Developmental Pathways to Conduct Disorder

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Conduct disorder (CD) is defined as a repetitive and persistent pattern of behavior which violates the rights of others (e.g., aggression, vandalism, theft) or which violates major age-appropriate societal norms or rules (e.g., deceitfulness, truancy, running away from home) [1]. Depending on the exact definition of CD, between 3% and 5% of preadolescent boys and between 6% and 8% of adolescent boys meet criteria for the disorder, with boys outnumbering girls by about 4:1 before adolescence and by about 2:1 in adolescence [2]. Most youth who commit serious illegal and delinquent acts, especially violent acts, show a history of antisocial and aggressive behavior that precedes their serious delinquency, and they either have been diagnosed with CD or would have been diagnosed with this disorder had they been referred for mental health treatment [3]. Serious and violent adult offenders often show histories of antisocial and aggressive behavior dating back to early childhood [4]. As a result, understanding the development of CD is critical for understanding the causes of criminal and violent behavior.

Criminal behavior is only one, albeit a serious one, of the many consequences associated with CD. Children who have CD can cause significant disruptions to families who are trying to manage the behavior of an antisocial and aggressive child [5]. Children who have CD can victimize peers with their aggressive acts, and such victimization can have serious physical and emotional consequences [6]. Further, the behavioral problems associated with CD can disrupt the school environment in a way that detracts from the educational experience of all students. Significant costs can be involved in trying to provide students who have CD with appropriate educational resources while ensuring the safety of students and teachers [7]. Further, children who have CD often experience a

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number of psychosocial impairments related to their behavioral disturbance, including poor school performance, peer rejection, high rates of anxiety, high rates of depression and suicide, and early and serious substance use [3].

Multiple causal factors: a developmental pathways approach

Given these many serious and costly effects of CD, it is not surprising that it is one of the leading reasons that children and adolescents are referred to mental health clinics for services, and it is one of the most extensively studied of all childhood disorders [8]. A number of comprehensive reviews of this extensive body of research have documented a large number of risk factors for CD [3,8–11]. These risk factors are remarkable for the sheer number of variables that have been associated with CD and by their great diversity. These risk factors include neurochemical (eg, low serotonin) and autonomic (eg, low resting heart rate) irregularities, neurocognitive deficits (eg, deficits in executive functioning), deficits in the processing of social information (eg, a hostile attributional bias), temperamental vulnerabilities (eg, poor emotional regulation), and personality predispositions (eg, impulsivity). In addition to these dispositional factors, at least as many contextual risk factors have been associated with CD; these risk factors, are also notable for both their number and diversity. They include factors within the child’s prenatal (eg, exposure to toxins), early child-care (eg, poor-quality child care), family (eg, ineffective discipline), peer (eg, association with deviant peers), and neighborhood (eg, high levels of exposure to violence) environments.

Given such a large and diverse array of risk factors, it has been difficult to determine the best method for studying them and for integrating them into comprehensive causal models to explain the development of CD. Some studies have focused on the influence of one or a few risk factors in isolation from others [12], whereas others have attempted to compare the relative effects of different factors to isolate those that seem most important [13]. One recent trend in research on CD is the use of a cumulative-risk perspective for understanding the potential effect of multiple risk factors. In the cumulative-risk perspective, the type of risk factor is not as important as the number of factors that are present for a child. For example, Stouthamer-Loeber and colleagues [14] reported that, in a high-risk sample of urban youth, the number of risk factors showed a linear association with risk for serious and persistent delinquency. Specifically, 2% of youth who had no childhood risk factor showed serious and persistent delinquency in adolescence, compared with 71% of youth who had risk factors from five different domains. Further, there is evidence that the cumulative effects of multiple risk factors may sometimes be interactive rather than additive. For example, Raine and colleagues [15] reported that, in a birth cohort of 4269 males born in Denmark, neither birth complications nor maternal rejection alone increased a child’s risk for violent offending at age 18 years but the combination of the two domains led to substantial increases in risk.
The cumulative-risk perspective is critical for demonstrating that research focusing on only one risk factor or even on one domain of risk is likely to explain only a modest amount of the variance in measures of antisocial and aggressive behaviors. There are two notable limitations in this perspective, however. First, this perspective assumes that the same causal process is operating for all children who have CD, although this causal process may involve different combinations of risk factors across individuals. As a result, the cumulative-risk perspective does not explicitly recognize that distinct causal mechanisms may underlie the antisocial and aggressive behavior of subgroups of youth who have CD [16,17]. Second, the cumulative-risk perspective does not specify the developmental processes that may be disrupted by the dispositional or contextual risk factors and that predispose the child to act in an aggressive and antisocial manner. For example, knowledge that a child experienced birth complications and a rejecting home environment does not indicate what developmental mechanism(s) might be disrupted by this combination of risk factors. Furthermore, other combinations of risk factors might lead to the same developmental disruptions.

