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Developmental Precursors of Moral Disengagement and the Role of Moral Disengagement in the Development of Antisocial Behavior

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Abstract

The purpose of the study was to advance our understanding of the developmental precursors of Moral Disengagement (MD) and the role of MD in the development of antisocial behavior from early risk among an ethnically diverse sample of 187 low-income boys followed prospectively from ages 1.5 to 17. Results indicated associations between early rejecting parenting, neighborhood impoverishment, and child empathy and later MD. The link between some of these early constructs and later antisocial behavior was mediated by MD. Finally, in an exploratory path model both MD and biases in social information processing were found to mediate separate paths from early risk factors to later antisocial behavior. Results were partially consistent with the notion that adolescent MD was predicted by a combination of early family, neighborhood, and child risk factors, and that MD may be a mechanism underlying some boys' risk of antisocial behavior.

Keywords

Moral disengagement; Antisocial behavior; Developmental psychopathology; Adolescence; Conduct disorder

Introduction

Psychological theories of moral agency have focused primarily on moral thought rather than moral conduct (Bandura et al. 1996). In response to the neglect of moral conduct, Bandura et al. (1996) developed a theory of Moral Disengagement (MD) to explain ways in which people justify their actions and commit immoral behaviors. MD has been strongly linked to antisocial outcomes in adult and child populations and may help us understand the etiology and maintenance of these behaviors. However, little is known about how MD may develop, with few studies having examined either correlates or antecedents of MD (Bandura et al. 2001; Paciello et al. 2008; Pelton et al. 2004), particularly using a prospective, longitudinal

design. Beyond understanding the link between MD and antisocial behavior, learning more about its genesis could advance our understanding of how adolescents become disengaged and disenfranchised from societal values. Therefore, our first goal was to explore theoretically important environmental and child factors that could promote the development of an uncaring and rejecting attitude toward societal values and thus serve as developmental precursors of MD.

MD may also represent a cognitive mediator between early risk and adolescents' antisocial behavior. Despite a plethora of research on social and behavioral processes linking the development of early conduct problems to later antisocial behavior in adolescence, beyond social information processing models (e.g., Crick and Dodge 1994; Huesmann 1998), few other cognitive mechanisms have been proposed to account for how the connection between early risk factors and later antisocial behavior might be mediated by these *intrapsychic* processes, such as moral attitudes. Therefore, our second goal was to explore the possible role of MD in mediating the association between early risk factors and antisocial behavior during adolescence.

Research on Antisocial Behavior and Moral Disengagement

Moral thought and development has been central to models of psychological development (e.g., Freud, Piaget, Kohlberg). For example, Kohlberg (1969) proposed a widely known stage-based theory of moral development. Although these models have been applied to normal and atypical development, with special attention to early developmental periods, few models of moral thought and cognition have focused primarily on adolescence and specifically as mechanisms in the development and maintenance of antisocial behavior.

Three important exceptions to the dearth of theoretical models and empirical research on moral thought and cognition as it relates to the development of problem behavior are programs of research carried out by Kochanska, Dodge, and Bandura. Kochanska's research has focused on the internalization of standards and the development of conscience in young children. This research has shown that early parenting and components of child temperament are critical in shaping children's internalization of rules and subsequent behavior (Kochanska 1997a, b, 2002). Specifically, Kochanska and colleagues have shown that parental empathic perspective taking and infrequent use of parental power assertion foster boys' internalization of rules and that boys' response to rules impacted their view of themselves as "moral individuals," which then was associated with the development of later behavior problems (Kochanska 1997b, 2002). Although this research has advanced our understanding of how parent and child factors affect internalization of rules, it has focused on low-risk samples of young children who were typically followed only through the preschool period, limiting conclusions about the model's validity for more serious forms of antisocial behavior during middle childhood and adolescence.

A second line of research focused on cognitive processes in relation to youth antisocial behavior is Dodge's seminal work on Social Information Processing (SIP: Crick and Dodge 1994). Dodge's social-cognitive model emphasizes a series of steps in information processing (e.g., interpretation of social cues, response evaluation) that are presumed to be proximal mechanisms that underlie children's social behavior generally and aggression specifically. Consistent, albeit modest, associations have been shown between each step in Dodge's model of SIP and children's antisocial tendencies (Crick and Dodge 1994; Orbio de Castro et al. 2002). Although a large literature on SIP has shown cognitive differences in maladjusted or aggressive youth, this literature has focused primarily on aggression rather than broader antisocial behavior. Furthermore, SIP steps have been shown to differ by group (aggressive versus non-aggressive) and have rarely been evaluated as a statistical mediator

between early risk factors for youth antisocial behavior and later antisocial behavior (for notable exceptions see Dodge et al. 1995; Fontaine et al. 2009; Schultz and Shaw 2003).

More recently, Bandura et al. (1996) proposed a theory of MD to account for various types of immoral behavior that combines moral and socio-cognitive approaches (see Arsenio and Lemerise 2004 for another effort to combine these domains). Within Bandura's theory, individuals are thought to refrain from immoral behavior in general and antisocial activities in particular because it will cause them to sanction themselves for acting against their beliefs (i.e., feeling bad about themselves for committing an immoral act). Accordingly, when one's moral beliefs and values justify antisocial behavior, there is less dissonance or inhibition from engaging in antisocial actions, as such acts are deemed acceptable. For example, a religion may hold murder as morally wrong, but may condone it in certain contexts (e.g., against non-believers in the crusades) and actually encourage and reward individuals for carrying out such acts. In more modern contexts, urban youth living in impoverished homes and neighborhoods that offer them little hope or opportunity for socially acceptable pathways to success may develop a moral code of behavior that is not bound by mainstream prohibitions against committing antisocial actions, particularly when such actions are associated with the means to obtain financial success (e.g., dealing illicit drugs) or ensuring safety (e.g., joining a gang). Under these circumstances, youth may develop ways of justifying their behavior as not being against their moral code because of their environmental circumstances.

