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Annual Research Review: A developmental psychopathology approach to understanding callous-unemotional traits in children and adolescents with serious conduct problems

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Recent research has suggested that the presence of significant levels of callous-unemotional (CU) traits designates a clinically important and etiologically distinct subgroup of children and adolescents with serious conduct problems. Based on this research, CU traits have been included in the most recent revision of the Diagnostic and Statistical Manual of Mental Disorders – 5th Edition (DSM-5; American Psychiatric Association, 2013) – as a specifier for the diagnosis of conduct disorder. In this review, we attempt to understand CU traits within a developmental psychopathological framework. Specifically, we summarize research on the normal development of the prosocial emotions of empathy and guilt (i.e., conscience) and we illustrate how the development of CU traits can be viewed as the normal development of conscience gone awry. Furthermore, we review research on the stability of CU traits across different developmental periods and highlight factors that can influence this stability. Finally, we highlight the implications of this developmental psychopathological framework for future etiological research, for assessment and diagnostic classification, and for treatment of children with serious conduct problems.
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Introduction

Serious conduct problems are defined as behaviors which involve the violation of the rights of others (e.g., stealing, physical aggression, destruction of property) or the violation of major societal norms (e.g., lying, running away from home; American Psychiatric Association, 2013). Such behaviors in childhood are a serious mental health concern because they are associated with a host of other social, emotional, and academic problems both concurrently and later in development (Odgers et al., 2007, 2008). Research investigating the causes of serious conduct problems has been very helpful in documenting a vast array of dispositional (e.g., biological, emotional, cognitive) and environmental (e.g., peer, familial, societal) risk factors that can make a child susceptible for exhibiting serious conduct problems (see Frick & Viding, 2009; Hill, 2002; Moffitt et al., 2008 for reviews). Recognizing the large number and great diversity in types of risk factors is important for causal theory because it suggests that any causal model that focuses on any one or even a very few types of risk is unlikely to be sufficient for adequately explaining the development of childhood conduct problems. However, the large number and vast array of different types of risk factors have also made it difficult to develop integrative theories to guide etiological research on childhood conduct problems, as well as to develop more effective interventions for children with serious conduct problems that stem from this research.

A developmental psychopathology approach

In this study, we attempt to demonstrate how a developmental psychopathological perspective could be important for aiding this difficult, yet, important endeavor. Developmental psychopathology attempts to integrate research on normal development with research on psychopathology to understand how normal developmental processes can go awry in persons with mental health problems (Cicchetti & Rogosch, 1996). There are a number of important implications of such an approach, but there are three implications that we would argue that are particularly important for advancing causal theories of serious conduct problems and that are the focus of this review.

First, developmental psychopathology puts a relatively greater emphasis on understanding the developmental mechanisms that can go awry in children with emotional and behavioral problems rather than emphasizing the various risk factors that negatively impact these mechanisms. For example, rather than focusing solely on dysfunctional parenting or peer rejection as potential risk factors for the development of conduct problems, a developmental psychopathology framework emphasizes understanding how these risk factors negatively impact the

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developing child (e.g., resulting in a failure to learn to regulate emotions). Similarly, rather than focusing solely on documenting neurochemical abnormalities or deficits in brain functioning, the developmental psychopathology approach attempts to explain what developmental processes may be related to these physiological markers as a clue to how these processes may go awry in persons with problems in adjustment, such as children with serious conduct problems.

Second, a developmental psychopathology approach also recognizes that every developmental outcome, both normal and abnormal, could come about through multiple different pathways, each involving distinct developmental processes. This is a concept labeled 'equifinality' (Cicchetti & Rogosch, 1996). Because of equifinality, a developmental psychopathology approach to understanding serious conduct problems attempts to delineate the various processes, each involving distinct deviations in normal development, which place a child at risk for exhibiting serious conduct problems. Thus, the various risk factors are organized and understood in relation to these distinct 'developmental pathways.'

Third, a developmental psychopathology perspective also recognizes that development, again both normal and abnormal, is not static but it is a dynamic and ongoing process. That is, the developing person is always undergoing and capable of change. As a result, causal models should consider the stability of both the outcome (e.g., conduct problems) and the developmental mechanisms (e.g., problems in emotional regulation) leading to the outcome and they should consider what factors could influence this stability. Importantly, factors which influence stability may or may not be the same factors that influence the initial development of an outcome (Loeber & Farrington, 2000) and the relative malleability of certain developmental outcomes (i.e., their susceptibility to influences on stability) may vary across developmental stages. Thus, understanding both the continuities and discontinuities across development is critical for explaining serious conduct problems and the developmental mechanisms that place a child at risk for these problems.

Previously, Frick and Viding (2009) outlined a developmental psychopathology framework for understanding the etiology of serious conduct problems. To summarize, they built on the well-supported distinction made by Moffitt (2006), Patterson (1996), and others (Aguilar, Sroufe, Egeland, & Carlson, 2000; Nagin & Tremblay, 1999) between serious conduct problems which emerge early in childhood and those which emerge coinciding with the onset of adolescence. They provided data to support a model in which adolescent onset of serious conduct problems seems to be related to problems in identity development which takes place in adolescence, whereas the childhood onset of serious conduct problems seems to be related to deviations in developmental mechanisms which are more enduring and are likely to cause problems across multiple developmental stages. Furthermore, they proposed that there are two common pathways within the childhood-onset group, one involving problems in emotional and behavioral regulation and a second involving problems in conscience development marked by a callous and unemotional interpersonal style.

The purpose of this review is to expand on this model presented in the previous review (Frick & Viding, 2009) by focusing largely on this second pathway within the childhood-onset group involving callous-unemotional (CU) traits. Specifically, we provide a brief overview of a substantial body of research showing that the presence of these traits seems to designate a distinct group of children and adolescents who show a particularly severe, aggressive, and stable pattern of conduct problems and who show a number of distinct emotional, cognitive, temperamental, biological, and social risk factors. This research is only briefly summarized because it has been the focus of several other recent comprehensive reviews (Frick, Ray, Thornton, & Kahn, 2013; Frick & White, 2008). The unique contribution of the current review is to place this research within the context of the developmental psychopathological framework described above. Specifically, we integrate research on children and adolescents with elevated CU traits with theories of the normal development of conscience and we consider what factors can cause this normal developmental process to go awry in children with CU traits. Furthermore, we review research on the stability of CU traits across various developmental stages and we highlight factors that have been shown to influence this stability. Such a focus on stability is critical for a developmental psychopathology approach, but has not been considered systematically in past reviews. Finally, we discuss the implications of this developmental psychopathology approach for advancing research on the causes of serious conduct problems, for assessment and diagnostic classification of children and adolescents with serious conduct problems, and for prevention and treatment.

