

Current research on conduct disorder in children and adolescents

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Abstract

In this article, research on the various risk factors of conduct disorder is reviewed, with a specific focus on recent theories of how these risk factors can negatively influence a child's development and place him or her at risk for acting in ways that violate the rights of others or that violate major societal norms. Support for several specific developmental pathways, each involving somewhat different risk factors and causal mechanisms, is provided. This research has important implications for how research is conducted and interpreted. It also has important implications for the assessment and diagnosis of conduct disorder. Most importantly, it highlights the need for a comprehensive and individualized approach to treatment that recognizes the different needs of youth across the various pathways.

Keywords

assessment, callous-unemotional traits, conduct disorder, developmental pathways, treatment

Conduct disorder (CD) is defined as a repetitive and persistent pattern of behavior that violates the rights of others or that violates major age-appropriate societal norms or rules (American Psychiatric Association, 2013). The symptoms of CD fall into four main categories: (1) aggression to people and animals, (2) destruction of property, (3) deceitfulness or theft, and (4) serious violations of rules (e.g., truancy, running away from home). It is listed in the Fifth Edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) as being part of the class of disorders labeled as “Disruptive, Impulse Control, and Conduct Disorders,” which all involve problems in the self-control of emotions and behaviors (American Psychiatric Association, 2013).

CD is an important mental health problem for a number of reasons. First, it often involves aggression, it is highly related to criminal behavior, and it is associated with a host of other social, emotional, and academic problems (Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005). For

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example, the behaviors associated with CD often lead a child to be rejected by his or her peers and to be suspended or expelled from school (Frick, 2012). Second, CD in childhood predicts later problems in adolescence and adulthood, including mental health problems (e.g., substance abuse), legal problems (e.g., risk for arrest), educational problems (e.g., school drop-out), social problems (e.g., poor marital adjustment), occupational problems (e.g., poor job performance), and physical health problems (e.g., poor respiratory function) (Odgers, Caspi, et al., 2007; Odgers, Moffitt, et al., 2008). In a New Zealand birth cohort followed into adulthood, boys who showed CD prior to adolescence were 3.2 times more likely to have an anxiety disorder, 2.9 times more likely to have major depression, 7.8 times more likely to be homeless, 3.6 times more likely to be dependent on alcohol, 2.7 times more likely to be convicted of criminal offenses, and 25 times more likely to have attempted suicide by age 32 years compared to boys without this disorder (Odgers, Caspi, et al., 2007). The adult outcomes for girls with CD in this same sample were as poor or worse than the outcomes for boys (Odgers, Moffitt, et al., 2008).

Thus, CD is a very serious mental health concern that is associated with substantial risk of both current and future impairments. Adding to the seriousness of CD is the fact that it is highly prevalent. A meta-analysis of epidemiological studies estimated that the worldwide prevalence of CD among children and adolescents aged 6–18 years is 3.2% (Canino, Polanczyk, Bauermeister, Rohde, & Frick, 2010). This prevalence estimate did not vary significantly across country or continents, although the vast majority of studies included in the meta-analysis were conducted in North America and Europe. Most studies find that boys are more likely to show CD than girls. However, the degree of this sex difference may vary somewhat across development. In young children (below 5 years of age), gender differences are small and sometimes non-existent (Maughan, Rowe, Messer, Goodman, & Meltzer, 2004). This changes in childhood when CD is two to three times more likely to be diagnosed in boys than in girls (Moffitt, Caspi, Rutter, & Silva, 2001). This gap closes to about 2:1 in adolescence when both boys and girls show a dramatic increase in the rates of CD (Loeber, Burke, Lahey, Winters, & Zera, 2000).

Given the seriousness of CD and its prevalence, it is not surprising that a significant amount of research has focused on understanding the causes of CD. This research has resulted in a long list of factors that can place a child at risk for acting in an antisocial and aggressive manner (see Dodge & Pettit, 2003; Frick, 2012; Frick & Viding, 2009; Moffitt, 2006 for reviews). They include dispositional risk factors, such as neurochemical (e.g., low serotonin) and autonomic (e.g., low resting heart rate) irregularities, neurocognitive deficits (e.g., deficits in executive functioning), deficits in the processing of social information (e.g., a hostile attributional bias), temperamental vulnerabilities (e.g., poor emotional regulation), and personality predispositions (e.g., impulsivity). In addition, they include risk factors in the child's prenatal (e.g., exposure to toxins), early child care (e.g., poor quality child care), family (e.g., ineffective discipline), peer (e.g., association with deviant peers), and neighborhood (e.g., high levels of exposure to violence) environments.