Focusing on the mechanisms through which the various risk factors can lead to the development of CD could be crucial for defining a few important routes or pathways that may put a child at risk for acting in an antisocial and aggressive manner. In addition, such a focus could be critical for treatment. Specifically, eliminating risk factors, such as improving prenatal care to reduce the risk of birth complications, is an important public health approach for reducing the incidence of CD [18]. Also understanding how birth complications may have placed the child at risk for CD would allow the implementation of interventions that could enhance the development of children who were not reached by such prenatal programs or who still experience birth complications despite the intervention.

Because of these limitations in the cumulative-risk perspective for understanding the etiology of CD, recent research has begun to use a developmental-pathways approach that attempts to overcome these limitations. The developmental-pathways approach can be defined by two important features. First, this approach explicitly recognizes that there are likely to be a number of different causal processes, each involving a distinct combination of risk factors, operating in the development of CD. Second, this approach integrates research on normal developmental processes with research on the correlates of antisocial and aggressive behavior in an attempt to specify clearly what effects these risk factors may have in putting the developing child at risk for showing CD. One example of such an approach to understanding the development of CD is the distinction that has been made between childhood-onset and adolescent-onset forms of CD.

**Childhood-onset and adolescent-onset conduct disorder**

A number of reviews of the literature have summarized research supporting the distinction between children who begin showing severe conduct problems in
childhood versus those in whom the onset of severe antisocial behavior coincides with the onset of puberty [19,20]. Children in the childhood-onset group often begin showing mild conduct problems as early as preschool or early elementary school, and their behavioral problems tend to increase in rate and severity throughout childhood and into adolescence [21]. In contrast, the adolescent-onset group does not show significant behavioral problems in childhood, but they begin exhibiting significant antisocial and delinquent behavior coinciding with the onset of adolescence [19]. In addition to the different patterns of onset, the childhood-onset group is more likely to show aggressive behaviors in childhood and adolescence and is more likely to continue to show antisocial and criminal behavior into adulthood. For example, Moffitt and colleagues [22] reported on a birth cohort of 539 males born in New Zealand in 1972 and 1973 and followed through the age of 26 years. Within this cohort, the 45 men who had displayed significant conduct problems before adolescence were more likely to have had a criminal conviction (55%) and had more convictions (mean, 6.9; SD, 11.5) as adults than the 121 men who showed significant conduct problems starting in adolescence (34%; mean, 3.5; SD, 10.8), and both groups differed from controls that did not have histories of conduct problems (17%; mean, 0.6; SD, 3.1). The difference was more dramatic when the focus was on convictions for violent offenses, for which adults in the early-onset group (38%) were much more likely to be convicted than adults from either the adolescent-onset (14%) or control (5%) groups.

A number of longitudinal studies have supported the different outcomes between the two groups [23], and this difference is one of the primary reasons the distinction between childhood-onset and adolescent-onset CD has been adopted by many official diagnostic classification systems used to define CD [1]. More relevant to causal theory, however, is research demonstrating that the two groups also differ in a number of the dispositional and contextual risk factors for CD. Specifically, most of the dispositional (eg, temperamental risk, low intelligence) and contextual (eg, family dysfunction; poverty) correlates are more strongly associated with the childhood-onset subtype of CD [22]. In contrast, any difference between the adolescent-onset group and children who do not have CD seems to manifest primarily in a greater affiliation with delinquent peers and higher levels of rebelliousness and authority conflict [24].

The different outcomes and risk factors for the two subtypes of CD have led to theoretical models that propose very different causal mechanisms operating across the two groups. For example, Moffitt [19,24] has proposed that children in the childhood-onset group develop their problem behavior through a transactional process involving a difficult and vulnerable child (eg, impulsive, with verbal deficits) who experiences an inadequate rearing environment (eg, poor parental supervision, poor-quality schools). This dysfunctional transactional process disrupts the child’s socialization, leading to poor social relations with persons both inside (eg, parents and siblings) and outside the family (eg, peers and teachers). These disruptions lead to enduring vulnerabilities that can negatively affect the child’s psychosocial adjustment across multiple developmental stages.
In contrast, Moffitt [19,24] has proposed a very different causal model to explain the development of conduct problems in children in the adolescent-onset pathway. Because children in this group are more likely to have their problems limited to adolescence, and because they show fewer risk factors, this group is conceptualized as showing an exaggeration of the normative process of adolescent rebellion. That is, all adolescents show some level of rebelliousness to parents and other authority figures [19]. This rebelliousness is part of a process by which the adolescent begins to develop an autonomous sense of self and a unique identity. According to Moffitt, the child in the adolescent-onset group engages in antisocial and delinquent behaviors as a misguided attempt to obtain a subjective sense of maturity and adult status in a way that is maladaptive (eg, breaking societal norms) but encouraged by an antisocial peer group. Given that their behavior is viewed as an exaggeration of a process specific to adolescence and not caused by an enduring vulnerability, their antisocial behavior is less likely to persist beyond adolescence. They may, however, have impairments that persist into adulthood because of the consequences of their adolescent antisocial behavior (eg, a criminal record, dropping out of school, substance abuse).