An extensive body of literature validates associations between MD and older children's, adolescents', and adults' antisocial behavior. Using Bandura and colleagues' (1996) MD scale, several studies have shown strong links with antisocial outcomes. For example, in adults MD has been associated with gambling (Barnes et al. 2005), violence towards animals (Vollum et al. 2004), criminal computer behavior (Rogers 2001), and attitudes about execution (Osofsky et al. 2005). Several studies have also established a link between MD and antisocial behavior for older school-age children and adolescents in a large normative sample of Italian boys and girls age 10–15 (Bandura et al. 1996), in an American sample of African–American boys and girls age 9–14 (Pelton et al. 2004), and in an American sample of male juvenile offenders age 13–18 (Mulford 2004). In a particularly informative study, Paciello et al. (2008) used group-based trajectory modeling to explore stability and change in MD with several important findings: MD was relatively stable across adolescence but decreased from age 14 to 20, group membership (i.e., normative versus chronically disengaged) was predicted by earlier reports of antisocial behavior, and group membership predicted current and future antisocial behavior even when controlling for gender and previous antisocial behavior. Overall these studies suggest that in adults and children, MD is consistently associated with antisocial behavior concurrently and longitudinally.

Potential Precursors of Moral Disengagement

Based on links between MD and antisocial behavior and a long history of research studying similar issues in criminology (e.g., Anderson 1999; Hirschi 1969), exploring developmental models of MD could increase our understanding of how cognitive mechanisms may explain why some adolescents become detached and disengaged from mainstream societal values. Theoretically, potential precursors of MD should be experiences that directly model or at least expose children to attitudes and beliefs condoning the use of antisocial behavior, particularly in ways that violate mainstream social mores (e.g., distribution and selling of illegal drugs, using violence as a primary conflict resolution strategy). Repeated exposure to such behavior and attitudes should eventually lead children to become morally disengaged from mainstream values and more likely to engage in antisocial activities.

Based on work in earlier childhood by Kochanska suggesting the importance of both parenting and child factors, research in developmental psychopathology on the development of antisocial behavior, and following the tenets of social learning theory, a developmentally-guided model of MD is proposed that emphasizes exposure and modeling across several contexts leading to the adoption of attitudes and beliefs consistent with MD (see Fig. 1). The selected constructs emphasize exposure to harsh treatment from and between primary caregivers and neighborhood cultures that may value antisocial attitudes along with child attributes that may contribute to adopting these disengaged beliefs.

It is hypothesized that children will first learn this lesson in the home through early experience with parents, via harsh and rejecting caregiving, and by witnessing the way parents treat each other (i.e., inter-parental aggression). These early familial environments may be learning opportunities for the child and have already been linked to later outcomes. Parental behavior has been shown in many facets to be associated with antisocial behavior (Criss and Shaw 2003; Owens and Shaw 2003), and more specifically, rejecting parenting has been consistently related to later conduct problems (Shaw et al. 2003). Children's exposure to inter-parental violence has also been linked to multiple types of child adjustment problems, most notably externalizing symptoms (Cummings et al. 1989; Fantuzzo et al. 1991).

Second, as the child matures and spends more time outside of the home in the neighborhood (i.e., at school age) and encounters peers and adults who also demonstrate hostile attitudes and behaviors, the child's emerging view of the world as a dangerous and uncaring place could be corroborated and further reinforced. Impoverished neighborhood environments characterized by high levels of crime and exposure to deviant peers and adults have been repeatedly related to antisocial behavior. For example, neighborhood disadvantage has been linked in many studies to various negative outcomes, including child behavior problems (see Leventhal and Brooks-Gunn 2000).

Whereas exposure to these harsh and unforgiving contexts is viewed as an important precursor to MD, it is also hypothesized that by the late school-age period, children would come to internalize attributions and attitudes consistent with MD, taking the form of hostile attributional biases and high callousness or low empathy and prosociality toward others. In most cases, components of SIP such as hostile attribution biases have been linked to antisocial outcomes, especially aggression and particularly reactive aggression (Crick and Dodge 1994; Dodge et al. 1997; Orbio de Castro et al. 2002). Likewise, callous and unemotional attributes and lack of empathy have usually been linked to broad antisocial outcomes and more proactive forms of antisocial behavior (see Frick and White 2008). As these child attributes have been shown to be related to current and future antisocial activities, they may also represent precursors of MD. From a theoretical perspective, both MD and empathy clearly share a sense of disengagement and thus should be linked. However, they can also be treated as separate constructs. In the case of low empathy, this disengagement is directed towards other individuals with a lack of regard and care for others' sense of well being, whereas in the case of MD, disengagement is directed at society and its values as a whole rather than the concerns of specific individuals. Empathy is a more person-specific construct and though it may represent a component of MD, it is less focused on a broad sense of disenfranchisement. Moreover, as empathy for others is the foundation for more abstract moral concepts and broader attitudes towards society, it is likely to be a precursor of later moral attitudes, such as MD.

Moral Disengagement as a Mediator Between Early Risk Factors and Antisocial Behavior

Based on findings that have linked these early risk factors (e.g., parenting, neighborhood adversity) with later antisocial outcomes, and the potential that they may also be correlated

with MD in adolescence, MD may serve as a cognitive mediator between these early risk factors and later antisocial behavior. Broadly speaking there is some precedent for cognitive factors such as SIP, to at least partially mediate associations between early contextual risk and later antisocial behavior (Dodge et al. 1995; Schultz and Shaw 2003). Moreover, MD was shown to partially mediate the relationship between positive parenting and delinquent behavior 15 months later among boys from a sample of low income, African–American families (Pelton et al. 2004). However, this study only addressed how MD might mediate associations between parenting (but not other risk factors) and later antisocial behavior. Furthermore, parenting was not assessed until middle childhood, whereas MD and antisocial behavior were measured concurrently. We tested a series of mediation models to explore whether MD may mediate links between individual risk factors assessed in early childhood and later antisocial behavior (see Fig. 1).

The Current Study

The goal of the current study is to examine the precursors of MD from multiple domains in a sample of low-income, ethnically diverse boys followed prospectively from infancy to adolescence. We hypothesized that there would be direct relations between earlier risk factors (rejecting parenting, inter-parental aggression, neighborhood impoverishment, SIP, and child empathy) and later MD at age 15. We further hypothesized that the relationship between each earlier risk factor and MD would remain while controlling for other early risk factors and potential confounding variables such as early child externalizing, child IQ, and race and ethnicity. Based on previous findings showing that cognitive processes partially mediated associations between early risk factors and antisocial outcomes (Dodge et al. 1995), including MD (Pelton et al. 2004), we expected an indirect or mediated pathway between individual risk factors assessed in early and middle childhood and antisocial behaviors at age 16 and 17.