Callous-unemotional traits and serious conduct problems

Callous-unemotional traits are characterized by a lack of guilt and remorse, a lack of concern for the feelings of others, shallow or superficial expression of emotions, and a lack of concern regarding performance in important activities (Frick, 2009). These traits have been considered integral to most definitions of 'psychopathy' in research on adult antisocial behavior (Hare & Neumann, 2008) and they have been important parts (negative indicators) of many definitions of prosociality in children (Lahey &

Waldman, 2003). CU traits have been measured in children as young as 2 years old (Waller et al., 2012) and prevalence rates for elevated levels of CU traits have ranged from 10% to 32% in community samples and 21% to 50% in clinic-referred samples of children (Kahn, Frick, Youngstrom, Findling, & Youngstrom, 2012; for a review, see Herpers, Rommelse, Bons, Buitelaar, & Scheepers, 2012). As noted above, there have been a number of recent reviews of the research on CU traits and their association with severe conduct problems in samples of children and adolescents (Frick, 2009; Frick & White, 2008; Frick et al., 2013). Thus, below we provide only a brief summary of some key findings from this research.

First, research has suggested that within youth with either childhood-onset conduct problems (Kahn et al., 2012; Pardini, Stepp, Hipwell, Stouthamer-Loeber, & Loeber, 2012) or within adjudicated adolescents who show serious antisocial behavior (Kruh, Frick, & Clements, 2005; Lawing, Frick, & Cruise, 2010), CU traits designate a particularly aggressive subgroup. Importantly, besides 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 (Frick, Cornell, et al., 2003; Kruh et al., 2005; Lawing et al., 2010; Marsee & Frick, 2007). Furthermore, CU traits are associated with an earlier onset to severe conduct problems (Dandreaux & Frick, 2009; Silverthorn, Frick, & Reynolds, 2001) and with a more stable pattern of conduct problems (Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005; Rowe et al., 2010). Importantly, even controlling for their more severe and early-onset conduct problems, children with CU traits show more antisocial outcomes in adulthood (Burke, Loeber, & Lahey, 2007; McMahon, Witkiewitz, & Kotler, 2010). For example, in a large high-risk community sample (n = 754), McMahon et al. (2010) reported that CU traits assessed in seventh grade significantly predicted adult antisocial outcomes (e.g., adult arrests, adult antisocial personality symptoms) controlling for both number of conduct problems and childhood onset of serious conduct problems [as well as symptoms of attention deficit hyperactivity disorders (ADHD)] in Grade 7.

Second, children and adolescents with serious conduct problems and CU traits also show distinct cognitive characteristics compared to other youths with conduct problems. Specifically, children and adolescents with CU traits are more likely to show an insensitivity to punishment cues using tasks in which a reward-dominant response set is primed (Fisher & Blair, 1998; Frick, Cornell, et al., 2003; Frick, Kimonis, et al., 2003) and they respond more poorly to gradual punishment schedules (Blair, Colledge, Murray, & Mitchell, 2001). In addition, adolescents with CU traits have been reported to underestimate the likelihood that they will be punished for misbehavior relative to other adolescents with serious behavior problems (Pardini, Lochman, & Frick, 2003). Also, several studies have reported that 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 (Chabrol, Van Leeuwen, Rodgers, & Gibbs, 2011; Pardini, 2011; Pardini et al., 2003; Stickle, Kirkpatrick, & Brush, 2009).

Third, children and adolescents with elevated CU traits show reduced emotional responsiveness in a number of situations. For example, relative to other children and adolescents with conduct problems, those with elevated CU traits show weaker responses to cues of distress in others (Blair, Colledge et al., 2001; Kimonis, Frick, Fazekas, & Loney, 2006; Kimonis, Frick, Muñoz, & Aucoin, 2008; Marsh et al., 2011). Furthermore, Willoughby, Waschbusch, Moore, and Propper (2011) reported that 5-year-old children (n = 178) with high levels of parent-reported CU traits and symptoms of oppositional defiant disorder (ODD) showed less negative reactivity to the still face paradigm (i.e., parental face showing no emotion or interaction with infant) as infants (6 months) compared to those with symptoms of ODD but with normative levels of CU traits. CU traits were also negatively related to skin conductance reactivity to peer provocation in a sample of detained adolescent boys (Kimonis, Frick, Skeem, et al., 2008). Both Anastassiou-Hadjicharalambous and Warden (2008) and de Wied, van Boxtel, Matthys, and Meeus (2012) reported that youth with both serious conduct problems and elevated CU traits showed a lower magnitude of heart rate change to emotionally evocative films compared to youth with conduct problems but normative levels of CU traits. Similarly, children with CU traits have shown blunted cortisol reactivity to experimentally induced stress (Stadler et al., 2011). Thus, across multiple samples and across various methods for measuring emotional responses, children with elevated levels of CU traits showed a reduced level of emotional reactivity to various types of emotional stimuli compared to those children with serious conduct problems but normative levels of CU traits.

Fourth, children and adolescents with elevated CU traits also show distinct temperament and personality characteristics, relative to other youth with serious conduct problems. Specifically, CU traits are often associated with lower levels of fear and lower levels of anxiety (or neuroticism), especially when controlling for their level of either impulsivity or conduct problems (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999; Lynam et al., 2005; Pardini, 2006; Pardini et al., 2012). This association has not only been found in cross-sectional studies, but

predictive associations have been reported as well. For example, Barker, Oliver, Viding, Salekin, and Maughan (2011) used a population-based sample (n = 7000) and reported that a fearless temperament at age 2 predicted both CU traits and conduct problems at age 13 (Barker et al., 2011). However, in follow-back analyses, children at age 13 who were high on both conduct problems and CU traits showed lower fearful responses to punishment cues at age 2 compared to those high on conduct problems alone.

Fifth, behavioral genetic research and studies examining biological markers have also found differences in children with serious conduct problems with and without elevated levels of CU traits. For example, in a large (n = 7374) population-based study of 7-year-old twins, the genetic influences on childhood-onset conduct problems were reported to be considerably greater in those high on teacher-reported CU traits (81%) than for those who showed normative levels of CU traits (30%; Viding, Blair, Moffitt, & Plomin, 2005). Furthermore, boys with conduct problems and elevated levels of CU traits show a reduced amygdala response following exposure to fearful faces and during a theory-of-mind task when compared to control boys, whereas boys with conduct problems and normative levels of CU traits show an enhanced amygdala response (Sebastian et al., 2012; Viding et al., 2012).

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 (Edens, Skopp, & Cahill, 2008; Hipwell et al., 2007; Oxford, Cavell, & Hughes, 2003; Pasalich, Dadds, Hawes, & Brennan, 2012; Wootton, Frick, Shelton, & Silverthorn, 1997; Yeh, Chen, Raine, Baker, & Jacobson, 2011). In contrast, low warmth in parenting appears to be more highly associated with conduct problems in youth with elevated CU traits (Kroneman, Hipwell, Loeber, Koot, & Pardini, 2011; Pasalich et al., 2012).