Although the distinction between childhood-onset and adolescent-onset trajectories has been useful for explaining two pathways through which children may develop CD, it is important to note that clear differences in risk factors between the two groups have not always been found [25], and the applicability of this model to girls requires further testing [26]. The distinction, however, clearly illustrates that there are likely to be subgroups of children who have CD who show different risk factors reflective of different causal mechanisms operating across groups. Research has begun extending this conceptualization by exploring whether additional distinctions can be made within childhood-onset CD. This group seems to show the most severe, chronic, and aggressive pattern of behavior and more dispositional and contextual risk factors that probably result in an enduring vulnerability. Growing evidence suggests that a further distinction can be made that further defines different types of vulnerabilities that may be present within this group of youth. This distinction is based on the presence of a callous and unmotivated interpersonal style and is similar to the distinction made within samples of antisocial adults using the construct of psychopathy [27].

**Callous-unemotional traits and developmental models of conduct disorder**

**Childhood-onset conduct disorder in children who have callous-unemotional traits**

In samples of both clinic-referred and nonreferred youth, factor analyses have isolated a personality dimension characterized by a lack of guilt, lack of empathy, and lack of emotional expression that has been labeled callous-unemotional (CU) traits [28]. Table 1 lists examples of traits that comprise this dimension. These CU traits are similar to those comprising the emotional detachment component of...
psychopathy in adult forensic samples, which are included in Table 1 for comparison [29]. Importantly, CU traits have been reliably assessed in samples as young as age 4 years [30], and they seem to designate a stable dimension of personality, at least in later childhood and adolescence. For example, in a high-risk sample of older children (mean age, 10.65 years; SD, 1.60), parent ratings of CU traits were quite stable over 4 years as the sample transitioned into adolescence [31].

More importantly for designating a unique pathway to CD, fairly substantial evidence suggests that the presence of CU traits is associated with more severe, more aggressive, and more stable patterns of antisocial behavior in youth. Specifically, in samples of adjudicated adolescent, the presence of CU traits has been associated with more serious offending [32,33], more severe violence [34], and more behavioral infractions and poorer treatment progress while adjudicated [35]. In these samples, CU traits have also been associated with an earlier onset of offending, supporting its link to the childhood-onset subtype of CD [33,36]. Similar findings have been reported in high-risk [37] and community [38] samples of adolescents in which the presence of CU traits has been associated with more severe and earlier onset of antisocial behavior. The link between CU traits and severity of conduct problems has been documented in preadolescent samples as well. In both clinic-referred [39] and community samples [30,40], children who have CU traits and conduct problems exhibit more severe and more aggressive antisocial behavior than other children who have conduct problems. Further, the association between CU traits and aggression has been documented for both boys and girls [41]. Finally, similar to the findings in adjudicated youth, CU traits have predicted poorer treatment outcome in boys who have conduct problems [42].

In addition to these cross-sectional studies, a number of longitudinal studies have indicated that the presence of CU traits predicts later antisocial and aggressive behavior. For example, several studies of adjudicated adolescents have

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<th>Callous-unemotional traits</th>
<th>Emotional detachment</th>
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<td>Is unconcerned about the feelings of others</td>
<td>Callous/ lacks empathy for others</td>
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<tr>
<td>Does not feel bad or guilty</td>
<td>Lacks remorse or guilt</td>
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<tr>
<td>Is unconcerned about schoolwork</td>
<td>Fails to accept responsibility for own actions</td>
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<td>Does not show emotions</td>
<td>Shallow affect</td>
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<td>Fails to keep promises</td>
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indicated that the presence of CU traits predicts reoffending, especially violent reoffending, and a shorter length of time to reoffending when youth are released from institutions [43–45]. Similarly, CU traits predicted increases in conduct problems over a 1-year period in a community sample (n = 1359) of children between the ages of 4 and 9 years [30]. Importantly, these prospective studies have generally included fairly limited follow-up periods of 1 to 2 years. In a more extended study of the predictive utility of CU traits, Frick and colleagues [46] reported that nonreferred children who had conduct problems and who also showed CU traits exhibited the highest rates of conduct problems, self-reported delinquency, and police contacts across a 4-year study period.

These studies suggest that, in youth who show conduct problems or delinquency, the presence of CU traits designates a particularly severe, aggressive, and chronic group. These studies, however, do not provide any data as to whether the causal processes that may lead to the behavioral problems are different for this group of antisocial youth. One of the strongest pieces of evidence for differences in causal processes across the two groups comes from a study of 3165 7-year-old twin pairs [47]. In this study, children scoring in the top 10% of the sample in a measure of conduct problems were further divided into those who had (n = 359) or did not have (n = 333) significant levels of CU traits, thus forming two subgroups of children who had childhood-onset conduct problems. Estimates of the genetic and environmental effects on variations in conduct problems were very different for the two groups. Specifically, the group heritability estimate for children scoring high on both conduct problems and CU traits was more than twice that for the group scoring low on CU traits. Although this twin study suggests that genetic factors may play a larger role in the development of conduct problems for children who have CU traits, it does not provide clues as to the mechanisms through which heredity may exert its effects. Understanding how genetics may play a role in the development of CU traits is important, because the fact that a trait has a strong genetic component does not mean that it is unchangeable [47].