While research has been very successful in documenting the numerous risk factors that can lead to CD, there has been great debate over the best way to integrate these factors into comprehensive causal models to explain the development of CD. However, there are a few points of agreement (Frick, 2012):

- First, to adequately explain the development of aggressive and antisocial behavior, causal models must consider the potential role of multiple risk factors.
- Second, causal models must consider the possibility that subgroups of antisocial youth may have distinct causal mechanisms underlying their antisocial and aggressive behaviors.
- Third, causal models need to integrate research on the development of antisocial and aggressive behavior with research on normally developing youth.

For example, research has suggested that the ability to adequately regulate emotion and behavior and the ability to feel empathy and guilt toward others seem to play a role in the development of CD (Frick & Viding, 2009). As a result, understanding the processes involved in the normal development of these abilities is critical for understanding how they may go awry in some children and place them at risk for acting in an aggressive or antisocial manner (Frick, Ray, Thornton, & Kahn, 2014a). As a result, current conceptualizations of CD recognize that there are likely multiple causal pathways that can lead to the disorder, each involving multiple interacting risk factors, and these risk factors disrupt critical developmental processes which make a child more likely to act in antisocial and aggressive manner. In the following section, some of the most common developmental pathways that can lead to the severe behavior problems associated with CD are described.

Developmental pathways to CD

Adolescent-onset versus childhood-onset

A number of reviews of research support important differences between children who begin showing severe conduct problems and antisocial behavior in childhood versus those whose onset of antisocial behavior does not emerge until adolescence (Frick & Viding, 2009; Moffitt, 2006). Children in the childhood-onset group often begin showing mild conduct problems (e.g., oppositional behavior, temper tantrums) as early as pre-school or early elementary school, and their behavioral problems tend to increase in rate and severity throughout childhood and into adolescence (Frick & Viding, 2009). 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 (Moffitt, 2006). 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, in the New Zealand birth cohort described previously, the rate of official convictions for violent acts in adulthood (prior to age 32 years) was 32.7% for males who began showing serious conduct problems prior to adolescence, 10.2% for males who began showing serious conduct problems in adolescence, and 0.4% for males who did not show serious conduct problems in either childhood or adolescence (Odgers, Moffitt, et al., 2008).

Thus, the childhood and adolescent subtypes of CD show very different trajectories of antisocial behavior, in terms of both their patterns of onset and life-course trajectory. In addition, there is now a rather extensive body of research to suggest that the two groups also differ on a number of dispositional and contextual risk factors that seem to implicate different developmental processes leading to the disruptive behaviors of the two groups (Frick & Viding, 2009; Moffitt, 2006). To summarize these findings, childhood-onset CD seems to be more strongly related to neuropsychological (e.g., deficits in executive functioning) and cognitive (e.g., low intelligence) deficits. Also, children who show the childhood-onset pattern seem to show more temperamental and personality risk factors, such as impulsivity, attention deficits, and problems in emotional regulation. This group also shows higher rates of family instability, more family conflict, and has parents who use less effective parenting strategies. When children within the adolescent-onset group differ from control children without conduct problems, it is often in showing higher levels of rebelliousness and being more rejecting of conventional values and status hierarchies (Dandreaux & Frick, 2009; Moffitt, 2006).