Method

Participants

Participants in this study are part of the Pitt Mother and Child Project (PMCP), an ongoing longitudinal study of child vulnerability and resiliency in low-income families (Shaw et al. 2003). In 1991 and 1992, 310 infant boys and their mothers were recruited from Allegheny County Women, Infant, and Children (WIC) Nutrition Supplement Clinics when the boys were between 6 and 17 months old. At the time of recruitment, 53% of the target children in the sample were European–American, 36% were African–American, 5% were biracial, and 6% were of other races (e.g., Hispanic–American or Asian–American). Two-thirds of mothers in the sample had 12 years of education or less. The mean per capita income was \$241 per month (\$2,892 per year), and the mean Hollingshead SES score was 24.5, indicative of a low socioeconomic standing (SES) sample. Thus, many boys in this study were considered at elevated risk for antisocial outcomes because of their SES.

Retention rates were generally high at each of the 13 time points from age 1.5 to 17 years old, with 90–94% of the initial 310 participants completing assessments at ages 5 and 6, some data available on 89% or 275 participants at ages 10, 11, or 12, and some data available on 87% or 272 participants at ages 15, 16, or 17. When compared with those who dropped out at earlier time points, participants who remained in the study at ages 15, 16, and/or 17 did not differ on the CBCL Externalizing scores at ages 2, 3.5, or 5, maternal age, income, or educational attainment (p s=0.20 to 0.93). Furthermore, the 187 families who had complete data and were included in primary analyses did not differ from those excluded on any of the above described measures, or on any study variables (all p values>0.3).

Procedures

Target children and their mothers participated in 2- to 3-hour visits at ages 1.5, 2, 3.5, 5, 5.5, 6, 8, 10, 11, 12, 15, and 17 years. Data were collected in the laboratory (ages 1.5, 2, 3.5, 6, 11) and/or at home (ages 2, 5, 5.5, 8, 10, 12, 15, 17). Adolescents completed phone assessments at age 16. During home and lab assessments, parents completed questionnaires regarding sociodemographic characteristics, family issues (e.g., parenting, family member's relationship quality), and child behavior. In addition, parents, other family members (siblings, alternative caregivers), and friends of the target child were videotaped interacting with each other and the target child in age-appropriate tasks, including mother-son clean-up tasks in early childhood, sibling play or discussion tasks during preschool and school-age periods, and peer discussion of problematic topics at age 15 and 17. Participants were reimbursed for their time.

Measures

Measures used in the current study are described below. They were selected based on their developmental appropriateness to constructs hypothesized to be associated with MD.

Rejecting parenting—Rejecting parenting was assessed when the boys were 1.5 and 2 years of age based on observations of parent-child interaction in multiple tasks (e.g., clean-up, nonstructured play) and settings (i.e., lab, home) as described by Shaw et al. (2003). A composite measure of rejecting parenting was created to be consistent with previous studies linking this construct to conduct problems (Shaw et al. 2003, 2004). Structured tasks included a cleanup task administered when the boys were 1.5 and 2 that was subsequently coded from videotapes using the Early Parenting Coding System (EPCS; Winslow and Shaw 1995) and includes two molecular ratings—verbal/physical approval and critical statements, and three global ratings—hostility, warmth, and punitiveness. Trained coders attained adequate reliability on each of these items (i.e., kappa coefficients ranged from 0.79 to 0.83), and all five molecular and global ratings were composited to generate a factor of rejecting parenting ($\alpha=0.61$ at 18 months and $\alpha=0.71$ at 24 months, $r=0.37$, $p<0.001$). Data from nonstructured tasks were gathered at the age-2 home assessment using the Home Observation for Measurement of the Environment (HOME) Inventory, which is based on examiner observations and interviews conducted with the primary caregiver (Caldwell and Bradley 1984). The HOME includes 36 items that assess the quality and quantity of support and stimulation in the home environment including an 8-item Acceptance factor which describes parent's responsiveness to the child's behavior or distress. The HOME has shown good reliability and validity properties (Caldwell and Bradley 1984), and in the current sample the internal consistency of the Acceptance factor was satisfactory ($\alpha=0.70$). HOME acceptance standard scores were reverse scored and added to standard scores derived from the EPCS rejecting composite at ages 1.5 and 2 ($r=0.33$, $p<0.01$) to create a single measure of rejecting parenting with complimentary components assessing parenting during both structured and unstructured tasks and using both molar and molecular coding (Shaw et al. 2003).

Inter-parental aggression—The Conflict Tactics Scales (CTS-Form N; Straus 1979) was used to assess verbal reasoning, verbal aggression, and violence between adult partners. Mothers completed this questionnaire when the boys were 3.5 and 6 years old. The CTS consists of 26 items which measure the frequency of conflict resolution tactics used by partners over the past year. For purposes of the present study, two factors were composited at each time point: Verbal and Physical Aggression, as both were hypothesized to be relevant to the development of MD. The CTS is widely used, has been demonstrated to have adequate reliability and validity, and has been shown to be associated with both child behavior problems (Fantuzzo et al. 1991) and child responses to conflict (Cummings et al.

1989). In large nationally representative samples, internal consistencies for the Verbal and Physical Aggression subscales have been high ($\alpha=0.77-0.88$; Straus 1979, 1991), as they were in the present study ($\alpha=0.83-0.93$ for Verbal and Physical aggression at ages 3.5 and 6).

Neighborhood impoverishment—Neighborhood impoverishment was ascertained by geocoding addresses using census data when children were 6, 8, and 10 years old. Data were coded at the block group level, the smallest unit for which all census data are available (Vanderbilt-Adriance and Shaw 2008). As all data were collected between 1995 and 2003, 2000 census data (rather than 1990 census data) were used. Based on methods devised by Wikström and Loeber (2000) and adapted by others including Vanderbilt-Adriance and Shaw (2008), a factor of neighborhood poverty was generated using the following census block group level variables: 1) median family income, 2) percent families below poverty level, 3) percent on public assistance, 4) percent unemployed, 5) percent single-mother households, 6) percent African-American, 7) percent Bachelor's degree and higher. Wikström and Loeber (2000) selected these variables based on previous research investigating neighborhood census structural characteristics associated with antisocial behavior (see Vanderbilt-Adriance and Shaw 2008). Using all census block groups in Allegheny County, Pennsylvania these individual variables were standardized, summed, and then averaged across ages (after reverse scoring median family income and percent Bachelor's degree) to create an overall neighborhood impoverishment factor score for each block group. Past research demonstrates that these variables correlate highly and are supported by factor analyses (Wikström and Loeber 2000). The score for the block group in which the child lived at each age was then averaged across all time points to yield a summary of the child's exposure to community risk from ages 6 to 10. Children's neighborhood impoverishment score was highly stable across time ($r=0.72-0.83$).

