

# The importance of callous-unemotional traits for developmental models of aggressive and antisocial behavior

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The current paper reviews research suggesting that the presence of a callous and unemotional interpersonal style designates an important subgroup of antisocial and aggressive youth. Specifically, callous-unemotional (CU) traits (e.g., lack of guilt, absence of empathy, callous use of others) seem to be relatively stable across childhood and adolescence and they designate a group of youth with a particularly severe, aggressive, and stable pattern of antisocial behavior. Further, antisocial youth with CU traits show a number of distinct emotional, cognitive, and personality characteristics compared to other antisocial youth. These characteristics of youth with CU traits have important implications for causal models of antisocial and aggressive behavior, for methods used to study antisocial youth, and for assessing and treating antisocial and aggressive behavior in children and adolescents.

**Keywords:** Callous-unemotional traits, aggression, antisocial behavior, conduct problems, children and adolescents, psychopathy.

There recently have been a number of reviews documenting a large number of risk factors that have been associated with aggressive and antisocial behavior (Dodge & Pettit, 2003; Frick & Marsee, 2006; Loeber & Farrington, 2000; Raine, 2002). These risk factors include characteristics of the child (e.g., neuropsychological deficits, autonomic irregularities, temperamental traits) and characteristics of the many social contexts (e.g., peer rejection, family dysfunction, neighborhood disorganization) that can influence the child's development. Such reviews have made it clear that theoretical models attempting to explain the development of antisocial and aggressive behavior and related psychiatric diagnoses (e.g., conduct disorder) need to be able to incorporate this broad array of risk factors into their proposed causal mechanisms.

It has also become increasingly clear that, within youth who develop severe patterns of aggressive and antisocial behavior, there are likely to be subgroups who may show distinct causal processes leading to their problem behavior. As a result, there have been a number of attempts to define important subgroups of antisocial and aggressive individuals that differ in their types of behavior, risk for future problem behavior, and associated risk factors that could suggest distinct etiologies (see Frick & Marsee, 2006 for a review). In the current review, we focus on one specific method for defining important subgroups of antisocial youth. This method focuses on the presence or absence of callous-unemotional (CU) traits (e.g., lack of guilt, lack empathy, callous use of others for one's own gain). We argue that use of these

traits has great potential for explaining the causes of the most severe and aggressive patterns of antisocial behavior displayed by youth and that use of these traits to subtype antisocial youth could help to integrate many of the past attempts for defining distinct groups of antisocial youth.

## CU traits and developmental models of psychopathy

CU traits are prominent in most conceptualizations of psychopathy in adults (Cleckley, 1976; Hare, 1993). The construct of psychopathy in adults has proven to designate a particular severe and violent group of antisocial adults (Hemphill, 2007; Porter & Woodworth, 2006) and a group of adults who seem to have distinct causal processes leading to their antisocial behavior (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Patrick, 2007). There is still substantial debate about how many dimensions best capture the construct of psychopathy in adult samples (see for a discussion Cooke, Michie, & Hart, 2006). However, at least three dimensions consistently emerge, one of which includes CU traits and has been variously labeled as 'deficient affective experience' (Cooke et al., 2006) or the 'affective factor' (Hare, 1993). The other two dimensions include a) an arrogant and deceitful interpersonal style involving a narcissistic view of one's self and conning and manipulative behavior and b) an impulsive and irresponsible behavioral style involving poorly planned behavior and proneness to boredom.

When the various traits associated with psychopathy are studied in samples of youth, three similar dimensions often emerge whether using teacher and

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parenting ratings of these traits in preadolescent children (Frick, Bodin, & Barry, 2000a; Kotler & McMahon, 2005) or using self-report or clinical ratings of these traits in incarcerated adolescents (Neumann, Kosson, Forth, & Hare, 2006; Vitacco, Rogers, & Neumann, 2003b; however, see Poythress, Dembo, Wareham, & Greenbaum, 2006 for a failure to separate these dimensions in justice-involved adolescents). Given this multidimensional structure of psychopathy, only one of which involves CU traits, the question becomes why focus on CU traits as the critical dimension for designating a unique group of antisocial youth?