In summary, children with serious conduct problems and elevated CU traits seem to show a number of unique cognitive, affective, personality, biological, and social characteristics, which seem to suggest that the causal processes underlying their behavior problems may be different from those underlying the behavior problems in children with normative levels of these traits. These findings led Frick and Viding (2009) to propose 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 the following section, we review research relevant to evaluating this proposal.

Conscience development and callous-unemotional traits

The development of conscience. Conscience has long been a construct of interest to developmental psychologists and, in particular, those studying moral emotions that promote prosocial behavior (Hoffman, 1970). Conscience is often defined by two primary constructs, namely, guilt and empathy (Thompson & Newton, 2010). Guilt has been defined as thoughts and feelings of distress associated with transgressions or mishaps (Baker, Baibazarova, Ktistaki, Shelton, & Van Goozen, 2012; Kochanska, Gross, Lin, & Nichols, 2002; Zahn-Waxler, Kochanska, Krupnick, & McKnew, 1990). In early childhood, it may be difficult to distinguish between guilt (e.g., feelings of distress due to effects of one's behavior on others) and feelings of shame (e.g., feelings of distress due to effects of one's behavior on self; Eisenberg, Eggum, & Edwards, 2010). That is, in the 2nd year of life, young children show a blend of shame and guilt demonstrated by bodily tension and an appearance of being affected by a transgression, as well as changes in affect (more negative and less positive) following misdeeds (Kochanska et al., 2002). However, guilt and shame become more differentiated over development with guilt becoming more specifically related to prosocial behavior and positive adjustment and shame being more specifically related to problems in adjustment such as anxiety and depression (Tangney, Wagner, & Gramzow, 1992).

The second key component to conscience is empathy, which is defined as a shared emotional response resulting from a comprehension and appreciation of the emotional state of others (Eisenberg et al., 2010). Empathy begins to develop in the 2nd and 3rd years of life and tends to increase across early childhood (Eisenberg & Fabes, 1998). As noted from the above definition, empathy involves both a cognitive (e.g., understanding of others emotions) and affective (e.g., shared emotional state) component and many theories of empathy have emphasized these separable components (Blair, 2005). However, these components appear to be interrelated in that emotional contagion (i.e., a child becoming distressed by the cries of another child) early in childhood may encourage early perspective taking (Belacchi & Farina, 2012; Zahn-Waxler & Radke-Yarrow, 1982). Similarly, an ability to recognize and understand others' emotions can promote a shared affective experience (Hinnant & O'Brien, 2007).

The moral emotions of empathy and guilt together define the construct labeled 'conscience' and the

primary developmental goal of conscience is to promote prosocial behavior (Eisenberg & Miller, 1987). Prosocial behavior is typically defined as voluntary behavior that is displayed for the benefit of another person, such as helping, sharing, or communicating concern and support to another person (Eisenberg, 1986). However, moral emotions also act to inhibit antisocial behaviors by motivating a person to avoid actions that will hurt or violate the rights of others (Miller & Eisenberg, 1988). Given the importance of empathy and guilt for motivating prosocial behavior and inhibiting antisocial behavior, there has been a significant amount of research investigating factors involved in conscience development.

One consistent finding is that certain temperamental styles can either enhance or hinder conscience development. Specifically, there is a temperament described as either behaviorally uninhibited (Kagan, Reznick, & Snidman, 1988) or fearless (Rothbart, 1981) that has been defined by a tendency to seek out novel and dangerous activities and to show less physiological arousal to unfamiliar people and circumstances, to punishment cues, and to other negative emotion stimuli. Children with this uninhibited or fearless temperament score lower on measures of conscience development (Asendorpf & Nunner-Winkler, 1992; Kochanska, DeVet, Goldman, Murray, & Putnam, 1994; Kochanska et al., 2002) and this association is found when the temperament is measured using behavioral measures of fearful inhibitions (e.g., avoidance of novel, strange, or threatening stimuli) and when it is measured using psychophysiological indexes of reduced reactivity to threatening stimuli (Baker et al., 2012; Fowles & Kochanska, 2000). Furthermore, this link has also been documented in one prospective study, with a measure of fearlessness in toddlers predicting parent ratings of guilt and shame at ages 6 and 7 (Rothbart, Ahadi, & Hershey, 1994).

As a result of these findings, several theories have emerged to explain the link between a child's temperament and the development of conscience. For example, Kochanska (1993) proposed that the anxiety and discomforting arousal that follow wrong doing and punishment are integral in the development of an internal system that functions to inhibit misbehavior, even in the absence of the punishing agent. Kochanska (1991) labels the negative arousal prompted by prohibited behaviors as 'deviation anxiety' and this negative emotion helps the child to learn to behave in accordance with family, school, and other societal norms and rules. Furthermore, Kochanska (1993) proposed that behaviorally inhibited children are predisposed to experience higher rates of this deviation anxiety, whereas fearless and behaviorally uninhibited children are not. Thus, this latter group may be at particular risk for problems in conscience development.

There have been many extensions of this basic model positing the importance of negative emotional arousal over misdeeds (i.e., guilt) for prosocial development (see Dadds & Salmon, 2003). For example, Malti and Krettenauer (2013) proposed that as children develop they begin to increasingly attribute guilt or remorse to themselves and a focus less on any positive outcomes that might result from a moral transgression. Normally developing children will increasingly internalize moral attributions and judgments and consider these attributions personally binding with increasing levels of experience (Nunner-Winkler, 2007). However, this process of internalization will be hindered if the negative arousal associated with guilt is attenuated due to the child's temperament.

Blair and colleagues (Blair, 1995; Blair, Jones, Clark, & Smith, 1997; Blair, Mitchell, & Blair, 2005; Blair, Colledge et al., 2001; Blair, Monson, et al., 2001) proposed a theoretical model to account for the role of fearful inhibitions in conscience development and this model focuses more specifically on the development of empathic concern. They contend that a critical process in the development of empathic concern is the ability to encode emotionally valenced stimuli. This ability leads a child to respond to distress cues in others with increased autonomic activity and this negative emotional response develops before the infant or toddler is cognitively able to take the perspective of others, such as when a young child becomes upset in response to the cries of another child. According to this model, these early negative emotional responses to the distress of others become conditioned to behaviors in the child that led to distress in others. Through a process of conditioning, the child learns to inhibit such behaviors as a way of avoiding this negative arousal. Fearless children may show problems in the encoding of emotional stimuli and, as a result, may not experience this negative arousal as strongly as other children leading to problems in empathic concern and perspective taking.