The different outcomes and risk factors for the two subtypes of antisocial individuals led Moffitt (2006) to propose that children in the childhood-onset group develop their problem behavior through a transactional process involving a difficult and vulnerable child (e.g., impulsive, with verbal deficits) who experiences an inadequate rearing environment (e.g., poor parental supervision, poor

quality schools). This dysfunctional transactional process disrupts the child's socialization leading to poor social relations with persons both inside (e.g., parents and siblings) and outside (e.g., peers and teachers) the family. These disruptions lead to enduring vulnerabilities that can negatively affect the child's psychosocial adjustment across the lifespan. In contrast, children in the adolescent-onset pathway show an exaggeration of the normative process of adolescent rebellion. That is, most adolescents show some level of rebelliousness to parents and other authority figures (Brezina & Piquero, 2007). This rebelliousness is part of a process by which the adolescent begins to develop his or her autonomous sense of self and his or her unique identity. According to Moffitt (2006), 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 (e.g., 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 due to an enduring vulnerability, their antisocial behavior is less likely to persist beyond adolescence. However, they may still have impairments that persist into adulthood due to the consequences of their adolescent antisocial behavior (e.g., a criminal record, dropping out of school, substance abuse) (Odgers, Moffitt, et al., 2008).

With limited prosocial emotions versus emotional dysregulation

This distinction between early and late starting antisocial behavior has been used to designate distinct groups of children with CD and to designate distinct patterns of criminal behavior in juveniles for a number of years (Patterson, 1986). It was first added to the DSM as part of the criteria for CD in the fourth edition of the manual (American Psychiatric Association, 1994), and it was retained in its next revision (American Psychiatric Association, 2013). Specifically, the DSM-5 includes the following specifier for the diagnosis of CD:

- *Childhood-onset type.* Individuals show at least one symptom characteristic of CD prior to age 10 years.
- *Adolescent-onset type.* Individuals show no symptom characteristic of CD prior to age 10 years (American Psychiatric Association, 2013).

More recently, there has been an increasing recognition of another distinction that could be important for designating important developmental pathways to CD. As noted above, childhood-onset CD is considered to be indicative of an enduring vulnerability that results from an interaction between dispositional traits in the child and problems in his or her rearing environment. However, there may be several different types of vulnerabilities within the childhood-onset group that reflect different developmental consequences of this interaction. In the DSM-5, another specifier for CD was added (American Psychiatric Association, 2013). Specifically, this specifier, which is labeled as "With Limited Prosocial Emotions," is applied to persons who meet the criteria for CD and who show at least two of the following symptoms over an extended period of time (i.e., at least 12 months) and in multiple relationships and settings:

- Lack of remorse or guilt;
- Callous/lack of empathy;
- Unconcerned about performance;
- Shallow or deficient affect.

In research, these symptoms have been labeled as the affective dimension of psychopathy (Hare & Neumann, 2008) or as callous-unemotional (CU) traits (Frick, 2012). These specific indicators

and the diagnostic threshold of two symptoms were chosen based on extensive secondary data analyses across large samples of youth in different countries (Kimonis et al., 2015). These analyses indicated that these four criteria consistently were the best indicators of the overall construct of CU traits across different types of samples in various countries. Furthermore, the two symptom cut-off seems to designate clinically meaningful distinctions within children and adolescents with severe conduct problems (Kahn, Frick, Youngstrom, Findling, & Youngstrom, 2012; Kimonis et al., 2014). Importantly, it is those within the childhood-onset group who are most likely to show these elevated rates of CU traits (Bauer, Whitman, & Kosson, 2011; Dandreaux & Frick, 2009). However, it is only a minority of children with childhood-onset CD who show elevated rates of these traits, typically with only 25%–30% of children who meet the criteria for CD also meeting criteria for the specifier With Limited Prosocial Emotions (Kahn et al., 2012; Pardini, Stepp, Hipwell, Stouthamer-Loeber, & Loeber, 2012).

Although only a minority of children and adolescents with CD show elevated rates of CU traits, research suggests that it is a group that is critical both for clinical practice and for etiological theories. Specifically, Frick, Ray, Thornton, and Kahn (2014b) reviewed over 200 published studies investigating the potential role of CU traits for designating an important subgroup of children or adolescent who show serious antisocial behavior. First, they reported that youth with CD specifically, or antisocial behavior more generally, showed a more stable pattern of behavior problems and more severe aggression if they also showed elevated CU traits. Besides showing more severe aggression, youth with elevated CU traits display more instrumental (i.e., for personal gain or dominance) and premeditated aggression compared to other children and adolescents with severe conduct problems. Second, Frick et al. (2014b) reviewed 20 studies that compared the treatment outcome for youth with conduct problems with and without elevated levels of CU traits, and 18 (90%) reported results suggesting that the group high on CU traits showed poorer treatment outcomes.