Social information processing—When boys were ages 10 and 11, hostile attribution bias and maladaptive response generation were assessed using a vignette procedure developed by Dodge and Somberg (1987). Interviewers orally presented the target child with eight social vignettes and accompanying pictures. In each vignette, the behavior of another boy leads to a negative outcome for the target child (e.g., being bumped), with the intentions of the other boy left ambiguous. Following each vignette, the target child was asked to assess the child's *attribution* of intent of the 'other boy' (did the other boy hurt the target child on purpose?) and asked the child how they would *respond* in the situation (e.g., tell a teacher, yell at the boy). The *attributions* were coded "hostile" if the target child responded that the 'other boy' performed the action on purpose. The *responses* to the situations were coded as retaliatory and therefore hostile (e.g., acts or threats of physical or verbal aggression), verbally engaging (non-hostile), or ambiguous in their adaptive value (e.g., doing nothing, making commands). In past research with this sample, inter-rater agreement was high for both variables in this construct ($\kappa=0.92$ for both). The number of hostile attribution responses at each age was summed and then averaged across the two ages ($\alpha=0.65$ and 0.63 at age 10 and 11 respectively). The same procedure was repeated with the number of hostile responses at each age ($\alpha=0.70$ and 0.65 age 10 and 11, respectively). These two mean scores ($r=0.72$) were summed to generate a composite of hostile SIP.

Empathy—To assess empathy/prosociality, including aspects of callousness and unemotional traits, the Child and Adolescent Disposition Scale (CADS, Lahey et al. 2008) was administered to mothers and youth at the age-12 assessment. Participants rated each of 48 items about the frequency of an emotion or behavior of the youth and how often it occurred during the last 12 months using a four-point Likert scale, ranging from 1 (*not at all*) to 4 (*very much/very often*). In a previous study (Lahey et al. 2008), three factors were

identified using both exploratory and confirmatory factor analysis in multiple samples: empathy/prosociality, negative emotionality, and daring. Moreover, these factors were shown in multiple samples to be internally consistent and externally valid, to have high test-retest reliability and to be related to antisocial behavior both additively and interactively. Within the present sample, the same three factors were found. The empathy/prosociality scale was used to assess empathy (or lack thereof). The scale contains 12 items (e.g., 'Would he feel guilty if he broke the law?', 'Does he feel badly for other children his age when they get hurt?'), and has shown good internal consistency in this sample ($\alpha=0.86$ for parent report and $\alpha=0.84$ for youth report). A sum of the empathy scale scores from both parent and youth report ($r=0.31$, $p<0.001$) was averaged to create a composite of empathy and decrease reporter bias.

Moral disengagement—To assess moral disengagement, youth completed the Mechanisms of Moral Disengagement scale (MDS; Bandura et al. 1996) at the age-15 home assessment. For each of 32 statements, respondents were asked to state whether they disagree, neither agree nor disagree, or agree with its meaning. Sample items include 'it is alright to beat someone who bad mouths your family,' 'if people are careless where they leave their things it is their own fault if things get stolen,' and 'it is alright to lie to keep your friends out of trouble.' Past research suggests a one factor solution ($\alpha=0.82$) of MD and MD scores were derived by taking a mean of scores from all 32 items (Bandura et al. 1996; Pelton et al. 2004). Internal consistency was found to be satisfactory in the current sample ($\alpha=0.85$).

Antisocial behavior—Youth antisocial behavior was assessed based on boys' reports at age 16 and 17 using the Self-Report of Delinquency Questionnaire (SRD; Elliot et al. 1985). The SRD contains 62 items which assess the frequency with which an individual has engaged in aggressive and delinquent behavior, alcohol and drug use, and related offenses during the prior year. Using a 3-point rating scale (1 = never, 2 = once/twice, 3 = more often), children rate the extent to which they engaged in different types of antisocial activities (e.g., stealing, throwing rocks at people, drug use). Internal consistency was high at age 16 and 17 ($\alpha=0.92$ and 0.93). SRD mean scores were summed across the two ages ($r=0.56$, $p<0.001$). These scores were then transformed using a natural log transformation ($\ln(x + 1)$) because the distribution of scores was skewed (skewness=1.67).

The following measures were examined as covariates because of previous research linking them to youth antisocial behavior.

Child IQ—Child intellectual skills were evaluated at the age-11 laboratory assessment using two subtests from the Wechsler Intelligence Scale for Children-III (WISC-III, Wechsler 1991), a commonly used measure of children's cognitive abilities. The Block Design and Vocabulary subtests were selected because of their high average correlation between the subtests and overall Full Scale IQs and the high test-retest reliability and internal consistency coefficients of these subtests (Sattler 1992). Full Scale IQ scores were prorated using procedures described by Tellegen and Briggs (1967, cited in Sattler 1992).

Child race/ethnicity—Each child's race and ethnicity was reported by their mothers at age 1.5 and then collapsed into two groups—Caucasian and non-Caucasian (52.4% and 47.6% respectively).

Early childhood externalizing—A mean of primary caregiver reports on the Child Behavior Checklist from ages 2 and 3.5 (CBCL; Achenbach and Rescorla 2000) was used to assess early conduct problems. The CBCL Externalizing factor includes items assessing

aggression and rule-breaking behavior and showed excellent internal consistency in the present sample (e.g., $\alpha=0.86$ at age 2).

Results

Analysis Plan

Preliminary analyses included an examination of study variable descriptive statistics and correlations (see Table 1). As a priori models were generated for the directionality of central risk factors (e.g., rejecting parenting, child empathy), tests for significance of planned correlations and regression coefficients were one-tailed as recommended in various sources (Cohen et al. 2003). The first goal of the study was addressed through inspection of univariate correlations and two regression models predicting levels of MD. In the first regression model, each risk factor was entered chronologically in a hierarchical multiple regression analysis. Externalizing problems in early childhood were entered on the first step as a control variable. For this model, 187 boys who had complete data for all precursors, MD, and antisocial behavior were used. A second regression model examining possible confounds or 'third variable' effects entered all study variables and also controlled for intelligence and race/ethnicity.