Before addressing this question, it is important to note that a significant portion of research attempting to extend the construct of psychopathy to youth has used measures that have combined across these three dimensions (see Frick & Dickens, 2006 for a review) based on the assumption that these dimensions all represent a higher-order construct that, when combined, best represents the construct of psychopathy (Neumann et al., 2006). Also, there have been conceptualizations proposed for youth that focus on other dimensions as being most important for subtyping youth with conduct problems, such as the one proposed by Lynam (1996) that focuses on the impulsive and irresponsible dimension as being most critical. In some support of this latter conceptualization, the impulsive and irresponsible dimension from many measures of psychopathy often shows the strongest and most consistent correlations with measures of conduct problems, delinquency, and other antisocial indices (Frick et al., 2000; Kotler & McMahon, 2005; Lynam, 1998).

However, for a construct to be important for subtyping within antisocial individuals, it also needs to show important areas of independence from general measures of antisocial behavior. That is, if a dimension accounts for the same variance in predicting important external criteria (e.g., risk for future aggression and violence) as general antisocial behavior, the incremental utility of this dimension is limited and it is unlikely to designate a distinct group *within* antisocial individuals. In adult samples, it is the callous and unemotional dimension that seems to be most specific to individuals' high on psychopathic traits compared to other antisocial individuals (Cooke & Michie, 1997). There is some evidence that the same may be true for youth. For example, in a sample of detained adolescents, CU traits were higher in violent sex offenders compared to other violent offenders and non-violent offenders, whereas the other dimensions of psychopathy did not differentiate across offender groups (Caputo, Frick, & Brodsky, 1999). Similarly, within a clinic-referred sample of preadolescent youth (ages 6–13), only the CU dimension designated a distinct group within children who showed early-onset disruptive behavior disorder diagnoses, whereas the other dimensions

(i.e., impulsivity and narcissism) were higher in children with disruptive behavior disorders but did not differentiate within this broad diagnostic category (Christian, Frick, Hill, Tyler, & Frazer 1997). Thus, a critical issue for this review is to focus on whether CU traits predict important external criteria independent of general measures of conduct problems and antisocial behavior. Stated in person-centered terms, the focus is on whether CU traits designate an important subgroup within antisocial youth.

### Stability of CU traits

Before focusing on the associations with external criteria, an important issue that has been raised is whether the behaviors that define CU traits are stable enough in children or adolescents to warrant the designation of 'traits' that implies some level of stability across development (Edens, Skeem, Cruise, & Cauffman, 2001; Seagrave & Grisso, 2002). There are now a number of studies showing that these traits are relatively stable from late childhood to early adolescence either when assessed by self-report (Munoz & Frick, 2007) or by parent report (Frick, Kimonis, Dandreaux, & Farrell, 2003c). This stability was particularly strong for parent report, where the Intraclass Correlation Coefficient for parent ratings of CU traits over a 4-year period was .71 (Frick et al., 2003). Such stability is much higher than is typically reported for other parent ratings of children's adjustment (Verhulst, Koot, & Berden, 1990). Over an even longer follow-up period, Obradović, Pardini, Long, and Loeber (2007) also reported relatively high rates of stability for parent and teacher ratings of CU traits in a sample of 506 inner-city boys assessed annually from ages 8 to 16, although this again was higher for parent-reports ( $r = .50$  and  $.27$  across 9 years for parent and teacher report, respectively). Importantly, these authors also reported relatively strong measurement invariance in the items used to assess these traits across their study period, suggesting that the items were measuring the construct of CU traits in similar ways across this rather extended developmental period.