One potentially important line of research has documented that children who have conduct problems and CU traits exhibit a distinct temperamental style. Specifically, in forensic [48], mental health [49] and community [50] samples, children and adolescents who have conduct problems and who also show CU traits exhibit a preference for novel, exciting, and dangerous activities. Further, children who have CU traits and conduct problems, but not other children who have conduct problems, show response perseveration on computer tasks in which a reward-oriented response set is primed [50–52]. That is, on tasks in which responding leads to a high rate of rewards initially but later leads to a high rate of punishment (eg, loss of points), children who have conduct problems and CU traits continue to respond despite the increasing rate of punishment. This reward-dominant cognitive style appears not only in computerized laboratory tests but also in social situations: youth who have CU traits emphasize the positive aspects (eg, obtaining rewards, gaining dominance) of solving peer conflicts with aggression and minimize the negative aspects (eg, getting punished) [48].
Perhaps one of the most consistent findings concerning temperamental differences in children who have CU traits is the finding that this group of children shows important differences in their response to emotional stimuli. For example, antisocial adolescents [48] and children who have conduct problems [49] and who also show CU traits seem to be less distressed by the effects of their behavior on others. Further, children who have CU traits and conduct problems show poorer recognition of visual depictions of emotional stimuli [53,54] and are less reactive to various types of negative emotional stimuli [50,55–59]. For example, in a sample of adolescents referred to a diversion program for delinquent behavior, youth with high levels of CU traits showed reduced emotional reactivity to words with negative emotional content (e.g., gun, blood) compared with emotionally neutral words (e.g., chair, table) using a lexical decision task that compared their response time for recognizing words with emotional or neutral content [58]. Similarly, in a sample of nonreferred children between the ages of 6 and 13 years, children who had conduct problems and CU traits showed evidence for reduced reactivity to pictures involving distressing emotional content (e.g., a child in pain, a hurt animal) using a dot-probe task that compared the speed at which the location of a dot was detected in pictures with emotional or neutral content [57]. Both these tasks involved indirect assessments of emotional reactivity by assessing differences in a cognitive-orienting response to emotional and nonemotional stimuli. Similar deficits in emotional responding have been found in studies directly assessing the physiologic responses to emotional stimuli of children who have CU traits [55,56]. Also, these studies have consistently indicated that the deficit in emotional processing found in children who have CU traits is not a global deficit that is consistent across all types of emotional stimuli but is specific to negative emotional stimuli [57,58] and may even be specific to stimuli involving distress or pain in others [56,57].

Callous-unemotional traits and conscience development

Taken together, these findings suggest that CU traits designate a group of children who have CD and who show a distinct temperamental style, characterized by a preference for dangerous and novel stimuli, a reward-oriented response style, and a lack of reactivity to certain types of negative emotional stimuli. This temperamental style has been variously labeled as low fearfulness [60], low behavioral inhibition [61], low harm avoidance [62], or high daring [63]. Several studies of normally developing children have linked this temperamental style with lower scores on measures of conscience development in both concurrent [64,65] and prospective studies [66]. These findings have led to a number of theories as to how this temperament may be involved in conscience development (see [67] for a more extended review).

For example, some theories suggest that internalization of parental and societal norms is partly dependent on the negative arousal evoked by potential punishment for misbehavior, and that the guilt and anxiety associated with actual or anticipated wrongdoing can be impaired if the child has a temperament in which
the negative arousal to cues of punishment is attenuated [68]. This temperament could make the child more difficult to socialize because he or she does not respond in the same way as other children to typical discipline strategies. In support of this possibility, Kochanska [69,70] reported that relatively fearful toddlers, but not fearless toddlers, showed enhanced scores on measures of conscience development later in childhood if they experienced gentle, consistent, and non-power-assertive parenting.

In addition to making the child more difficult to socialize, a temperament characterized by low levels of emotional reactivity could also negatively affect the development of empathetic concern in response to the distress in others. Specifically, some theories of empathy development in early childhood suggest that negative emotional arousal to the distress of others becomes conditioned to behaviors on the part of the child that prompted the distress [71]. As a result of this conditioning, the child learns to inhibit such behaviors as a means of avoiding this negative arousal. This learning process can facilitate the development of the child’s ability to take the perspective of others by encouraging the child to anticipate which behaviors may lead to distress in others. This process through which avoidance learning fosters perspective taking can be impaired by a temperamental deficit in emotional arousal to the distress of others.