The hypothesis that MD would mediate the relationship between individual risk factors assessed in early and middle childhood and adolescent antisocial behaviors was tested using a macro for SPSS (Preacher and Hayes 2004) that contains two complementary methods (MacKinnon et al. 2002; Dearing and Hamilton 2006). First, the Sobel method (as described by MacKinnon et al. 2002) was used because it requires less power to detect effects than other methods (Baron and Kenny 1986) and can quantify the magnitude of mediation (MacKinnon et al. 2002). Second, an approach to estimate the indirect effects using bootstrapping methods was used to estimate confidence intervals based on unbiased standard errors. We used both methods because although the Sobel test can quantify the size of mediation, bootstrapping can be more powerful when distributional assumptions of normality are violated.

Patterns of missing data were examined before addressing substantive research questions. When the subsample of 187 was compared to the original study sample, the boys and their families did not differ on any study variable, SES, or maternal education. As an examination of missing data patterns suggested that data were missing completely at random, imputation using maximum likelihood estimation (specifically the EM algorithm in SPSS 15.0) was used to conduct the same analyses. As the results did not differ substantially (the main difference was an attenuation of the relationship between neighborhood and MD in imputed analyses), results using the more straightforward listwise deletion method are presented.

Direct Relationships of Precursors to MD

Table 1 presents descriptive statistics and intercorrelations. As hypothesized, there were significant positive correlations between rejecting parenting and MD, and neighborhood impoverishment and MD, as well as a significant negative correlation between empathy and MD. However, unexpectedly neither inter-parental aggression nor hostile SIP was related to later MD. Although SIP was not associated with MD, consistent with past studies (Orbio de Castro et al. 2002) it was associated with later antisocial behavior. Moreover, in an exploration of potential confounding variables, race and IQ were found to be correlated to MD (r_s were 0.15 and -0.15 , $p<0.05$ respectively). IQ was also associated with parenting ($r=-0.22$, $p<0.01$), neighborhood impoverishment ($r=-0.39$, $p<0.001$), and SIP ($r=-0.28$, $p<0.001$; all exploratory analyses two-tailed). Early externalizing was not associated with MD ($r=0.05$, $p>0.20$) but was weakly related to antisocial behavior ($r=0.17$, $p=0.12$) and

therefore was used as a control variable in all future analyses to account for the continuity of antisocial behavior across childhood and adolescence.¹

Unique Relationships of Precursors to MD

As displayed in Table 2, although rejecting parenting was significantly associated with later MD initially, the magnitude of this association was progressively attenuated as other variables (especially neighborhood impoverishment and empathy) were entered in the regression model (i.e., in final model *ns*). Neighborhood impoverishment was significantly associated with later MD, albeit quite modestly, with all other variables in the regression equation, as was empathy. Furthermore, in another analysis when IQ and race were added to the model, the addition of these variables attenuated the relationship of other variables to MD, and only empathy remained as a unique and significant predictor of MD. IQ and race were not related to MD in this full model ($p > 0.25$).

As empathy appeared to be the strongest predictor of MD, exploratory follow-up mediation analyses were conducted to examine whether associations between rejecting parenting and neighborhood impoverishment and later MD were accounted for by empathy. Empathy was found to significantly mediate the relationship between parenting and MD ($z = 2.34$, $p = 0.019$, 95% C.I. = 0.003, 0.017) and the relationship between neighborhood impoverishment and MD exhibited a trend towards being mediated by empathy ($z = 1.84$, $p = 0.06$, 95% C.I. = 0.003, 0.028).

MD as a Mediator of Early Risk and Adolescent Antisocial Behavior

Only a subset of the risk factors could be tested for mediation and/or indirect effects by MD, as only neighborhood and empathy were related to later antisocial behavior and MD. The link between antisocial behavior and neighborhood impoverishment was mediated by MD ($z = 2.11$, $p < 0.05$, 95% C.I. = 0.002, 0.017), as was the link between empathy and antisocial behavior ($z = -2.92$, $p = 0.004$, 95% C.I. = -0.053, -0.013). In addition, rejecting parenting showed a marginally significant indirect effect on antisocial behavior through MD ($z = 1.68$, $p < 0.1$, 90% C.I. = 0.002, 0.008) even though rejecting parenting was not directly related to antisocial behavior.

Dual Process Model of Cognitive Mediation

Although our initial aims were met, one additional exploratory analysis was conducted based on three results. First, in the bivariate correlations SIP and MD were found to be uncorrelated with each other but both were correlated with later antisocial behavior. Second, in regression analyses empathy mediated the path between rejecting parenting and neighborhood impoverishment and MD and was therefore posited to be an intermediate mediator between these early risks and MD. Third, rejecting parenting, neighborhood impoverishment, and IQ were all correlated to MD and hypothesized to be exogenous variables predicting later MD. Based on this pattern of findings, a path model was tested while controlling for early externalizing (see Fig. 2). The model was fitted in the sample of 187 boys used throughout prior analyses using Mplus 4.0 (Muthén and Muthén 2004). Additionally, as Mplus can efficiently handle missing data, models were also tested for all families with three or more time points, with a final effective sample size of 294. Fit of a path model was considered acceptable if it had a non-significant chi-square fit statistic (χ^2) and a Root Mean Square Error of Approximation smaller than 0.05 (Kline 1998). Nested model comparisons were performed by examining the change in χ^2 fit values.

¹It should be noted that the pattern of results was similar when not controlling for early externalizing behavior, although in some cases the relationships between variables was stronger when controlling for this early behavior.