Based on these findings, there does appear to be relatively high stability in ratings of CU traits from childhood to adolescence, although this seems to be especially true for parenting ratings. However, this level of stability does not imply that these traits are unchangeable. That is, Frick et al. (2003) reported that, despite the high level of stability in these traits across their 4-year study period, there were a significant number of youth who decreased in their level of CU traits over the course of the study (see also Lynam, Caspi, Moffitt, Loeber, & Stouthamer-Loeber, 2007 for a similar pattern of change over a longer period of development). Further, this decrease

in the level of CU traits was related to the level of conduct problems displayed by the child, the socio-economic status of the child's parents, and the quality of parenting the child received. Thus, CU traits do appear to be at least somewhat malleable and seem to be influenced by factors in the child's psychosocial environment.

It is also important to note that studies on the stability of CU traits have largely focused on the developmental period from later childhood to early adolescence. Such studies do not address the stability of these traits earlier in development or, most critically, the stability of these traits from childhood or adolescence into adulthood (Edens et al., 2001). With respect to younger children, Dadds, Fraser, Frost, and Hawes (2005) found moderate 1-year stability estimates for parent-reported CU traits ( $r = .55$ ) in a community sample of Australian children who were 4 to 9 years of age. With respect to the prediction of adult psychopathy measures, Blonigen, Hicks, Kruger, Patrick, and Iacono (2006) reported that the CU dimension was relatively stable ( $r = .60$ ) from late adolescence (age 17) into early adulthood (age 24). In a longer follow-up assessments, Burke, Loeber, and Lahey (2007) reported that CU traits assessed in clinic-referred boys ages 7 to 12 predicted adult measures of psychopathy at ages 18 to 19, even after controlling for the child's level of conduct problems and other risk factors (e.g., dysfunctional parenting, economic disadvantage, intelligence). Using a measure that included CU traits, Lynam et al. (2007) reported similar findings with early measures of these traits (age 13) predicting adult measures of psychopathy (age 24), even after controlling for childhood antisocial behavior and other psychosocial risk factors. Besides showing the stability of these traits from childhood to adulthood, both of these latter two longitudinal studies are notable for showing the predictive utility of these traits after controlling for childhood antisocial behavior. As noted previously, such findings are important for supporting the unique predictive utility of CU traits after controlling for the severity of antisocial behaviors.

### **CU traits and the severity of conduct problems, aggression, and delinquency**

One of the most important and useful aspects of the construct of psychopathy in adult samples has been its ability to designate a particularly violent and chronic subgroup of antisocial individuals. Frick and Dickens (2006) reviewed 24 published studies using child or adolescent samples in which either psychopathic traits in general, or CU traits specifically, were associated with more severe conduct problems, delinquency, or aggression. Ten of these studies were cross-sectional studies demonstrating contemporaneous associations between psychopathic traits

and antisocial behavior and 12 were longitudinal studies demonstrating predictive relations between these two constructs. Further, they reviewed five published studies showing an association between psychopathic traits and poor treatment outcome. While these studies were weighted towards adolescent samples and tended to have limited follow-up periods (e.g., 1 to 2 years), the review did include studies with samples as young as age 3 (Kimonis et al., 2006a) and with follow-up periods as long as 10 years (Gretton, Catchpole, & Hare, 2004). Not included in this review were eight additional concurrent studies showing the association between psychopathic traits and severity of conduct problems (Dadds, Whiting, & Hawes, 2006b), violence and aggression (Dolan & Rennie, 2006a); Enebrink, Anderson, & Langstrom, 2005; Skeem & Cauffman, 2003; Vitacco, Neumann, Caldwell, Leistico, & Van Rybroek, 2006) and delinquency (Dolan & Rennie, 2006c; Loeber et al., 2005; Poythress et al., 2006) and three longitudinal studies showing the predictive relationships between psychopathic traits and later antisocial personality (Loeber, Burke, & Lahey, 2002), violence and aggression (Ridenour, Marchant, & Dean, 2001) and delinquency (Pardini, Obradović, & Loeber, 2003).