Thus, there are several developmental theories linking a temperament characterized by low levels of fearful inhibitions with impairments in conscience development. These theories are consistent with many of the characteristics of antisocial youth who have CU traits. Specifically, children who have conduct problems and CU traits seem to be less responsive to typical parental socialization practices [72,73], and they are more impaired in their moral reasoning [48,52,55]. Therefore, the use of CU traits to designate a distinct subgroup of youth within the childhood-onset pattern of CD could be important for linking research on antisocial and delinquent behavior with theories of conscience development. In addition, defining a group of youth with this distinct causal process could help in developing causal models for other youth who have childhood-onset CD but who do not show CU traits. Specifically, a high level of CU traits seems to be present in only about one third of clinic-referred children who have childhood-onset conduct problems [39]. The studies comparing the characteristics of antisocial youth who have or do not have CU traits provide some clues about the processes that may be operating in the development of the conduct problems in this latter group.

Children who have childhood-onset CD seem to show higher levels impulsivity and higher rates of attention deficit hyperactivity disorder (ADHD) than children who do not have conduct problems and children who have adolescent-onset CD [19,24]. Within the childhood-onset group, children who have high and low levels of CU traits do not differ in their levels of impulsivity.
or rates of ADHD [39]. Second, children who have childhood-onset CD but who do not have elevated CU traits are less aggressive than children who have high levels of CU traits. When they do act aggressively, they are likely to confine their actions to reactive forms of aggression [34,40] in response to real or perceived provocation by others [50]. Third, children who have childhood-onset CD but who do not have CU traits are more likely to show intellectual deficits, especially deficits in verbal intelligence [74]. Fourth, the conduct problems of the low CU group seem to be more strongly related to ineffective parenting practices, such as poor monitoring and supervision by the parents or the use of harsh and inconsistent discipline [72,73]. Fifth, antisocial youth who do not have CU traits seem to have problems regulating their emotions. They exhibit high levels of self-reported anxiety [49,50], they are more reactive to the distress of others in social situations [48], and they are highly reactive to negative emotional stimuli [57,58].

Thus, children who have childhood-onset CD but do not have CU traits show a number of important dispositional (e.g., impulsivity, low verbal intelligence, poor emotional regulation) and contextual (e.g., higher rates of family dysfunction) risk factors, consistent with a characterological disturbance that is likely to lead to problems at multiple developmental stages. These risk factors are very different from those found in children who have high levels of CU traits. Further, the many different types of risk factors that are found in this group of youth make it likely that a number of different causal processes can lead to the impulsive and antisocial behavior exhibited they demonstrate. For example, the deficits in verbal dysfunction could be related to problems in executive functioning that make it difficult for the child to delay gratification and lead to deficits in the child’s ability to anticipate the consequences of his or her behavior [75]. Further, given the strong association with ineffective parenting practices, it is also quite possible that children in this group are not socialized adequately and, as a result, do not learn to regulate their behavior appropriately in response to environmental contingencies [19]. Problems in regulating emotions seems to be the risk factor that most clearly distinguishes this group from children who have CU traits, who, as noted previously, show too little emotional arousal in many situations. As a result, problems in emotional regulation have been the focus of one of the few causal theories developed specifically for this group of youth.

Specifically, it is quite likely that many children who have childhood-onset CD who do not show CU traits have a temperament characterized by strong emotional reactivity, a deficit in the skills needed to regulate their emotional reactivity adequately, or both [67]. These problems in emotional regulation can result in the child’s committing impulsive and unplanned aggressive and antisocial acts for which he or she may be remorseful afterwards but still have difficulty controlling in the future [48]. Further, the problems in emotional regulation can also make a child particularly susceptible to becoming angry because of perceived provocations from peers, leading to aggressive acts within the context of high emotional arousal, such as in arguments and fights with teachers and classmates [58]. In addition, the problems in emotional regulation can disrupt socialization attempts by both parents and teachers. For example, Patterson and
colleagues [19,76] have proposed that antisocial and aggressive youth often are involved in coercive cycles with their parents in which parent and child attempt to control each other through increasingly aversive behaviors (eg, harsh parental discipline, child’s display of anger and hostility toward the parent). A child who has problems in emotional regulation can be more likely to elicit and maintain such coercive cycles in parent–child interactions and to generalize this pattern of behavior to other settings, such as at school and with peers [77].

**Developmental pathways to conduct disorder: summary and implications for research**

The available research suggests that a number of distinct causal pathways can lead children to act in a severely antisocial and aggressive manner and be diagnosed as having CD. Each pathway involves somewhat distinct patterns of risk factors that seem to lead to different disruptions in normative developmental processes. The research reviewed in this article has uncovered several such pathways, distinguishing first between adolescent-onset and childhood-onset CD, with the former being viewed as an exaggeration of the normal process of identity formation in adolescence that leads to high rates of rebelliousness and the latter involving more enduring vulnerabilities that lead to more pervasive problems across multiple developmental stages. Further, research suggests that an important distinction can be made within childhood-onset CD between those who have and those who do not have CU traits, with these two groups showing different types of enduring vulnerabilities. Those who have CU traits seem to show a temperament characterized by a lack of emotional reactivity to certain negative emotions that could place the child at risk for problems in the development of empathy, guilt, and other aspects of conscience. In contrast, children who have childhood-onset CD but do not have CU traits show emotional (eg, problems regulating emotions), cognitive (eg, verbal deficits), and contextual (eg, poor rearing environments) risk factors that lead to problems in the regulation of emotions and behaviors, resulting in impulsive and reactively aggressive behaviors that are present across multiple developmental stages. Much more research is needed to refine the knowledge of these pathways and to determine if there might be other important distinctions or better methods of distinguishing among subgroups within the diagnostic category of CD. This research highlights the potential importance of using a developmental-pathways approach for understanding how the many risk factors associated with CD may be causally related to the development of CD. Further, this approach has several important implications for guiding future research in this area.