These theories relating temperament to conscience development all emphasize the importance of emotional arousal. That is, although many of these theories consider cognitive influences on moral development (e.g., internalization of moral attributions; attention to rewards and punishment cues), the cognitive influences are generally considered secondary to problems in emotional responsiveness. Newman and Baskin-Sommers (2012) and Vitale and Newman (2009) proposed a theory of conscience development which places cognitive factors in a primary role by suggesting that an ability to modulate goal-directed behavior in response to peripheral and secondary cues is critical for the development of empathy and guilt. That is, a person who has trouble switching their attention from their primary focus (i.e., obtaining a toy) to less salient contingencies (e.g., a child crying because the toy was taken) can have difficulty developing empathic concern for others. Similarly, Moul, Killcross, and Dadds (2012)

proposed a theory of conscience development involving two interrelated cognitive processes, both of which are associated with the function of the amygdala. The first process is the child's reflexive shifting of their gaze to the eye region in response to cues of fear and distress in others. This attention to the eye region is proposed to be critical for the child's ability to recognize and respond to cues of fear and distress in others. The second process is the relative balance of (a) learning guided by attention to the general valence of the potential outcome (e.g., positive or negative outcomes) and (b) learning guided by attention to the specific value of an outcome (i.e., how severe are the consequences). A learning style that is dominated by attention to the valence of an outcome and deficient in the encoding of the relative value of the outcome can lead to a behavioral style that is motivated more by potential rewards, even once the behavior leads to serious negative consequences.

In short, there are a number of theories to explain how children with certain temperamental styles, especially those characterized by deficits in emotional responding and/or deficits in the cognitive processing of punishment contingencies, can have problems in conscience development. However, it is also clear from past research that not all children with a fearless and uninhibited temperament will show deficits in empathy and guilt. As a result, most theories of conscience development also consider the role of parenting and, more specifically, how parenting may interact with the child's temperament in conscience development. For example, Kochanska (1997) and Kochanska & Murray (2000) proposed that the parent–child relationship, especially the responsiveness between parent and child, may be especially important for conscience development in fearless children. This aspect of parenting does not rely on punishment related arousal for socialization and, instead, focuses on the positive qualities (e.g., parental warmth) of the parent–child relationship. In support of this proposal, attachment security was shown to be predictive of conscience development in temperamentally fearless children (Kochanska, 1995, 1997). As another example of temperament and parenting interactions in predicting conscience development, Cornell and Frick (2007) proposed that behaviorally inhibited children, because they are temperamentally predisposed to develop appropriate levels of guilt, often do so even with less than optimal parenting. However, behaviorally uninhibited children require stronger and more consistent parenting to develop appropriate levels of guilt. They tested this possibility in a sample of preschool (ages 3–5) children nominated by their teachers as being highly behaviorally inhibited or highly uninhibited. Consistent with their predictions, behaviorally inhibited children showed higher levels of guilt, irrespective of the consistency of parenting. However, uninhibited children showed higher levels of guilt only when parental consistency was high. Similarly, authoritarian parenting (i.e., use of strong rule-oriented and obedience-oriented parenting) was unrelated to a measure of guilt in behaviorally inhibited children, but positively related to levels of guilt in uninhibited children.

Callous-unemotional traits as normal conscience development gone awry. Based on this review, it is clear that there has been a significant amount of research investigating factors related to the normal development of empathy and guilt, especially with respect to how temperament may influence conscience development. This research could be critical for understanding the development of CU traits and for developing effective prevention and treatment interventions for children who show elevated levels of these traits. Specifically, there are several findings from research to suggest that elevated CU traits represent failures in the normal development of conscience.

First, problems in guilt and empathy often are the best indicators of the overall construct of CU traits (Frick, 2009). Thus, to some extent, CU traits are defined by the two main components of conscience. Second, measures of CU traits have been associated with measures of guilt and remorse (Lotze, Ravindran, & Myers, 2010; Pardini & Byrd, 2012) and even more consistently correlated (negatively) with other measures of empathy, especially with measures of affective empathy (Chabrol et al., 2011; Dadds, Cauchi, Wimalaweera, Hawes, & Brennan, 2012; Dadds et al., 2009; Jones, Happe, Gilbert, Burnett, & Viding, 2010; Kimonis, Frick, Skeem, et al., 2008 Pardini & Byrd, 2012; Pardini et al., 2003). Third, as noted previously, empathy and guilt are considered moral emotions because they help to encourage prosocial behaviors and CU traits have been negatively associated with self--report measures of prosocial behavior (Roose, Bijttebier, Decoene, Claes, & Frick, 2010) and, on a laboratory task measuring altruistic behavior, adolescents high on CU traits were more likely to make decisions which benefitted themselves while harming others (Sakai, Dalwani, Gelhorn, Mikulich-Gilbertson, & Crowley, 2012). Children and adolescents with CU traits also show more deficits in evaluating moral transgressions (Blair, 1997; Blair, Monson, and Frederickson, 2001; Dolan & Fullam, 2010). Specifically, compared to other youth with conduct problems, youth showing elevated CU traits tend to make less clear distinctions between moral (i.e., actions defined by the consequences to others, such as hurting someone else) and conventional transgressions (i.e., actions defined by breaking social rules, such as talking in class) and make fewer references to the welfare of others when making these distinctions. Thus, there is a clear conceptual and empirical link among CU traits, the different aspects of conscience, and prosocial behaviors.

Also, based on the research reviewed previously on the emotional and cognitive characteristics of children and adolescents with elevated levels of CU traits, it is clear that these youths show a number of risk factors hypothesized to lead to problems in conscience development. Specifically, they show a lack of responsiveness to distress cues in others, they show deficits in the processing of cues to punishment, and they show lower levels of fearful inhibitions. Furthermore, children with CU traits and serious conduct problems show deficits in their reflexive attention to the eye region of faces leading to deficits in recognizing fearful facial expressions in others (Dadds, El Masry, Wimalaweera, & Guastella, 2008).

This link between CU traits and conscience development highlights the importance of taking a developmental psychopathological perspective for advancing both causal research and treatment for children with serious conduct problems and CU traits. Specifically, causal models of CU traits need to consider findings from research on the processes involved in the normal development of conscience. Furthermore, treatment for children with serious conduct problems could be enhanced for those high on CU traits by targeting factors proven to enhance conscience development in typically developing children. A notable example is a controlled treatment study by Dadds and colleagues (Dadds et al., 2012) of children and adolescents (ages 6–16; Mn age = 10.52 years) randomly assigned to either a typical parenting training intervention (n = 109) or an emotional recognition training group (n = 87). Participants in the latter group received specific training in the accurate perception and interpretation of emotions in others. The results indicated that participants with elevated CU traits showed poorer response to the typical parenting training program in terms of the change in their levels of conduct problems. However, those high on CU traits who received training in the accurate perception and interpretation of emotions of others showed greater improvements in affective empathy relative to those in the typical parent training group.