Taken together, this body of research provides quite compelling evidence that psychopathic traits in general are associated with more severe conduct problems, violence and aggression, and delinquency in samples of youth. However, a significant proportion of these studies did not investigate the role of CU traits specifically, either alone or in comparison to the other dimensions of psychopathy. However, in the studies that did address this issue, CU traits generally were less associated with measures of conduct problems than the impulsive and narcissism dimensions of psychopathy (Corrado, Vincent, Hart, & Cohen, 2004; Frick et al., 2000a). However, CU traits were important for designating a more severe (Christian et al., 1997) and stable (Frick, Stickle, Dandreaux, Farrell, & Kimonis, 2005; Loeber, Burke, & Lahey, 2002) pattern of antisocial behavior within children who showed serious conduct problems.

In terms of aggression, in the studies that did compare the dimensions of psychopathy, CU traits generally showed similar associations to general measures of aggression and violence compared to the other dimensions of psychopathy (Brandt, Kennedy, Patrick, & Curtin, 1997; Dadds et al., 2005; Dolan & Rennie, 2006b; Kruh, Frick, & Clements, 2005; Marsee, Silverthorn, & Frick, 2005), although a few studies did show somewhat higher associations between aggression and CU traits compared to the narcissism and impulsive dimensions (Skeem & Cauffman, 2003; Lexcen, Vincent, & Grisso, 2004). However, as was the case for conduct problems, CU traits seemed to be important for designating a subgroup of antisocial youth who

showed more severe aggression and violence, especially youth who were more likely to show both instrumental (e.g., for gain) and reactive (e.g., in response to perceived provocation) aggression (Enebrink et al., 2005; Frick et al., 2003a; Kruh et al., 2005).

Following a similar pattern, CU traits were consistently related to measures of delinquency but it is not clear that they were more predictive than other dimensions of psychopathy (Brandt et al., 1997; Corrado et al., 2004; Lexcen et al., 2004; Poythress et al., 2006; Spain, Douglas, Poythress, & Epstein, 2004). However, CU traits did predict later delinquency even after controlling for the level of conduct problems (Pardini et al., 2006) or antisocial behavior (Salekin, Ziegler, Larrea, Anthony, & Bennett, 2003). Also, they designated a group of antisocial and conduct problem youth who were at greater risk for both concurrent (Enebrink et al., 2005) and later delinquency (Frick et al., 2005) and who showed an earlier age of onset to their delinquency (Christian et al., 1997; Frick et al., 2005; Silverthorn, Frick, & Reynolds, 2001).

Taken together, these studies suggest that CU traits are associated with conduct problems, aggression, and delinquency. However, they do not appear to be any more highly correlated than the other dimensions of psychopathy (i.e., narcissism, impulsivity) in various samples of youth. In fact, they appear to be less highly correlated with measures of conduct problems. In contrast, CU traits seem to be quite important for designating *within* antisocial youth, a group who shows a more stable and aggressive pattern of behavior, who is at increased risk for early-onset delinquency, and who is at risk for later antisocial and delinquent behavior. Thus, these data provide some support for our theoretical model suggesting that these traits may be particularly important for designating a unique developmental pathway to severe antisocial behavior and aggression. However, the more important test of the utility of these traits for causal theories is whether antisocial youth with and without CU traits show different risk factors that could suggest different processes contributing to the development of behavioral problems across the two groups.

### CU traits and distinct correlates to antisocial behavior

To date, two large twin studies have reported substantial genetic influences on measures of CU traits (Larson, Andershed & Lichtenstein, 2006; Taylor, Loney, Bobadilla, Iacono, & McGue, 2003), with both providing very similar estimates of the amount of variation in CU traits accounted for by genetic effects (i.e., 43% and 42%, respectively). Importantly, a substantial proportion of this genetic variance for explaining CU traits was independent of other dimensions of psychopathy (Larson et al., 2006) and