Thus, there was strong evidence to suggest that CU traits designate a clinically important group of antisocial youth with respect to their degree of impairment and response to treatment. However, Frick et al. (2014b) also reviewed research suggesting that these traits also classify a group of youth with CD who show very different genetic, cognitive, emotional, and social characteristics. These findings seem to suggest that the causes of the antisocial behavior are different in those with and without CU traits. Specifically, Frick et al. (2014b) reviewed behavioral genetic research suggesting that the genetic influences on childhood-onset conduct problems are considerably greater in those high on CU traits compared to those who show normative levels of these traits. Furthermore, children and adolescents with serious conduct problems and CU traits also show an insensitivity to punishment cues, which includes responding more poorly to punishment cues after a reward-dominant response set is primed, responding more poorly to gradual punishment schedules, and underestimating the likelihood that they will be punished for misbehavior relative to other youth with serious conduct problems. Children and adolescents with serious conduct problems and elevated CU traits endorse more deviant values and goals in social situations, such as viewing aggression as a more acceptable means for obtaining goals, blaming others for their misbehavior, and emphasizing the importance of dominance and revenge in social conflicts. Children and adolescents with elevated CU traits also show reduced emotional responsiveness in a number of situations including showing weaker responses to cues of distress in others, less reactivity to peer provocation, less fear to novel and dangerous situations, and less anxiety over the consequences of their behavior relative to other youth with serious conduct problems. Finally, conduct problems tend to have a different association with parenting practices depending on whether or not the child or adolescent shows elevated levels of CU traits. Specifically, harsh, inconsistent, and coercive discipline is more strongly associated with conduct problems in youth with normative levels of CU traits relative to youth with elevated CU traits,

whereas low warmth in parenting appears to be more highly associated with conduct problems in youth with elevated CU traits.

These findings have led to a number of theories hypothesizing different causal processes underlying the behavior problems in children with and without elevated CU traits. For example, Frick et al. (2014a) have proposed that children with serious conduct problems and elevated CU traits, but not other children with serious conduct problems, have a temperament (i.e., fearless, insensitive to punishment, low responsiveness to cues of distress in others) that can interfere with the normal development of conscience and place the child at risk for a particularly severe and aggressive pattern of antisocial behavior. In contrast, children and adolescents with childhood-onset antisocial behavior with normative levels of CU traits do not typically show problems in empathy and guilt. In fact, they appear to be highly reactive to emotional cues in others and they are highly distressed by the effects of their behavior on others (Frick & Viding, 2009). Thus, the antisocial behavior in this group does not seem to be easily explained by deficits in conscience development. Furthermore, this group that does not show elevated levels of CU traits displays higher levels of emotional reactivity to provocation from others. The conduct problems in this group are strongly associated with hostile/coercive parenting. Based on these findings, it appears that children in this group show a temperament characterized by strong emotional reactivity combined with inadequate socializing experiences that do not help them to develop the skills needed to adequately regulate their emotional reactivity (Frick & Morris, 2004). The resulting problems in emotional regulation can result in the child committing impulsive and unplanned aggressive and antisocial acts, for which he or she may feel remorseful afterward, but for which he or she may still have difficulty controlling in the future.

Summary of research on developmental pathways to CD

In summary, recent research on children and adolescents with CD has largely converged to indicate that there are several important and somewhat distinct developmental pathways that can lead to the severe conduct problems that define this disorder. Thus, recent causal theories have attempted to account for these distinct developmental pathways with important implications for how research is conducted. That is, research should no longer focus simply on documenting what risk factors are associated with CD or which risk factors account for the most or the most unique variance in measures of antisocial behavior, aggression, or delinquency. Such methods can lead to inconsistent and sometimes misleading results. Specifically, a variable may be related to the symptoms of CD or differentiate between children with and without CD in the overall sample. However, this overall association may obscure the fact that it is only related to the behavior of a subgroup of youth with CD.

