$;**
 $p < 0.01$;***
 $p < 0.001$.Statistical information presented is an unstandardized regression coefficient and respective standard error, unless noted by ^a.

^aIndicates that the statistical information presented is an odds-ratio and 95% confidence interval. Block 1: unadjusted associations; Block 2: includes gender; Block 3: includes all previous covariates and the same measure of functioning at T₂ (when available); Block 4: includes all previous covariates and presence of antisocial personality, substance use, major depressive, anxiety, oppositional-defiant, and attention-deficit/hyperactivity disorder before age 18

Table 3

Conduct Disorder Predicting Psychopathology After Age 18

	Block 1 HR (95% CI)	Block 2 HR (95% CI)	Block 3 HR (95% CI)	Block 4 HR (95% CI)
AAB	42.10 (15.52–114.09) ***	25.79 (0.912–72.75) ***	25.69 (9.09–72.60) ***	20.49 (5.99–70.11) ***
SUD	2.80 (2.01–3.92) ***	2.42 (1.74–3.36) ***	1.12 (0.71–1.76)	1.11 (0.70–1.76)
MDD	1.17 (0.75–1.83)	1.52 (1.02–2.25) *	1.23 (0.83–1.83)	1.17 (0.74–1.87)
Anxiety Disorder	0.96 (0.38–2.43)	1.38 (0.58–3.27)	1.36 (0.55–3.34)	0.77 (0.40–1.47)

*
 $p < 0.05$;

**
 $p < 0.01$;

 $p < 0.001$;

HR hazard ratio, *AAB* Adult Antisocial Behavior, *SUD* Substance Use Disorder, *AUD* Alcohol Use Disorder, *DUD* Drug Use Disorder and *MDD* Major Depressive Disorder. Block 1: unadjusted associations; Block 2: includes gender; Block 3: includes all previous covariates and presence of the same disorder before age 18; Block 4: includes all previous covariates and presence of the all disorders listed and ODD and ADHD before age 18

Table 4

Examination of the Indirect Effects for the Full Mediation Model

	Unadjusted for comorbid psychopathology			Adjusted for comorbid psychopathology		
	After age 18			After age 18		
	CD → DV	AAB → DV	Joint Path	CD → DV	AAB → DV	Joint path
Academic/Occupational						
Yrs. of School	-0.57 (0.28)**	-0.83 (0.43)*	-2.91 (1.31)**	-0.58 (0.28)**	-0.66 (0.47)	-2.32 (1.48)
HH. Income	-1.13 (0.36)***	-1.03 (0.60)*	-3.59 (2.02)*	-1.10 (0.33)***	-1.01 (0.60)*	-3.65 (2.17)*
Interpersonal						
Marital Status ^a						
Never vs. Current	1.82 (0.95–3.49)	4.71 (0.49–45.38)	5.44 (4.02)	1.81 (0.90–3.63)*	3.68 (0.45–30.40)	4.68 (3.92)
Div./Sep. vs. Current	1.14 (0.57–2.28)	13.33 (2.39–74.22)***	9.08 (3.33)***	1.19 (0.53–2.66)	12.25 (2.88–52.10)***	9.00 (3.14)***
Family Support	-1.14 (0.56)**	-2.34 (1.12)**	-8.23 (3.51)**	-1.16 (0.54)**	-2.27 (1.13)**	-8.76 (4.39)**
Additional Outcomes						
Life Satisfaction	2.42 (1.59)	7.02 (3.63)*	24.63 (11.35)**	2.26 (1.45)	6.87 (3.64)*	24.68 (12.19)**
Global Functioning	-5.01 (1.51)***	-8.34 (2.72)***	-31.19 (12.72)*	-4.76 (1.25)****	-7.76 (2.30)***	-29.09 (11.39)**
Incarceration ^a	1.84 (1.13–2.98)**	21.02 (9.19–48.10)****	10.69 (2.23)****	1.44 (0.80–2.57)	12.03 (5.44–26.62)****	8.94 (1.99)****

*
p<0.10;

**
p<0.05;

p<0.01;

p<0.001.

Statistical information presented is an unstandardized regression coefficient and respective standard error, unless noted by ^a.

^aIndicates that the statistical information presented is an odds-ratio and 95% confidence interval. CD Conduct Disorder, AAB Adult Antisocial Behavior. All models also include gender; the same outcome at T₂ (when available); SUD, MDD, anxiety disorder, ODD, and ADHD before age 18. Results under the 'Adjusted for Comorbid Psychopathology After Age 18' heading is also adjusted for SUD, MDD, anxiety disorder, after age 18