independent of antisocial behavior (Taylor et al., 2003). While these studies show that CU traits do have a heritable component, they do not directly address the issue of whether children with conduct problems with and without CU traits have different patterns of genetic influence. Viding, Blair, Moffitt, and Plomin (2005) addressed this question directly in a sample of 3,687 twin pairs who were 7 years old. They selected twins high on conduct problems and further divided them into those who were high and low on CU traits. Overall, the heritability for the high conduct problem group was substantial (.68) but the estimate was very different for those high on CU traits (.81) and those low on CU traits (.30). This finding was replicated in the same sample two years later at age 9 (Viding, Jones, Frick, Moffitt, & Plomin, in press). Interestingly, Viding et al. (2005) reported that, in addition to the difference in genetic influences in the groups high and low on CU traits, the influence of shared environment was substantial for the group low on CU traits but negligible for the group high on these traits. This would be consistent with four studies summarized in Table 1 showing that conduct problems tend to be more associated with ineffective parenting practices in children low on CU traits.

Table 1 also provides a summary of 27 additional published studies showing different emotional, cognitive, and personality characteristics of antisocial youth with and without CU traits. Importantly, as noted in this table, the studies generally focused on school-aged samples of children or adolescents with no study including children below the age of 6. Eleven studies included only boys and the studies involved a mix of community ( $n = 11$ ), clinic-referred ( $n = 11$ ) and adjudicated ( $n = 5$ ) samples.

In terms of emotional correlates, 10 studies documented abnormalities in how antisocial youth with CU traits process emotional stimuli, including emotional pictures (Kimonis, Frick, Fazekas, & Loney, 2006b), emotional words (Loney, Frick, Clements, Ellis, & Kerlin, 2003), emotional facial expressions (Dadds et al., 2005; Blair, Colledge, Murray, & Mitchell, 2001b), and emotional vocal tones (Blair, Budhani, Colledge, & Scott, 2005). When studies have compared types of emotional stimuli, there is consistent evidence that youth with CU traits do not show abnormalities in how they process stimuli with positive emotional content. Instead, the deficits are found in the processing of negative emotional stimuli (Kimonis et al., 2006b; Loney et al., 2003) and, even more specifically, to signs of fear (Blair & Coles, 2000) and distress (Kimonis et al., 2006b) in others.

Another 10 studies summarized in Table 1 have documented a number of distinct cognitive characteristics of antisocial youth with CU traits, such as being less sensitive to punishment cues, especially when a reward oriented response set is primed (Fisher & Blair, 1998; O'Brien & Frick, 1996; Pardini, Lochman, & Frick, 2003) and a tendency to show more positive outcome expectancies in

**Table 1** Studies investigating unique correlates to CU traits

Study	<i>n</i>	Age range	Percent male	Sample type	Measure	Results
Emotion Blair, 1999	42	8–17	100%	Clinical	APSD	Boys with behavior problems and high levels of psychopathic traits <sup>A</sup> were less responsive to distress cues.
Blair, Budhani, Colledge, & Scott, 2005	43	11–15	100%	Clinical	APSD	Boys with behavior problems and high levels of psychopathic traits showed impaired recognition of fearful vocal tones.
Blair & Coles, 2000	55	11–14	56%	Community	APSD	Psychopathic traits were inversely related to ability to recognize sad and fearful facial expressions.
Blair, Colledge, Murray, & Mitchell, 2001b	51	9–17	100%	Clinical	APSD	Boys with behavior problems and psychopathic traits made more errors recognizing fearful facial expressions and were less responsive to sad expressions.
Dadds et al., 2006a	98	8–15	100%	Community	APSD	Antisocial youth with CU traits showed poor recognition of facial expressions of fear unless instructed to attend to the eyes.
Kimonis et al., 2006b	50	6–13	54%	Community	APSD	Children high on both CU traits and conduct problems showed reduced attentional orienting responses to distressing pictorial stimuli.
Loney, Butler, Lima, Counts, & Eckel, 2006	108	12–18	49%	Community	APSD	Boys high on CU traits and conduct problems showed lower resting levels of cortisol.
Loney, Frick, Clements, Ellis, & Kerlin, 2003	60	12–18	100%	Adjudicated	APSD	CU traits were associated with diminished reactivity to negative emotional words.
Sharp, Van Goozen, & Goodyer, 2006	659	7–11	48%	Community	APSD	Psychopathic traits were associated with low arousal to unpleasant stimuli.
Stevens, Charman, & Blair, 2001	37	9–15	100%	Clinical	APSD	Boys with behavior problems and high levels of psychopathic traits were less able to recognize sad and fearful faces and sad vocal tones.
Cognition Blair, 1997	42	Mn = 13.2	100%	Clinical	APSD	Boys with behavior problems and high levels of psychopathic traits made fewer distinctions between moral and conventional social rules and were less likely to attribute moral motivations/emotions in story protagonists.
Blair, Colledge, & Mitchell, 2001a	51	9–17	100%	Clinical	APSD	Boys with behavior problems and high levels of psychopathic traits were less able to change stimulus responses and responded poorly to gradual punishment.