To test our initial path model, all relevant paths between exogenous and endogenous variables and covariances were specified and the overall model had acceptable fit ($\chi^2=3.22$, $df=4$, $p>0.8$; CFI=1.00; RMSEA=0.000 in the smaller sample, $\chi^2=5.23$, $df=4$, $p>0.25$; CFI=0.98; RMSEA=0.033 in the larger sample). The model was then trimmed iteratively removing non-significant paths from the model until all non-significant paths were removed but all covariances were included. This model fit the data better and was more parsimonious ($\chi^2=8.97$, $df=15$, $p>0.8$; and $\chi^2=13.35$, $df=15$, $p>0.5$; respectively; CFI=1.00, RMSEA=0.000 both samples) (see Fig. 2 for results from the smaller sample), explained 17% of the variance in antisocial behavior, and emphasized two distinct pathways—one from rejecting parenting through empathy and MD to antisocial behavior and one from IQ through SIP to antisocial behavior. In the final model all indirect paths were tested and several were significant or showed trends towards significance: rejecting parenting to antisocial behavior through empathy and MD ($p<0.05$), empathy to antisocial behavior through MD ($p<0.05$), neighborhood to antisocial behavior through MD ($p<0.05$), and IQ to antisocial behavior through SIP ($p<0.01$). Note that results were almost identical regardless of sample size except that in the larger sample, neighborhood impoverishment was linked directly to empathy rather than MD.

Discussion

The goals of the present study were to examine developmental precursors of MD and test whether MD mediated associations between early risk factors and adolescent antisocial behavior within a sample of low-income, ethnically diverse boys followed from infancy through adolescence. Consistent with the proposed model, in univariate models rejecting parenting, neighborhood impoverishment, and empathy were all related to later MD; however, neither parental conflict nor SIP were directly related to MD. Further, when examined in a multivariate framework, only neighborhood impoverishment and empathy explained significant variance in later MD. MD was also found to mediate the association between neighborhood impoverishment and antisocial behavior and between empathy and antisocial behavior. Finally, when examined in an exploratory path analysis, a dual process model emerged that emphasized two separate cognitive pathways from early risk to later antisocial behavior.

Effects of Early Risk on Later MD

Even within a univariate framework, only some of the hypothesized risk factors were related to MD. These included observed rejecting parenting assessed at ages 1.5 and 2, neighborhood impoverishment derived from census data between child ages 6 and 10, and parent and child's report of empathy assessed at age 12. All of these measures were modestly related to adolescent reports of MD at age 15, spanning 3 to 13.5 years and using multiple informants and methods. Notably, both inter-parental aggression and SIP were not related to MD. Inter-parental aggression itself may not be related to MD because conflict between parents may not be exhibited in front of the child, or may not be a salient enough cue by itself to teach children that the world is a harsh and uncaring place. SIP, despite some theoretical similarities with MD (i.e., hostility towards others), may not be related to MD because SIP is focused more on cognitive schemas about another individual's motivation for behavior in specific situations rather than attitudes about society in general. In addition, the steps of SIP measured in this study (hostile attribution bias and response generation) are theorized and shown to be related more directly to reactive than proactive antisocial behavior (Crick and Dodge 1994, 1996; Dodge and Coie 1987), whereas MD may be more related to proactive antisocial behavior. Had different SIP steps, such as the response evaluation component, been evaluated in the current study, we would have expected associations with proactive antisocial behavior and perhaps with MD. However, it should be

noted that these relations would be more likely to occur if the measure of antisocial behavior used had been designed to discriminate proactive and reactive aggression from one another rather than a general measure of delinquency. Last, it is also possible that the association between SIP and MD was attenuated in the current study because of differences in how each construct was assessed. SIP was measured using vignettes about specific situations while MD was evaluated using a questionnaire asking about global attitudes towards others.

Empathy and MD

Empathy emerged as the most robust predictor of MD, maintaining its association in multivariate analyses by mediating associations between other risk factors and MD. These findings could be interpreted as illuminating a possible pathway towards MD, in which the quality of early parenting contributes towards the development of empathy, which in turn affects the development of later MD. Accordingly, youth with adverse experiences with parents may develop low levels of empathy towards others during the transition to adolescence and, when combined with neighborhood risk, be primed to develop a cognitively and affectively disengaged stance towards society and others. However, as empathy was only measured at age 12, it is not possible to rule out 'child effects' as an alternative explanation, such that children with lower levels of empathy during early childhood might have elicited harsher parenting from caregivers. For example, measuring empathy during early childhood may have resulted in links with other precursors measured in early adolescence, including parenting and social information processing. Moreover, the design of this study cannot address whether empathy develops from contextual versus child factors (i.e., Knafo et al. 2008; Michalik et al. 2007). With these limitations in mind, exploring empathy during adolescence may still help expand our understanding of this construct, particularly in relation to adolescent callous-unemotional traits (Frick and White 2008).

MD as a Mediator of Early Risk and Adolescent Antisocial Behavior

MD mediated the path between neighborhood and antisocial behavior, and the path between empathy and antisocial behavior. That MD was only moderately correlated with antisocial behavior (i.e., $r=0.35$), yet was involved in indirect pathways between neighborhood, rejecting parenting, and empathy, suggests that MD should be considered as a potential cognitive mechanism linking early risk and later deviant behaviors.

Dual Process Model of Cognitive Mediation

Though exploratory, the path model tested suggests two distinct paths from early risk to later antisocial behavior. In one path, high levels of rejecting parenting may lead to lower levels of empathy and contribute with neighborhood impoverishment to high MD linking to later antisocial behavior. In the other path, children with lower IQs may be more likely to have hostile SIP, which may then predispose them to higher rates of antisocial behavior. The results from the path model suggest that MD and SIP may be separate and distinct cognitive mediators that have different precursors but similar outcomes (an example of equifinality). The novel nature of these analyses suggest that future work testing both cognitive mediators and multiple paths involving separate cognitive mediators is needed in the field to expand our understanding of the development of both antisocial behavior and their related cognitive markers.

Limitations

The current study was designed to maximize several important considerations in developmental research, including the use of multiple assessment methods and informants, a prospective, longitudinal design of over 15 years, and the use of a sample of boys at risk for

showing meaningful levels of antisocial behavior (i.e., 94 already had juvenile court records by age 17). However, the current study does have several limitations. First, although using a low-SES sample of boys may be advantageous in many ways, the findings may not be generalizable to girls and children from non-urban, higher SES samples. Therefore, future studies using more normative populations are needed to assess whether risk factors from this study or others (e.g., deviant peer associations, parental monitoring, youth involvement with religion, youth's moral identity) are linked to MD in lower risk environments or in samples of girls.