Two examples help to illustrate the importance of considering the multiple pathways to CD in future research. First, in a sample of pre-adolescent (aged 6–13 years) children ($n = 166$), a measure of dysfunctional parenting showed a moderate, but significant, relation to a measure of conduct problems after controlling for demographic variables such as age, gender, ethnicity, socioeconomic status, and intellectual level of the child (Wootton, Frick, Shelton, & Silverthorn, 1997). However, this overall association obscured very different associations within children with conduct problems, with the association between ineffective parenting and conduct problems being quite strong for children low on CU traits (Std Beta = .47, $p < .01$) but negative and non-significant for children high on CU traits (Std Beta = -.14, $p = ns$). Second, several recent studies have shown that children with serious conduct problems with and without CU traits show opposing emotional responses on neurological, physiological, and behavioral indices (Fanti, Panayiotou, Lazarou, Michael, & Georgiou, 2015; Viding et al., 2012). As a result, a failure to account for these differences would

obscure associations between certain patterns of emotional responding and serious conduct problems. Specifically, using functional magnetic resonance imaging (MRI) responses to fearful and calm faces in a sample of boys (aged 10–16 years), Viding et al. (2012) reported that amygdala responses to fearful faces (relative to calm faces) were stronger in boys with conduct problems without elevated CU traits, whereas the responses were weaker compared to controls in boys with conduct problems who were elevated on CU traits. Similarly, in a sample of children (mean age of 11.21; standard deviation [SD]=1.06), Fanti et al. (2015) reported that on both physiological (i.e., startle reflex during fear imagery) and behavioral (i.e., ratings of fear and sensitivity to punishment) measures of fearfulness, children with chronic conduct problems with and without CU traits showed opposing responses, with those high on CU traits showing weaker startle reflex and lower ratings of fear and punishment sensitivity and those normative on CU traits showing enhanced physiological responses and higher behavioral ratings. Again, these findings suggest that ignoring the differences among the two groups high on conduct problems would have obscured important associations and led to erroneous conclusions on the potential importance of emotional responding for understanding the development of conduct problems.

Developmental pathways to CD: implications for assessment

In addition to these implications for etiological research, this research on the developmental pathways to CD also has important implications for clinical assessments as well. That is, Frick and McMahon (2008) summarize methods for assessing whether or not a child's level of conduct problems is severe and impairing enough to meet criteria for CD or another diagnosis. However, research on developmental pathways to CD also suggests that even among children who show behavior that is severe and impairing enough to meet the diagnostic threshold for CD, there can be great variability in the level of severity of the child's behavior and the amount of harm it causes to others. As a result, DSM-5 criteria for CD also includes a severity specifier based on the number of symptoms of CD displayed by the person with the disorder and the amount of harm it causes to others (American Psychiatric Association, 2013). Specifically, a person who meets criteria for CD can show the following levels of severity:

- *Mild*—with few symptoms beyond the diagnostic threshold and behavior that causes relative minor harm to others (e.g., lying, truancy);
- *Moderate*—the number of symptoms and amount of harm to others are intermediate to those specified as “mild” or “severe”;
- *Severe*—many symptoms beyond the diagnostic threshold that cause considerable harm to others (e.g., rape, use of a weapon).

Thus, the first implication of the multiple pathways to CD for assessment is the need to carefully assess the level of severity of the child or adolescent's behavior, given the great variability in severity across persons with the disorder.

The second implication for clinical assessments is the need to assess for the large number of risk factors than can be associated with CD across the different developmental pathways (Frick, 2012). That is, in each pathway described above, there are a large number of risk factors that can disrupt the important developmental processes leading to CD. For example, certain personality traits (e.g., attitudes rejecting traditional status hierarchies) and contextual influences (e.g., poor parental supervision, association with a deviant peer group) can lead to the exaggerated rebelliousness displayed by persons in the adolescent-onset pathway. Similarly, certain dispositional (e.g., high levels of emotional reactivity, low verbal intelligence) and contextual (e.g., harsh and inconsistent

parenting) factors can lead to the problems in developing appropriate behavioral and emotional regulation displayed by children with childhood-onset CD but who show normative levels of CU traits. Other dispositional (e.g., low levels of emotional reactivity to distress in others) and contextual (e.g., low parental warmth) factors can play a role in the failure to develop adequate levels of empathy and guilt in those children with CD who show elevated levels of CU traits.