First, the developmental-pathways model suggests that research can no longer focus simply on documenting which risk factors are associated with CD or delinquency or even which risk factors account for the most or the most unique variance in measures of antisocial behavior, aggression, or delinquency. Such
methods assume that CD is a unitary outcome. Specifically, a variable may be related to a measure of CD or differentiate between children who have or do not have CD in the overall sample. This overall association, however, may obscure the fact that it is related only to the behavior of a subgroup of youth who have CD (see [78] for a more extended discussion of this issue). For example, in a sample (n = 166) of preadolescent children (aged 6–13 years), a measure of dysfunctional parenting showed a moderate, but significant, relation to a measure of conduct problems after controlling for such demographic variables as age, gender, ethnicity, socioeconomic status, and intellectual level of the child [73]. This overall association, however, obscured very different associations within subgroups of children who have conduct problems: the association between ineffective parenting and conduct problems was quite strong among children who are low on CU traits but was negative and nonsignificant among children who are high on CU traits.

This differential association was detected through testing an interaction between a measure of parenting practices and a measure of CU traits in predicting conduct problems using multiple regression analysis. Sometimes, however, the effects of having distinct subgroups of children who have conduct problems do not emerge as interactions but lead to suppressor effects in correlational analyses. For example, in a sample of clinic-referred children, conduct problems were significantly associated with anxiety (r = .30; \(p < .001\)), but this association increased (partial r = .41; \(p < .001\)) when the level of CU traits was controlled [49]. Further, there was a nonsignificant negative correlation between CU traits and anxiety (r = −.12; \(p = \text{not significant}\)) that became significant after controlling for conduct problems (partial r = .31; \(p < .001\)). This suppressor effect was replicated in a community sample of children [50] and in a sample of adjudicated adolescents [79]. This pattern of relations suggest that children who have conduct problems, with or without CU traits, display high levels of anxiety that may be secondary to their behavioral problems and a result of the many psychosocial impairments associated with their conduct problems. When the level of conduct problem severity is controlled, however, children with high levels of CU traits show lower levels of anxiety, suggesting that they are less distressed by the effects of their behavior, given a similar level of impairment.

These interactive and suppressor effects are just two examples of some of the complex multivariate associations that can result from the heterogeneous nature of CD and that are often ignored in research that focuses only on the univariate or main effects of risk factors. Because of the difficulty in detecting and interpreting these complex multivariate associations, some researchers have recommended greater use of person-centered analyses [80] that explicitly divide children into theoretically meaningful subgroups, such as childhood-onset and adolescent-onset groups [22] or groups with or without CU traits [39,50]. Such analyses are more consistent with the theoretical view of CD being a heterogeneous outcome and allow direct comparisons of subgroups within this diagnostic category of variables of theoretical interest (eg, emotional reactivity) or practical importance (eg, risk for violence).
A second implication of the developmental-pathways approach for studying CD is the importance of integrating research on abnormal development, in this case research on severe antisocial and aggressive behavior, with research and theory on normal development. Unfortunately, the two bodies of research are largely conducted in isolation from each other with little integration of the theories and methods across the two areas [81]. Research on the normal processes involved in identity formation in adolescence could provide important clues about why some children show an exaggeration of this normative process resulting in adolescent-onset CD. Similarly, research on the normal processes involved in conscience development could be quite important for understanding how these processes may go awry in children who have CU traits. Finally, the growing body of research on how children develop strategies to regulate their emotions could be quite influential in explaining how some children who have childhood-onset CD develop their conduct problems secondary to their problems regulating their emotions [67].

This integration of research on normal development with research on antisocial and aggressive behavior leads to a third implication of a developmental-pathways approach for research on CD. By defining the processes earlier in development that can place a child at risk for developing CD (eg, lack of emotional reactivity, deficits in conscience development), this approach allows research into protective factors that might deflect children from these deviant pathways. Specifically, it is quite likely that a substantial portion of children who have a temperament characterized by low fearful inhibitions would, despite this temperamental risk factor, develop sufficient levels of empathy and guilt to inhibit serious antisocial and aggressive behaviors. Further, emerging developmental research is investigating certain parenting practices that might promote conscience development in relatively fearless children. For example, some research suggests that the use of parenting practices that do not rely solely on punishment-related arousal for internalization of parental norms but instead focus on the positive qualities of the parent–child relationship are more effective in promoting conscience development in relatively fearless children [82]. Alternatively, in a sample of preschool children (mean age, 4.39 years; SD, .51), fearless and behaviorally uninhibited children who experienced consistent and very strong rule-oriented (ie, authoritarian) parenting show enhanced conscience development (Cornell AH, Frick PJ. The contribution of parenting styles and behavioral inhibition to the development of conscience in preschool children; manuscript submitted for publication). These examples illustrate the importance of going beyond documenting patterns of risk in deviant samples and testing potential protective factors that can enhance development in children who may show some of the temperamental risk factors for CD.