Stability of callous-unemotional traits

As noted above, another assumption of a developmental psychopathology perspective is the importance of understanding the continuities and discontinuities across development for constructs important to understanding problems in adjustment, like CU traits. Thus, besides tying CU traits to research on conscience development, it is also critical to consider the stability of CU traits across development and to consider factors that can influence this stability. Understanding the stability of CU traits is critical for determining the malleability of these traits across development, which can aid in determining at what stages intervention may be most effective. Furthermore, factors that influence the stability of these traits could be important for defining the most important targets of these interventions. However, the importance of understanding the stability of CU traits is also related to conceptualizing them as problems in normal conscience development. Specifically, if CU traits are related to the same processes operating in the normal development of conscience, then one would expect that at crucial periods for conscience development there will be relatively temporary and stage-specific variations in the levels of these traits. If these variations are so great that current levels of the traits are only minimally predictive of later levels, then the usefulness of CU traits as a psychopathological construct at that stage of development is likely to be limited. Fortunately, there is a growing body of research examining the stability of CU traits over a broad range of ages spanning early childhood into adulthood. A summary of these studies including their methodology and key results is provided in Table 1.

Stability of callous-unemotional traits at different developmental stages. The first section of Table 1 summarizes studies of the stability of CU traits in early childhood and all three studies used parent ratings of these traits at each time point. In early childhood (ages 2–8), three studies provided five stability coefficients for CU traits measured by the same informant and method over a period of 6 months to 2 years with a mean stability estimate of .59 (range .41–.84; Hawes & Dadds, 2007; Waller et al., 2012; Willoughby et al., 2011). Of particular note, Willoughby et al. (2011) reported a stability of r = .84 (p < .0001) for a latent construct of CU traits from 3 to 5 years of age. Importantly, these authors also reported on the stability of symptoms of ADHD across this same time period (r = .79, p < .0001), illustrating that the stability of CU traits was comparable to the stability of other psychopathological constructs during this developmental period. Furthermore, CU traits have been associated with higher levels of aggression in samples of preschool children ages 3 and 4 (Ezpeleta, de la Osa, Granero, Penelo, & Domenech, 2013; Kimonis et al., 2006). Thus, by the ages of 3 and 4, individual differences in CU traits appear to be relatively stable and are associated with aggressive behaviors.

As also noted in Table 1, several studies have examined the stability of CU traits across childhood or from childhood to early adolescence. In general, the findings from these studies suggest that CU traits are fairly stable in childhood, but there is substantial variability in the level of stability. Specifically, five studies examined the stability of CU traits across childhood and adolescence and provided 87 stability coefficients over follow-up intervals ranging from 1 to 9 years with a mean stability coefficient of .59 (range .27–.84) and intraclass correlations (ICC's) ranging from .44 to .74 (Barker

Table 1 Stability of CU Traits

Study	Sample	Methods	Results
Stability across early childhood			
Hawes and Dadds (2007)	*N* = 49; age = 4–8; 100% male; clinical sample	Parent reports of CU traits.	CU traits showed considerable stability over 6 months (*r* = .64).
Waller et al. (2012)	*N* = 731; Mn age = 29.9 months; 51% male; clinical sample	Parent reports of CU traits.	CU traits showed considerable stability between ages 2 and 3 (*r* = .46), 3 and 4 (*r* = .61), and 2 and 4, (*r* = .41).
Willoughby et al. (2011)	*N* = 178; age = 36 months; 51% male; community sample	Parent reports of CU traits; created latent construct for CU traits by conducting a longitudinal CFA; and examined the correlation of the latent construct of CU traits across 1 and 2 years.	CU traits show considerable stability from ages 3 to 5 years (*r* = .84).
Stability across childhood and adolescence			
Barker and Salekin (2012)	*N* = 5923; age = 7; 50.6% male; community sample	Parent reports of CU traits.	The correlation between CU traits assessed at age 7 and CU traits at age 13 was *r* = .39.
Barry et al. (2008)	*N* = 80; age = 9–12; 56% male; community sample	Parent and teacher reports of CU traits.	CU traits showed considerable stability over a 2-year period. For parent report, 1-year stability was *r* = .57 and .60 and the 2-year stability was *r* = .60. For teacher report, 1-year stability was *r* = .69 and .40 and 2-year stability was *r* = .43.
Fontaine et al. (2011)	*N* = 9578; age = 7; 47% male; community twin sample.	Teacher reports of CU traits assessed at ages 7, 9, & 12; used growth mixture modeling to identify different developmental trajectories of CU traits.	The majority of the sample showed stable patterns of CU traits: stable low (74.6%) and stable high (4.7%). A larger proportion of children showed a decreasing pattern (13.4%) than an increasing pattern (7.3%) of CU traits from 7 to 12 years.
Frick, Kimonis, et al., (2003)	*N* = 98; Mn age = 10.65; 53% male; community sample	Parent reports of CU traits.	CU traits showed considerable stability over a 4-year period (ICC = .71).
Lynam et al. (2009)	*N* = 1517; age = 13; 100% male; community sample	Self-reports of psychopathic traits, including CU traits.	Psychopathic traits showed considerable stability across 6 months (ICC = .74), 1 year (ICC = .71), 2 years (ICC = .67), and 5 years (ICC = .56).
Muñoz and Frick (2007)	*N* = 91; Mn age = 13.4; 52% male; high-risk community sample	Parent and self-reports of CU traits.	Both parent (*r* = .71) and self-report (*r* = .48) of CU traits showed considerable stability over 3 years.
Obradovic et al. (2007)	*N* = 503; age = 8; 100% male; community sample	Parent and teacher report of CU traits.	Both parent (*r*s = .50–.84) and teacher (*r*s = .27–.65) report of CU traits showed considerable stability over periods of 1–9 years. The stability between age 8 and age 16 was *r* = .27 and .50 for teacher and parent report, respectively.
Pardini et al. (2007)	*N* = 120; age = 9–12; 59% male; community sample	Parent and teacher reports of CU traits.	Combined parent and teacher ratings of CU traits showed considerable 1-year stability (*r* = .59).