Thus, research on the developmental pathways can help guide clinical assessments as to the types of risk factors that should be assessed and provide some guidance as to how these factors may have contributed to the development of CD (Frick & McMahon, 2008). As a result, it is also important to directly assess the key behaviors that differentiate the different developmental pathways. These indicators are as follows:

- The age at which the serious behaviors associated with CD emerged for the child;
- The level of CU traits displayed by the child.

Establishing an exact age of onset for CD is sometimes quite difficult, especially for older adolescents, given that retrospective recall of past behaviors is often inexact (Moffitt et al., 2008). The typical method for establishing age of onset in research has been to collect information from multiple sources (e.g., youth's self-report, parent report, official records of illegal behavior) and to use the youngest age reported across the multiple sources (Dandreaux & Frick, 2009). Use of both parent and child report to determine earliest age of first symptom of CD is supported by research showing that both parent report and adolescent self-report showed a similar median age of onset for antisocial behaviors, and both were independently correlated with external criteria (e.g., severity of impairment) (Lahey et al., 1999). Additionally, Farrington, Loeber, Stouthamer-Loeber, Van Kammen, and Schmidt (1996) reported that self-report may tap behaviors that may not have come to the attention of authorities or parents. Alternatively, parental report and official record reviews may capture events that the youth may be unwilling to report. Thus, utilizing the information from multiple sources overcomes the limitations in any single source.

CU traits have been assessed using several different formats (Frick & Ray, 2015; Kotler & McMahon, 2010). However, because these traits are often assessed as one part of the broader construct of psychopathy, the number of items specifically assessing CU traits has been quite limited, typically with as few as four (Forth, Kosson, & Hare, 2003) or six (Frick, Bodin, & Barry, 2000) items. Furthermore, the response options for rating the severity or frequency of the CU items on these scales have also been limited, often with only three response options (Forth et al., 2003; Frick et al., 2000). The few items, the limited range in response options, and the fact that ratings of CU traits are negatively skewed in most samples (Frick et al., 2000) lead to significant psychometric limitations in many of these measures, such as displaying poor internal consistency (Poythress, Dembo, Wareham, & Greenbaum, 2006).

In an effort to overcome these limitations in the assessment of CU traits, the Inventory of Callous–Unemotional Traits (ICU; Kimonis et al., 2008) was developed to include 24 items all assessing CU traits that are anchored on a 4-point Likert scale from 0 (*Not at all true*) to 3 (*Definitely true*). Several studies have tested the construct validity of the ICU using factor analyses and reported that the best fitting model tends to be one specifying a general CU factor and three subfactors: callous (capturing a lack of empathy and remorse), uncaring (capturing an uncaring attitude about performance on tasks and other's feelings), and unemotional (capturing deficient emotional affect) dimensions (Frick & Ray, 2015). Furthermore, the total score seems to show adequate reliability across samples, and it shows correlations with measure of antisocial behavior and other emotional and cognitive variables (Frick et al., 2014b). Thus, research supports the total scale of the ICU as a continuous measure of CU traits that overcomes some of the limitations of

past measures (Frick & Ray, 2015). Furthermore, its use of objective ratings provides a very time efficient method for assessing these traits in many settings. Finally, several researchers have developed methods for operationalizing the criteria from the DSM-5 specifier of With Limited Prosocial Emotions using items from the ICU (Kimonis et al., 2014; McMahon, Witkiewitz, Kotler, & The Conduct Problems Prevention Research Group, 2010).

Developmental pathways to CD: implications for treatment

The research on different developmental pathways to CD also has several important implications for intervention. One key implication of this approach is the importance of prevention. As noted previously, the group of children with CD who are most aggressive and who are most likely to continue their antisocial behavior into adulthood often begin showing mild conduct problems very early in childhood. Importantly, there are a number of interventions that have proven effective in treating early emerging conduct problems (Eyberg, Nelson, & Boggs, 2008). For example, there is a group of treatment programs that are called Parent Management Training (PMT) or “behavioral parent training” that have proven to be quite effective in reducing conduct problems in young children (Kazdin, Whitley, & Marciano, 2006). These interventions teach parents how to:

- Develop and implement structured contingency management programs to alter their child’s behavior in the home;
- Improve the quality of parent–child interactions (e.g., having parents more involved in their children’s activities, improving parent–child communication, increasing parental warmth and responsiveness);
- Use more effective discipline strategies (e.g., being more consistent in discipline, using a variety of approaches to discipline) (McMahon & Forehand, 2003).