Further, these last examples illustrate the need for more research focusing on the role of contextual factors in the development of CU traits and in the tendency of children who have these traits to show severe patterns of antisocial and aggressive behavior. As reviewed previously, much of the research that has been conducted in this group of youth has focused on cognitive and emotional risk
factors that may be involved in the etiology of the conduct problems displayed
by this group. Little research has investigated contextual factors that may interact
with the child’s temperament to enhance or to decrease the child’s risk for CU
traits and subsequent severe antisocial and aggressive behavior. For example, one
study that did focus on the child’s peer context reported that young adolescent
youth who had CU traits showed very high rates of deviant peer affiliation that
could play an important role in the level and severity of their antisocial behav-
ior [83]. Further, in one of the few studies to investigate the stability of CU traits
across an extended follow-up period (ie, 4 years), the presence of fewer con-
textual risk factors (eg, higher socioeconomic status and less family dysfunc-
tion) was associated with reductions in the level of CU traits over time [31].

Developmental pathways to conduct disorder: implications for assessment
and intervention

Although the past decade has led to a number of advances in the un-
derstanding of the different developmental pathways that can lead to CD, only
recently have there been attempts to focus on the applied implications of
this research for assessment and treatment. One key implication of this approach
is an emphasis on prevention. As noted previously, the most serious and vio-
lent offenders often show childhood-onset CD, and thus they have a history of
behavior problems that often precedes their serious delinquency by many years.
Further, a number of interventions have proven effective in treating CD in pre-
school and early school-age children; their effectiveness decreases greatly in
older children and adolescents [84,85]. Thus, intervening early in the devel-
opedmental trajectory of childhood-onset CD, when the behaviors seem to be more
malleable, is an important goal for preventing later serious delinquency. Even
these interventions, however, require a child to have already shown serious and
impairing problem behavior, albeit at an early age. Focusing on the early devel-
opedmental processes that can precede even these early conduct problems would
open the possibility of prevention programs that promote optimal development in
children who have certain risk factors (eg, a fearless temperament, poor emo-
tional regulation) even before the behavioral problems emerge.

A second implication of the developmental approach outlined here is that
interventions, whether they are implemented as prevention or treatment pro-
grams, need to be comprehensive and target multiple risk factors. Each of the
pathways leading to CD involves multiple interacting factors. Thus, it is not sur-
prising that some of the most effective interventions for CD are those that
involve multiple components rather than targeting only a single risk factor. For
example, the Families and Schools Together (FAST Track) program is a multi-
component intervention designed to intervene early for children who have con-
duct problems. Its effectiveness has been documented in a large, multisite trial
[86]. The FAST Track intervention was community based (ie, implemented
largely in schools) and involved several treatment components including (1) a parenting intervention that focused on teaching parents more appropriate behavior management skills, (2) a cognitive behavior intervention that focused on helping children develop anger control and social problem-solving skills, (3) a classroom intervention that helped teachers implement more effective behavior management skills, (4) academic tutoring, and (5) a case-management component involving home visits to support family functioning.

A third implication of the developmental-pathways approach is that interventions not only need to be comprehensive, like the FAST Track program, but also need to be individualized. Because the causal processes leading to CD may be different across subgroups of children who have the disorder, it is quite likely that treatments will need to be different across these groups as well. The only direct test of this assumption to date is a study testing the effectiveness of a parenting intervention for boys ages 4 to 9 years referred to a mental health clinic for conduct problems [42]. These authors reported that children who had CU traits showed a less positive overall response to this treatment than other children who had conduct problems. This differential effectiveness was not found consistently across all phases of the treatment, however. That is, children who did or did not have CU traits seemed to respond equally well to the first part of the intervention that focused on teaching parents methods of using positive reinforcement to encourage prosocial behavior. In contrast, only the group that did not have CU traits showed added improvement with the second part of the intervention that focused on teaching parents more effective discipline strategies. This outcome would be consistent with the reward-oriented response style that, as reviewed previously, seems to be characteristic of children who have CU traits.