(continued)

Table 1 (continued)

Study	Sample	Methods	Results
Van Baardewijk et al. (2011)	*N* = 159; age = 9–12; 52% male; community sample	Self-reports of CU traits.	CU traits showed considerable stability over 18 months (*r* = .63).
Stability from childhood or adolescence into adulthood			
Blonigen et al. (2006)	*N* = 1252; age = 17; 46% male; community twin sample	Self-reports of CU traits.	CU traits showed considerable stability (*r* = .60) from age 17 to age 24.
Burke et al. (2007)	*N* = 177; age = 7–12; 100% male; clinical sample	Parent and teacher reports of CU traits assessed at initial assessment; clinician ratings of CU traits at ages 18–19.	Both parent and teacher reports of CU traits measured at Wave 1 (ages 7–12) significantly predicted clinician-rated CU traits measured at ages 18 and 19.
Forsman et al. (2008)	*N* = 1467; age = 16; 41% male; community twin sample	Self-reports of CU traits.	CU traits showed considerable stability between ages 16 and 19 for both boys and girls (*r* = .43 and .54, respectively).
Lee, Klaver, Hart, Moretti, and Douglas (2009)	*N* = 83; age = 13–20; forensic sample	Clinician ratings and self-reports of CU traits; applied generalizability theory to assess the stability of the construct of CU over 6 months correcting for various sources of error.	CU traits had relatively low 6-month stability based on generalizability coefficients accounting for variation associated with item content, time, and the interaction between the two (G = .48).
Loney, Taylor, Butler, and Iacono (2007)	*N* = 352; age = 16–18; 100% male; community twin sample	Self-reports of CU traits.	CU traits were moderately stable over 6 years (ICC = .40).
Lynam et al. (2007)	*N* = 250; age = 13; 100% male; high-risk community sample	Self-reports of psychopathic traits, including CU traits at age 13; clinician ratings of psychopathic traits, including CU traits at age 24.	Psychopathic traits at age 13 were moderately correlated with psychopathic traits in adulthood (*r* = .31); 21% of the boys who scored in the upper 10% on the measure of psychopathic traits at age 13 were elevated on measures of psychopathy at age 24; this was 3.22 times the risk for boys not scoring high at age 13.
Pardini and Loeber (2008)	*N* = 506; Mn age = 13.9; 100% male; high-risk community sample	Parent reports of CU traits; growth curve modeling	Mean levels of CU traits showed considerable stability from ages 14 to 18 with an average rate of yearly change of −0.111.

The age provided in the sample characteristics refers to the age of the sample at the initial assessment.

& Salekin, 2012; Barry, Barry, Deming, & Lochman, 2008; Muñoz & Frick, 2007; Obradovic, Pardini, Long, & Loeber, 2007; Pardini, Lochman, & Powell, 2007; Van Baardewijk, Vermeiren, Stegge, & Doreleijers, 2011). Besides the length of follow-up (i.e., longer follow-up periods leading to lower stability estimates), the greatest influence on the strength of stability was the reporter used to assess CU traits. Specifically, parent ratings of CU traits tend to be more stable over time than either self-report (Marsee & Frick, 2007) or teacher reports (Barry et al., 2008; Obradovic et al., 2007). For example, Obradovic et al. (2007) assessed the stability of CU traits over 9 years (ages 8–16) among a community sample of boys (n = 503) and reported a stability of r = .50 (p < .001) for parent report and a stability of r = .27 (p < .001) for teacher reports. The smaller correlations found for teacher ratings were attributed to the fact that the same parent reported on CU traits at both time points, whereas different teachers provided ratings. Thus, the smaller correlations for teachers could potentially reflect the effects of different reporters. However, Muñoz and Frick (2007) also reported that self-reports were less stable than parent reports and this cannot be attributed to differences in informants. Specifically, in a high-risk community sample of 91 boys (Mn age of 13.4 years at the initial assessment), the stability in parent report of CU traits across 3 years was r = .71, whereas the stability of self-report of CU traits was

r = .48 (both p < .01). The reason for this reporter difference in stability estimates remains unclear. However, it is possible that parents rely more on historical factors than youth when making their ratings of these traits.

Despite the differences in stability across reporters, these estimates suggest a rather substantial level of stability across childhood and adolescence for parent reports of CU traits and more modest, but still significant, stability for teacher reports and child self-reports. Furthermore, these estimates of stability are comparable to the level reported for other psychopathological constructs (Verhulst & Van Der Ende, 1995; Visser, van der Ende, Koot, & Verhulst, 1999). In a direct comparison of the stability of CU traits with other related psychopathological constructs, Loeber, Pardini, Stouthamer-Loeber, Hipwell, and Sembower (2009) reported that, in a large (n = 2451) community sample of girls ages 5–12, the year-to-year stability for CU traits (mean ICC of .74) was comparable to that found for relational aggression (.76), for symptoms of conduct disorder/ODD (.81), for the inattention symptoms of ADHD (.75), and for the hyperactivity-impulsivity symptoms of ADHD (.79).

Four studies summarized in Table 1 examined the stability of CU traits from either childhood or adolescence into early adulthood. For example, Forsman, Lichtenstein, Andershed, and Larsson (2008) reported that the stability of CU traits from ages 16 to 19 years (n = 1467) was r = .43 and r = .54 (both p < .05) for boys and girls, respectively. In a somewhat older sample, Blonigen, Hicks, Kruger, Patrick, and Iacono (2006) reported a stability of r = .60 (p < .001) from ages 17 to 24 (n = 1252). Two studies summarized in Table 1 provide information on the stability of traits over somewhat longer periods from childhood into early adulthood. First, Burke et al. (2007) reported that both parent- and teacher-rated CU traits assessed at ages 7–12 in a sample of clinic-referred boys (n = 177) were significantly associated with clinician-rated CU traits at ages 18 and 19. Second, Lynam, Caspi, Moffitt, Loeber, and Stouthamer-Loeber (2007) reported that self-report of psychopathic traits, which included CU traits, at age 13 (n = 250) was significantly associated, r = .31 (p < .001), with clinician ratings of psychopathic traits (again including CU traits) at age 24. Importantly, this stability coefficient included traits other than CU traits (e.g., impulsivity). Also, this estimate was based on two different methods of assessing CU traits and, as a result, the stability estimate would likely have been higher if the same method was used at the two time points.

Again, it is important to consider how this level of stability in CU traits from childhood or adolescence to adulthood compares with the stability of other psychopathological constructs. Specifically, Kokko and Pulkkinen (2005) examined the stability of aggression from ages 14 to 36 and reported a stability of r = .18 (p < .05) and r = .13 (p = ns) for males (n = 154) and females (n = 145), respectively. Furthermore, the level of stability from childhood or adolescence to early adulthood reported for CU traits is comparable to the stability of other self-reported personality traits assessed in childhood based on a comprehensive meta-analysis (Roberts & DelVecchio, 2000). Specifically, Roberts and DelVecchio (2000) reported average stability coefficients ranging from r = .35 to .49 for personality traits measured prior to age 12 and from r = .43 to .54 for traits measured from ages 12 to 21. Thus, the stability of CU traits from childhood and adolescence to adulthood appears to be higher than found for many forms of psychopathology and comparable to what is found for other personality traits.