Second, although an advantage of the model tested in this study was the measurement of risk factors at developmentally salient periods (e.g., rejecting parenting during the terrible twos, SIP at school-age), there was great variation in the proximity of the measurement of risk factors relative to the assessment of MD. Thus, the stronger associations between empathy and MD could be partially accounted for by the short span of time relative to the timing of the measurement of other risk factors.² Perhaps if rejecting parenting or a comparably developmentally salient parenting factor (e.g., monitoring) had been assessed at age 12, empathy and parenting would have shown more comparable levels of association with MD.

Third, another limitation of this study is the presence of missing data. As 12 time-points were used over 15 years, missing data were inevitable. However, as previous analyses showed, those who were included in the analyses did not differ on several demographic measures or on any other study measure and using more sophisticated statistical methods did not change the overall pattern of results, suggesting that the results were generalizable to the larger sample.

Fourth, a limitation of the exploratory path model was the measurement of both SIP and antisocial behavior in relation to proactive and reactive forms of antisocial behavior. Although the dual process model seems to represent an example of equifinality, our measurement of AB covers, but does not distinguish between, two highly related but distinct constructs: reactive and proactive behaviors. Some authors have argued that similar constructs such as aggression can be divided into proactive and reactive components (e.g., Vitaro et al. 2006) and these different forms of aggression may have different precursors despite their high covariation. In the present dual process model, SIP may lead to more reactive versus proactive antisocial behaviors than MD. Although this possibility is intriguing, the current study employed a measure of antisocial behavior that does not distinguish between proactive and reactive behavior. Moreover, later steps in SIP that are related to more proactive behaviors were not measured. Future studies that have more fine-grained measures of these specific constructs within SIP and antisocial behavior could address this possible dual-process model in more detail.

Clinical Implications and Future Directions

The study of MD, although in its infancy, offers much potential for understanding the intrapsychic mechanisms underlying the development of antisocial behavior, and potentially its treatment. In the long run, research on MD and other cognitive factors involved in antisocial behavior may help not only with treatment planning but also could be helpful in identifying subgroups of children with antisocial behavior, as the classification of "conduct disorder" currently encompasses a very heterogeneous group of youth. By identifying subgroups, such as those who are more disengaged, interventions could be developed that

²Given the longitudinal nature of this project, this question was addressed by computing a similar regression to predict MD using the same or similar predictor variables all assessed at age 12: empathy, inter-parental aggression, parental knowledge (see Trentacosta et al. 2009), and neighborhood impoverishment. In this regression, empathy continued to be the strongest predictor of MD, albeit the relationship between MD and neighborhood impoverishment was stronger using age 12 versus age 6–10 data.

are tailored to behavioral symptoms and cognitive attitudes. For example, findings from the current study suggest that even within the domain of cognitive attitudes, early stage SIP and MD represent fairly independent pathways leading to adolescent antisocial behavior. More proximally, understanding the development of MD may help researchers understand how attitudes and behaviors in adolescents may be linked, particularly in high risk environments, and how earlier experiences may contribute to the development of these attitudes.

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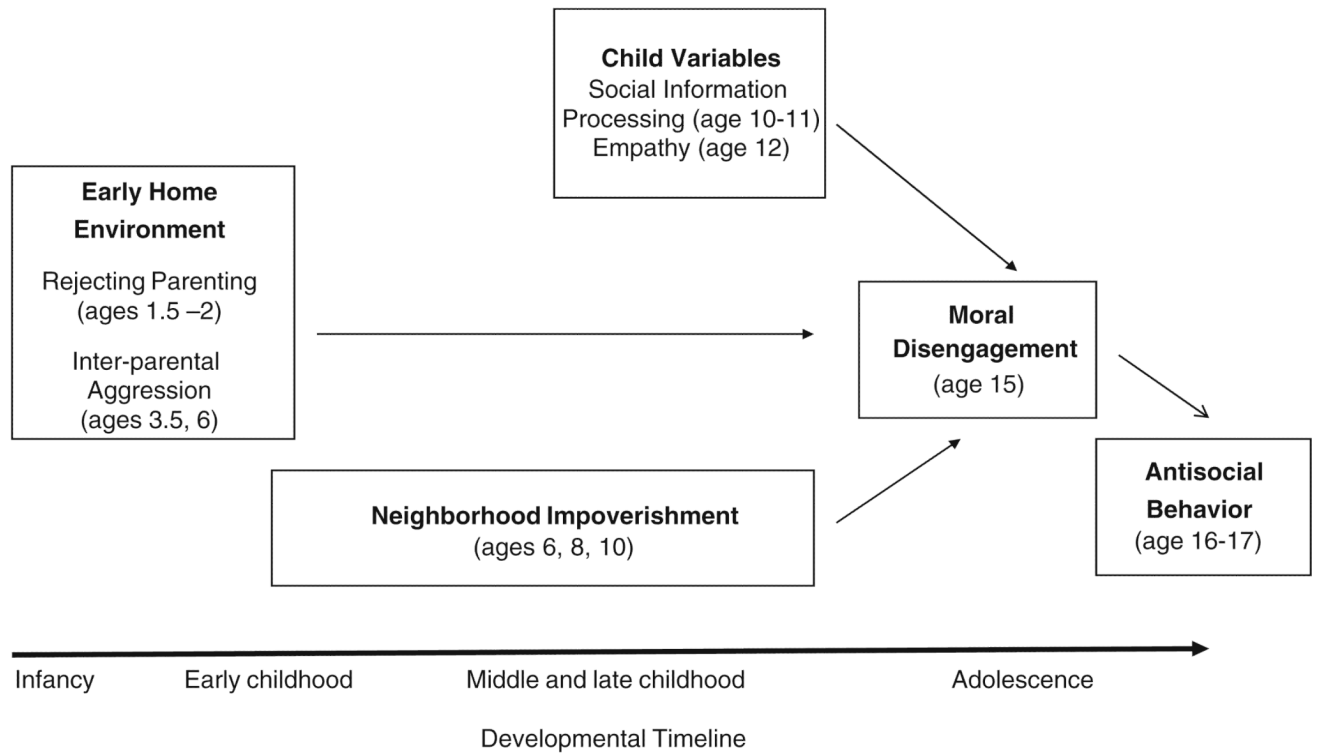