These findings suggest that interventions may be more effective if they are more specifically tailored to the unique needs of children within the different developmental pathways. This focus on a comprehensive and individualized approach to treatment may be particularly important for enhancing the effectiveness of existing treatments for older children and adolescents who show severe antisocial and delinquency behavior. For example, a recent study group commissioned by the Office of Juvenile Justice and Delinquency Prevention of the United States Department of Justice reviewed four juvenile justice programs that provided individualized and comprehensive services to adjudicated youth under the age of 13 years [87]. This summary outlined several features of such comprehensive models that seemed to be critical to their success. One critical feature was that a system existed for ensuring that an array of mental health, medical, child welfare, and educational services were available to adjudicated youth. Another critical feature was the existence of a system for providing a comprehensive assessment to determine the specific needs of the adjudicated youth and of a strong case-management system for ensuring that services were provided in an integrated and coherent manner. A similar model of individualized interventions has proven to be effective for older adjudicated youth. Multisystemic therapy uses an individualized approach to intervention that has proven effective for reducing recidivism in a number of adjudicated adolescent
samples [88]. Multisystemic therapy starts with a comprehensive assessment of the various individual and contextual risk factors that may have contributed to the child’s or adolescent’s antisocial behavior. This assessment is used to guide an individualized treatment plan tailored to each child’s specific developmental needs and closely supervised and monitored to ensure that it is implemented in a rigorous and coordinated manner.

Research on the various developmental pathways leading to CD could be important for guiding these comprehensive and individualized approaches to treatment. Knowledge of the different developmental processes that may be operating in the various subgroups of youth who have CD could help in determining the most effective combination of services for an individual child [89]. For example, interventions that focus on enhancing identity development in adolescents and increasing their contact with prosocial peers, such as mentoring programs [90,91] or programs that provide structured after-school activities [92] may be particularly effective for children within the adolescent-onset pathway. Interventions that focus on anger control [93] or parental supervision and discipline [94] may be more effective for children within the childhood-onset pathway who do not exhibit CU traits. Further, interventions that intervene early in the parent–child relationship to teach parents ways to foster empathic concern in their young child or that help the child develop cognitive perspective-taking skills may be more effective for children who have CU traits [95]. Later in development, interventions that emphasize the reward-oriented response style of this group and attempt to motivate children by appealing to their self-interest, rather than interventions that focus solely on punishment-oriented strategies, may be more effective for this group of youth who have CD [89].

Using research on developmental pathways and implementing an individualized approach to treatment requires a comprehensive assessment that goes well beyond simply assessing the diagnostic criteria for CD. As summarized by McMahon and Frick [96], the developmental-pathways approach for understanding CD suggests that assessments must accomplish several important goals. First, the evaluation must assess the wide variations in onset, type, and severity of antisocial and aggressive behavior that are present across the different developmental pathways. This assessment is important for helping determine which pathway might best describe the individual child and for determining the intensity of and the most appropriate setting for treatment. It provides important information on the child’s level of risk of harm to others. Second, given that children in the different developmental pathways are likely to show a number of problems in adjustment that may require intervention [3], in addition to their behavioral problems, it is important to assess some of the most common co-occurring problems with CD, such as impulsivity, anxiety, peer rejection, substance abuse, and cognitive deficits. Third, it is important to assess for the most common risk factors that can be associated with the different pathways to CD, which again helps in determining the pathway that may best describe the child and also uncovers important targets of intervention. Fourth, it is important to assess for other characteristics, like the presence of CU traits, that can help de-
termine the pathway that best describes the child and explain the development of
the problem behavior.

With respect to this last recommendation, it is important to note that there
are significant limitations in the assessment tools that are available for assess-
ing CU traits. The two most widely used and the only commercially available
tools for assessing these traits at present are the Antisocial Process Screen-
Device (APSD; [97]) and the Psychopathy Checklist -Youth Version (PCL-YV;
[98]). The APSD involves parent and teacher ratings to assess CU traits in pre-
adolescent children. In contrast, the PCL-YV requires a highly trained clinician
to complete a semistructured interview and collect collateral information
(eg, institutional charts) to score a checklist that includes CU traits. The PCL-YV
has primarily been used in samples of adjudicated older adolescents. Although
they are not commercially available, a number of self-report inventories have
been developed for use in samples of both adjudicated and nonadjudicated ado-
lescents [37,38,58]. Also, some studies have used combinations of items from
existing ratings scales to assess CU traits in child samples [30,47]. Thus, although
the evidence for the importance of assessing CU traits in samples of antisocial
youth is growing, and a number of different measures are available for research
purposes, there is a clear need for more systematic development of measures of
CU traits that have proven adequate reliability and validity to guide evaluations
in applied settings.

In conclusion, the developmental-pathway perspective for understanding the
causes of CD has important implications for both research and practice. Because
children who have CD are served in schools, in mental health clinics, and in
juvenile justice settings, this research is relevant for professionals working in a
number of different settings. Although it is important not to overstate the avail-
sable support for this model of CD, it does offer substantial hope that sig-
ificant advances in the understanding of serious criminal and violent behavior
are on the horizon. Most importantly, there has been the view in the past that
many of the most severely antisocial and delinquent youth are “untreatable” [99].
It may be, instead, that existing treatments have not been the most appropriate for
certain groups of antisocial youth. By understanding how the causal processes
leading to CD may vary across groups, and by clearly articulating the devel-
opmental mechanisms that are involved, this research could provide a firm basis
for enhancing prevention and treatment programs for groups of antisocial youth
who have not heretofore responded to existing treatments.

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