However, the level of stability in CU traits from childhood to adulthood reported by Lynam et al. (2007), that is, r = .31, also clearly suggests that CU traits are not unchangeable, given that only 9% of the variance of age 24 scores were accounted for by the scores at age 13. To illustrate this, Lynam et al. (2007) also reported that only 21% of the boys who scored in the upper 10% on the measure of psychopathic traits at age 13 were elevated on measures of psychopathy at age 24. However, children at age 13 who were in the upper 10% of psychopathic traits at age 13 were 3.22 times more likely than other children to show elevations on the adult measure 11 years later. Thus, CU traits in childhood were clearly a risk factor for showing high levels of psychopathic traits in adulthood, but a large number of boys seemed to show reductions in their rate of CU traits over time. These findings make it critical to investigate factors that can influence the stability of CU traits across development.

Influences on the stability of callous-unemotional traits. Several studies have examined the strength of genetic influences on the stability of CU traits (Blonigen et al., 2006; Fontaine, Rijsdijk, McCrory, & Viding, 2010; Forsman et al., 2008). For example, Blonigen et al. (2006) found that genetic factors were responsible for a larger proportion of the variance (58%) in the stability of CU traits compared to nonshared and shared environmental factors. Forsman et al. (2008) also found that genetic factors contributed to the stability of CU traits above environmental factors. That is, cross-twin stability was higher among monozygotic twins (r = .31 for boys and girls, both, p < .05) compared to dizygotic twins (r = .05 and .15 for boys and girls, respectively, p = ns) from ages 16 to 19. Fontaine et al. (2010) identified trajectories of CU traits among a large sample (n = 9462) of twins from the Twins Early Development Study (TEDS) based on teacher ratings of CU traits at ages 7, 9, and 12. They identified four trajectories of CU traits (high stable, increasing, decreasing, and low stable). For boys, genetic effects were more important for determining group

membership (r = .58–.71, p < .05) compared to nonshared (r = .21–.39, p < .05) and shared (r = .01–.08, p = ns) environmental effects. However, for girls, shared environmental factors were more important for determining group membership, especially with respect to being in the high stable and increasing groups (r = .75 and .47, respectively, both p < .05) than genetic factors (r = .00 and .26, respectively, both p = ns). Thus, across these studies, genetic factors seem to play a substantial role in determining the stability of CU traits, although more research is needed to determine if this may be different for boys and girls.

Although these results support the role of genetic factors in the stability of CU traits, they also suggest that at least some of the variance in stability is due to environmental factors. One such factor that has been consistently documented as being associated with more stable patterns of CU traits is dysfunctional parenting. For example, Waller et al. (2012) found that harsh parenting (e.g., physical and verbal punishment) predicted subsequent CU traits measured 1 year later after controlling for prior CU traits. This finding was consistent across three assessment periods (i.e., from ages 2 to 3, ages 3 to 4, and ages 2 to 4). Frick, Kimonis, et al., 2003 found that both low positive parenting (e.g., parental involvement and positive reinforcement) and high levels of harsh and inconsistent parenting were associated with more stable patterns of CU traits in a community sample of 98 children across their 4-year study period (average age of 10 years at the initial assessment). Pardini et al. (2007) reported similar findings in that harsh parenting was associated with increases in CU traits, whereas parental warmth predicted decreases in CU traits over a 1-year period in a community sample (n = 120) of 9- to 12-year olds. Finally, Pardini and Loeber (2008) reported that poor parent–child communication (e.g., arguing, insulting) predicted high and stable patterns of CU traits across adolescence (14–18 years of age) in a community sample of 506 youth.

As noted previously, Fontaine, McCrory, Boivin, Moffitt, and Viding (2011) used a person-centered approach (i.e., growth mixture modeling) in the TEDS sample to identify four developmental trajectories in CU traits including a low stable (74.6%), a high stable (4.7%), a decreasing (13.4%), and an increasing (7.3%) group. Thus, the vast majority of the sample was located in the stable groups (79.3%). Importantly, they documented a number of factors in childhood (age 4) that were associated with more stable patterns of CU traits. Specifically, they reported that poor cognitive ability (verbal and nonverbal), conduct problems, hyperactivity, peer problems, lack of prosocial activity, low socioeconomic status, poor parenting (i.e., discipline and communication of feelings), and chaotic home life were all associated with high-stable trajectories of CU traits. Furthermore, poor verbal cognitive ability, conduct problems, hyperactivity, low socioeconomic status, and chaotic home life were associated with increasing trajectories of CU traits.

One finding reported by Fontaine et al. (2011) that has not been found consistently in other studies is the influence of peer relationship problems on the stability of CU traits. Specifically, Barry et al. (2008) examined potential peer influences on the 2-year stability of CU traits among a sample of children who were between the ages of 9 and 12 (n = 80) at the initial assessment period but they did not find that either social competence or social preference influenced stability. These inconsistent findings on peer influences may be due to the type of peer problem studied or they may reflect differences in the influence of peer factors on the stability of CU traits depending on other characteristics of the child. Specifically, Barker and Salekin (2012) reported that, in a large representative community sample of children (n = 5923), peer victimization at age 8 was associated with later CU traits at age 13, but this was largely through indirect effects from the influence of peer victimization on the child's level of irritability.

Importantly, several other findings reported by Fontaine et al. (2011) are consistent with those reported in other studies and they have important implications for understanding the stability of CU traits across childhood and adolescence. First, their results suggest that it is more common for children to show substantial decreases in CU traits across development than to show substantial increases (see also Frick, Kimonis, et al., 2003; Lynam et al., 2007; Pardini & Loeber, 2008). Furthermore, Frick, Kimonis, et al., 2003 also reported that the presence of significant conduct problems and being from families of lower socioeconomic statuses predicted a more stable pattern of CU traits. As a result, research needs to expand its focus on the potential influences on the stability of CU traits beyond parenting factors.

As noted previously, an understanding of the factors that influence the stability of CU traits could guide interventions to target these factors in an effort to reduce the level of CU traits in children and adolescents. Although a number of interventions have demonstrated success in reducing the behavior problems in children with elevated CU traits (Kolko & Pardini, 2010) and adolescents (Caldwell, Skeem, Salekin, & Van Rybroek, 2006; White, Frick, Lawing, & Bauer, 2013), only a few studies have attempted to directly target a reduction in CU traits themselves. Consistent with the importance of parenting on the stability of CU traits, these interventions have largely focused on improving the parenting that a child with CU traits experiences. First, Hawes and Dadds (2007) reported that a social learning parenting intervention for young clinic-referred boys (ages 4–8) with conduct problems led to a modest but

significant decline in level of CU traits from pre- to posttreatment (d = .49) and from pretreatment to 6-month follow-up (d = .57). Second, Somech and Elizur (2012) demonstrated even stronger intervention effects on CU traits in a sample of younger children (ages 3–5) and with a more intensive parent training program. Their intervention consisted of fourteen 2-hr treatment sessions and it included components focused on improving the parent–child relationship by teaching both parent and child emotional regulation skills. Relative to a minimal intervention control group, there was a significant decline in level of CU traits from pre- to posttreatment (d = .85) and these gains were maintained at a 1-year follow-up. These treatment studies are promising in suggesting that intensive interventions that (a) focus on changing a consistent predictor of the stability of CU traits (i.e., problematic parenting) and (b) are conducted early in childhood can lead to significant reductions in CU traits.