Fig. 1. An additive model for the development of moral disengagement

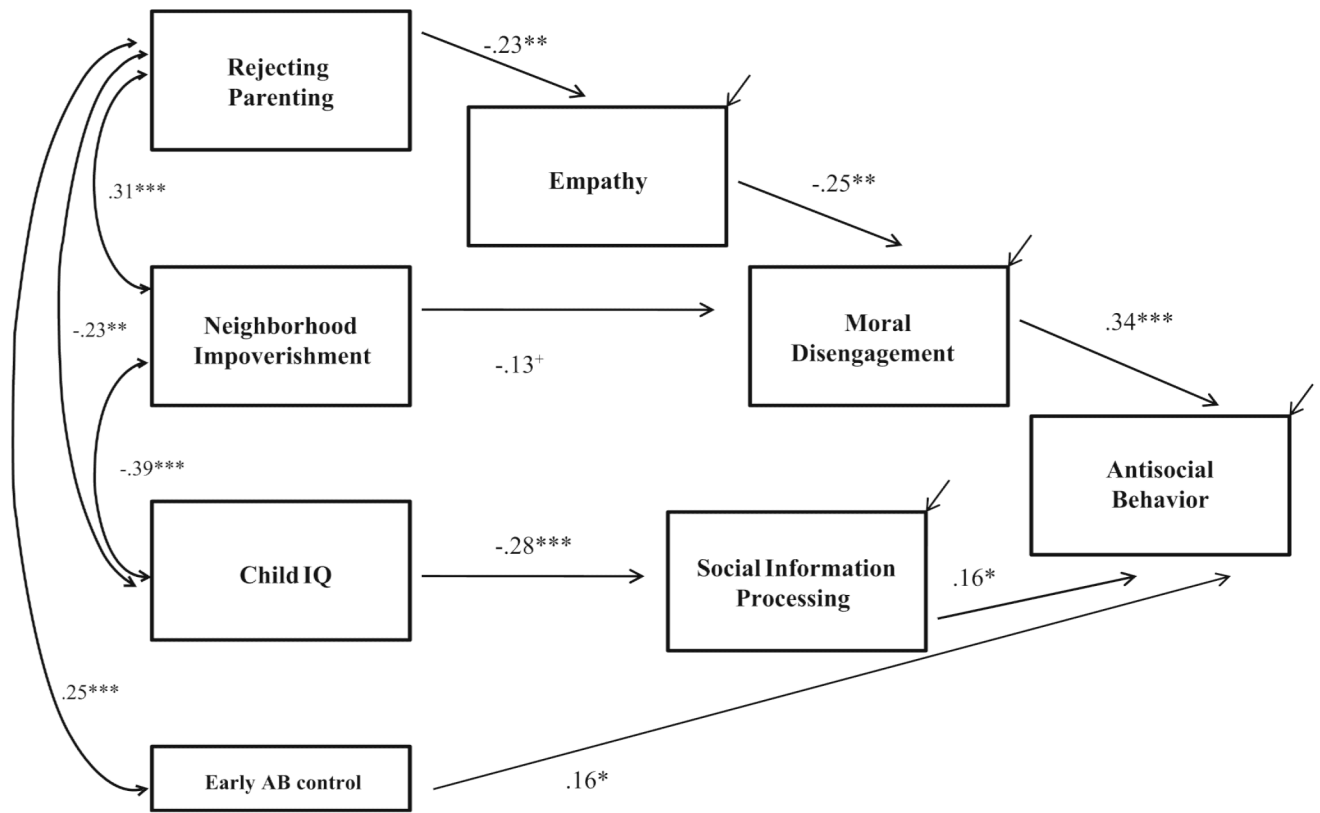


Fig. 2.

A dual process path model linking early risk to antisocial behavior through cognitive mechanisms. Note: All covariances were modeled. Only those that were significant are displayed. $n=187$, standardized coefficients presented. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, # $p < 0.10$

Table 1
Descriptive Statistics and Intercorrelations for Independent and Dependent Variables

Measure	<i>M</i> (<i>SD</i>)	Range	1	2	3	4	5	6
1 Rejecting parenting	0.022 (1.63)	-3.6 to 7.5						
2 Conflict tactics scale	13.7 (10.9)	0 to 75	0.09					
3 Neighborhood impoverishment	0.197 (0.891)	-1.5 to 3.3	0.31**	0.03				
4 Social information processing	0.803 (0.332)	0 to 1.9	0.11#	-0.10#	0.14*			
5 Empathy	3.04 (0.381)	1.9 to 3.8	-0.23**	-0.03	-0.16*	-0.09#		
6 Moral disengagement	1.44 (0.250)	1.0 to 2.2	0.13*	-0.03	0.17*	0.03	-0.27***	
7 Delinquency	0.167 ^a (0.154)	0 to 0.9	0.08	0.18**	0.12#	0.16*	-0.18**	0.35***

n=187. All tests one-tailed

^aThe mean of the SRD presented is the mean before the transformation, but all other statistics are based on a transformed variable

*** *p*<0.001

** *p*<0.01,

* *p*<0.05,

p<0.10

Table 2

Hierarchical Regression Analysis of Independent Variables Predicting MD

Model	Variable	B	SE	β	R ² (ΔR^2)
Step 1	Early externalizing (included in all steps)	0.000	0.002	0.013	0.017
	Rejecting parenting	0.019	0.012	0.127*	
Step 2	Rejecting parenting	0.019	0.012	0.126*	0.017 (0.000)
	Inter-parental aggression	0.000	0.002	0.015	
Step 3	Rejecting parenting	0.012	0.012	0.078	0.036 (0.019***)
	Inter-parental aggression	0.000	0.002	0.012	
	Neighborhood impoverishment	0.041	0.022	0.144*	
Step 4	Rejecting parenting	0.012	0.012	0.077	0.036 (0.000)
	Inter-parental aggression	0.000	0.002	0.013	
	Neighborhood impoverishment	0.040	0.022	0.143*	
Step 5	Social information processing	0.006	0.056	0.008	0.090 (0.054**)
	Rejecting parenting	0.006	0.012	0.036	
	Inter-parental aggression	0.001	0.002	0.029	
	Neighborhood impoverishment	0.034	0.021	0.120***	
	Social information processing	-0.006	0.055	-0.008	
Empathy	-0.160	0.049	-0.243**		

n=187; all coefficient significance tests are one-tailed

 $p < 0.10$,

**
 $p < 0.01$,

*
 $p < 0.05$