While these parenting programs are quite effective in reducing conduct problems in young children, the effectiveness of these programs is substantially reduced in later childhood and adolescence (Eyberg et al., 2008). Thus, intervening early in the developmental trajectory of childhood-onset conduct problems is an important goal for preventing later serious aggression and antisocial behavior. However, these interventions require that a child already is showing serious and impairing conduct problems, albeit at an early age. An emerging trend in treatment studies is to intervene in families with young children who show certain risk factors (e.g., an fearless temperament, poor emotional regulation) for conduct problems, using programs that promote positive social and emotional development and prevent the onset of serious behavior problems (Kochanska, Kim, Boldt, & Nordling, 2013).

A second implication of the research on developmental pathways to CD is that interventions need to be comprehensive and target multiple risk factors. As noted throughout this article, no gene, no temperamental risk factor, and no environmental risk factor operate in isolation. Thus, it is not surprising that some of the most effective interventions for antisocial behavior involve multiple components, rather than targeting only a single risk factor. For example, the Fast Track program was developed and implemented in four school systems in the United States, and it included PMT, social skills training, educational tutoring, contingency management training to teachers in the classroom, and social cognitive interventions focused on developing perspective-taking and the ability to regulate emotion and behavior (Conduct Problems Prevention Research Group, 2004). This comprehensive intervention started when the child was in the first grade (i.e., age 6 years) has proven to reduce aggressive behavior throughout childhood, reduce self-reported delinquency in adolescence, and reduce arrests in adulthood (Dodge et al., 2015).

A third implication of the developmental model of CD is that interventions not only need to be comprehensive, but they also need to be individualized. That is, given that the causal processes leading to antisocial behavior appear to vary across the different developmental pathways to CD, there is not likely to be any single “best” treatment for this disorder. Instead, interventions must be tailored to the individual needs of children with CD, and these needs will likely differ depending on the specific mechanisms underlying the child’s behavioral disturbance. This approach to treatment is consistent with the recommendations made by a study group commissioned by the Office of Juvenile Justice and Delinquency Prevention of the US Department of Justice which reviewed four juvenile justice programs that provided individualized and comprehensive services to adjudicated youth who were under the age of 13 years (Burns et al., 2003). Successful programs included a system for ensuring that an array of mental health, medical, child welfare, and educational services were available to adjudicated youth. In addition, there was a system for providing a comprehensive assessment to determine the specific needs of each youth and a strong case-management system for ensuring that services were provided in an integrated and coherent manner. While this review focused on treating adjudicated youth, similar models of comprehensive and individualized interventions have proven to be effective for adolescents with CD in various mental health settings (Alexander, Waldron, Robbins, & Neeb, 2013; Zajac, Randall, & Swenson, 2015).

Research on the different developmental pathways to conduct problems has great potential for informing these individualized approaches to treatment (Frick, 2012). That is, knowledge of the different developmental processes that may be operating in the various subgroups of antisocial youth could help in determining the most effective combination of services for an individual child. For example, interventions that focus on enhancing identity development in adolescents and increasing contact with prosocial peers, such as mentoring programs (Grossman & Tierney, 1998) or programs that provide structured after-school activities (Mahoney & Stattin, 2000), may be particularly effective for youth within the adolescent-onset pathway. In contrast, interventions that focus on anger control (Larson & Lochman, 2003) or that focus on reducing harsh and ineffective parenting (Forgatch & Patterson, 2010) may be more effective for children within the childhood-onset pathway who do not exhibit CU traits but who often show problems with emotional regulation and often come from families which use dysfunctional parenting practices.