Implications for research, diagnosis, assessment, and treatment

In summary, the presence of elevated CU traits seems to designate a distinct group of children and adolescents with serious conduct problems who show deficits in their conscience development. Parent ratings of these traits are relatively stable from as early as 3–4 years of age. Although a large number of children decrease in their level of these traits across childhood and adolescence, children with elevated CU traits are at higher risk than other children for showing similar features in adulthood. Even this moderate level of stability is a great mental health concern, given that persons with these traits are at higher risk for severe aggression and other forms of serious antisocial behaviors.

Recognizing that children with elevated CU traits are a unique subgroup of children with serious conduct problems with distinct developmental mechanisms leading to their problem behavior is critical for future research attempting to weave the myriad of risk factors associated with serous conduct problems into comprehensive causal models. Most importantly, it suggests that future etiological research needs to abandon the common approach of studying all youth with conduct problems as a homogenous group. Instead, research needs to consider how causal factors may operate differently across subgroups of children with conduct problems, especially across those with and without elevated CU traits. For example, Kimonis et al. (2006) reported that children high on conduct problems show very different emotional profiles depending on the presence of elevated CU traits. Specifically, those high on conduct problems with elevated CU traits showed a reduced responsiveness to distress cues in others, whereas those high on conduct problems without elevated CU traits showed an enhanced level of responsiveness to distress cues in others. Sebastian et al. (2012) showed that these differences are reflected in different patterns of neural activity, in that children with severe conduct problems and elevated CU traits exhibited lower right amygdala activity during an affective theory-of-mind task, whereas those with normative levels of CU traits showed the opposite pattern of amygdala activity (i.e., increased right amygdala activity). The findings of these two studies illustrate the importance of considering children with CU traits separately from other children with conduct problems. Otherwise, the opposing patterns of emotional responsiveness would have canceled each other out and led to erroneous conclusions about the importance of emotional responding in explaining the development of serious conduct problems.

Such research will be encouraged by including CU traits in the diagnostic criteria for disorders involving serious conduct problems, such as CD. Including CU traits in diagnostic criteria is also supported by research indicating that CU traits are associated with later antisocial behavior and, more importantly, that they predict antisocial outcomes even controlling for other methods of defining subgroups of children with severe conduct problems, such as controlling for number of conduct problems, age of onset of conduct problems, and levels of impulsivity (McMahon et al., 2010). Thus, the 5th Edition of the Diagnostic Manual of Mental Disorders (DSM-5) added to the diagnosis of CD a specifier to designate those youth with serious conduct problems who also show elevated rates of CU traits (American Psychiatric Association, 2013). In an attempt to minimize the potential for iatrogenic effects of the label 'CU,' the name for the specifier is 'with Limited Prosocial Emotions' which is also consistent with the link we have made between the development of these traits and the development of empathy and guilt (i.e., prosocial emotions).

Given the addition of this specifier to the DSM-5, it is critical that future research continue to examine the optimal ways to assess CU traits and how these methods may differ from the assessment of the behavioral symptoms of CD. Specifically, to assess the behavioral symptoms of CD, a clinician needs to document if the behavior has ever occurred over a specific time frame (e.g., past 6 or 12 months). In contrast, to assess the indicators of the CU specifier, characteristics need be shown 'persistently over at least 12 months and in more than one relationship or setting' (American Psychiatric Association, 2013). Thus, it is critical to obtain information from multiple sources who can aid in determining if the characteristics reflect the child or adolescent's typical pattern of interpersonal and emotional functioning and are not just isolated occurrences in some situations. Given the importance of obtaining multiple sources of information, it will be critical for future research to test different methods for making such a

multisource assessment to guide clinical practice, as has been the case for other forms of psychopathology (De Los Reyes et al., 2011).

Another consideration is that, to be considered for the specifier 'with Limited Prosocial Emotions' in the DSM-5, a person must meet full criteria for a diagnosis of CD. In one respect, this is consistent with the vast majority of research on CU traits as designating a unique and important subgroup *within* antisocial individuals. However, as indicated by the recent comprehensive review by Frick et al. (2013), much of the available research has not required a diagnosis of CD, but instead has studied CU traits within antisocial individuals defined by a variety of methods, such as by elevations on behavior rating scales or defined by the presence of serious delinquent and illegal behavior. Thus, CU traits are likely to designate unique developmental pathways to serious conduct problems, even when they do not reach the level required by a diagnosis of CD. Furthermore, there is evidence that significant levels of CU traits may emerge in some samples even in the absence of serious conduct problems (Kumsta, Sonuga-Barke, & Rutter, 2012) and, in these individuals, it may still be associated with significant levels of impairment (Moran, Ford, Butler, & Goodman, 2008) and a distinct pattern of emotional responses (Musser, Galloway-Long, Frick, & Nigg, 2013). Thus, more research is needed to fully understand the causes of CU traits and their effects on a person's psychosocial adjustment even in the absence of serious conduct problems.

Finally, and potentially most importantly, using CU traits to designate a distinct group of children and adolescents with serious conduct problems also has important implications for prevention and treatment. First, by considering CU traits as involving the same processes that operate in the normal development of conscience, interventions can be implemented early in development, potentially before very serious conduct problems have emerged, targeting factors that have demonstrated success in the enhancement of conscience development, such as enhancing a warm and responsive parent–child relationship (Somech & Elizur, 2012). Second, by recognizing the unique processes leading to the severe conduct problems of children and adolescents with elevated CU traits, intensive and comprehensive interventions can be tailored to the unique characteristics of this group of children and adolescents with severe conduct problems, such as teaching emotional recognition skills and other skills related to empathetic concern or by finding unique ways to motivate the child or adolescent with CU traits (e.g., capitalizing on their self-interest) which do not rely solely on punishment (Caldwell et al., 2006; Dadds et al., 2012; White et al., 2013).

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Key points

- Callous-unemotional (CU) traits designate a clinically important and etiologically distinct subgroup of children and adolescents with serious conduct problems.
- CU traits involve problems in the development of guilt and empathy, which are key components to most conceptualizations of conscience.
- Theories of conscience development can inform etiological theories of CU traits and help to guide early interventions for these traits.
- Parent ratings of CU traits are relatively stable from as early as 3–4 years of age.
- Despite a moderate level of stability, a large number of children decrease in their level of CU traits across childhood and adolescence, and identifying factors which contribute to this decrease (e.g., warm parenting) can help guide interventions.

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