As noted previously, children and adolescents who show significant levels of CU traits present quite a treatment challenge. That is, these youth often do not show as much improvement as other youth with CD to typical mental health treatments (Frick et al., 2014b). However, despite their poor response to many traditional treatments, recent research has also suggested that children with elevated CU traits are not “untreatable” and they can respond positively to some intensive treatments that are tailored to their unique cognitive and emotional risk factors. For example, Hawes and Dadds (2005) reported that clinic-referred boys (aged 4–9 years) with conduct problems and CU traits were less responsive to a parenting intervention than boys with conduct problems who were low on CU traits. However, this differential effectiveness was not consistently found across all phases of the treatment. That is, children with and without 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 without CU traits showed added improvement with the second part of the intervention that focused on teaching parents to use more effective discipline strategies. This outcome would be consistent with the reward-oriented response style that, as reviewed previously, appears to be characteristic of children with CU traits. Similarly, Caldwell, Skeem, Salekin, and Van Rybroek (2006) demonstrated that adolescent offenders with CU traits improved when treated using an intensive treatment program that utilized reward-oriented approaches, targeted the self-interests of the adolescent, and taught empathy skills. Specifically, they reported that adolescent offenders high

on CU traits who received the intensive treatment were less likely to recidivate in a 2-year follow-up period than offenders with these traits who underwent a standard treatment program in the same correctional facility. Finally, White, Frick, Lawing, and Bauer (2013) tested whether or not CU traits moderated the treatment effectiveness of Functional Family Therapy (FFT; Alexander et al., 2013) in a sample of adolescents who had been arrested and referred for mental health treatment at a community mental health center. FFT is a comprehensive and individualized approach to treatment that focuses on engaging the child and family in treatment and providing motivations for change that are individualized for each family and child. Results indicated that CU traits were associated with poorer behavioral, emotional, and social adjustment prior to treatment, but they were also associated with greater improvements in adjustment over the course of treatment. Also, the association between CU traits and risk of violent charges decreased after treatment at 6- and 12-month follow-ups. However, CU traits were still correlated with poorer levels of adjustment at post-treatment, less perceived change over treatment by youth and their parents, and increased likelihood of violent offending during treatment.

In summary, research suggests that certain intensive and individualized interventions can reduce the level and severity of conduct problems in children and adolescents with elevated CU traits, although youth with these traits often start treatment with more severe problems in adjustment and still end treatment with elevated levels of conduct problems. Thus, future research needs to continue to refine these interventions, likely by focusing on enhancing treatment components that directly address the unique needs of youth with CU traits (Kimonis & Armstrong, 2012; Miller et al., 2014). Furthermore, very little research has focused on whether CU traits themselves respond to treatment, although a few studies provide promising results (Hawes & Dadds, 2007; Somech & Elizur, 2012). The strongest effects on CU traits appear to be for intensive interventions implemented early in development and that help parents learn methods for teaching children the skills needed for perspective-taking. For example, Somech and Elizur (2012) demonstrated significant reductions in CU traits in a sample of young children (aged 3–5 years) who received an intensive parent-training program, which consisted of 14, 2-hr treatment sessions and included components focused on both parent and child self-regulation and strategies to enhance the child's development of emotional recognition skills. Relative to a minimal intervention control group, there was a significant decline in level of CU traits from pre- to post-treatment ($d = .85$), and these gains were maintained at a 1-year follow-up.

Conclusion

CD is a prevalent and serious mental health condition that is associated with significant risk for both current and future impairment. Furthermore, it involves behavior (e.g., aggression, property destruction) that can result in significant harm to others. It is not surprising, therefore, that a significant amount of research has uncovered a host of risk factors that have been associated with this disorder. In this article, we review recent research investigating how these factors may negatively influence child development in several ways that place the child at risk for the symptoms of the disorder. Specifically, they can lead a child to show an exaggeration of the normal process of adolescent rebellion, they could lead to difficulties in the development of skills to appropriately regulate emotions and behavior, or they could make it difficult for the child to develop appropriate levels of empathy, guilt, and other important prosocial emotions.

This method for understating the different pathways to CD has important implications for research, assessment, and intervention. Specifically, research needs to go beyond simply documenting various risk factors that are associated with the symptoms of CD and determine how they might be related to specific developmental mechanisms that can lead the child to act in ways that

violate the rights of others or that violate major society norms. Furthermore, research needs to recognize that these developmental mechanisms may differ across subgroups of youth with the disorder. Finally, assessment and treatment need to recognize these different pathways to CD so that the specific needs of youth with CD across the developmental pathways can be identified and interventions can be tailored to these specific needs.

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