Table 1 (Continued)

Study	<i>n</i>	Age range	Percent male	Sample type	Measure	Results
Blair, Monson, & Frederickson, 2001c	102	8–16	100%	Clinical	APSD	Boys with behavior problems and high levels of psychopathic traits performed more poorly when asked to make distinctions between moral and conventional social rules and made fewer references to the welfare of others when making determinations between moral and conventional rules.
Fisher & Blair, 1998	39	9–16	100%	Clinical	APSD	Boys with behavior problems and high levels of psychopathic traits showed deficient responses to punishment when reward oriented response was primed; also, showed poorer ability to make moral versus conventional distinctions about social rules.
Frick, Cornell, Bodin, et al., 2003	98	Mn = 12.36	53%	Community	APSD	Youth high on CU traits and conduct problems showed poorer response to punishment when reward oriented response was primed and, for boys only, were less likely to show a hostile attributional bias.
Loney, Frick, Ellis, et al., 1998	117	6–13	78%	Clinical	APSD	Antisocial youth with high levels of CU traits showed higher levels of verbal intelligence.
O'Brien & Frick, 1996	132	6–13	78%	Clinical	APSD	Children high on psychopathic traits and low anxiety were showed less responsiveness to punishment when a reward-oriented response set was primed.
Pardini, Lochman, et al., 2003	169	11–18	57%	Adjudicated	APSD	CU traits were associated with lower scores on a measures of empathy and perspective taking; were also associated with valuing reward and dominance and devaluing punishment in aggressive peer interactions.
Salekin, Neumann, Leistico, & Zalot, 2004	122	11–18	66%	Adjudicated	PCL:YV	CU traits were positively correlated with verbal IQ scores.
Vitale et al., 2005	329	16	53%	Community	APSD	Youth with high levels of psychopathic traits showed reduced interference on a Stroop task and made more passive avoidance errors.
Personality Andershed et al., 2002	1077	Mn = 14.42	NR	Community	SRP-II	Boys with high levels of psychopathic traits and conduct problems were more impulsive, more prone to boredom, and showed less trait anxiety.

**Table 1** (Continued)

Study	n	Age range	Percent male	Sample type	Measure	Results
Essau, Sagagawa, & Frick, 2006	1443	13–18	54%	Community	ICU	CU traits were positively associated with sensation seeking and negatively correlated with extraversion, agreeableness, conscientiousness, and openness.
Frick, Lilienfeld, et al., 1999	143	6–13	77%	Clinical	APSD	When controlling for level of conduct problems, CU traits were negatively related to trait anxiety and positively related to fearlessness.
Lynam, Caspi, et al., 2005	746	13–16	100%	Community	CPS	CU traits were negatively related to neuroticism and agreeableness when controlling for level of conduct problems.
Pardini, 2006	169	11–18	58%	Adjudicated	APSD	CU traits were associated with fearlessness and this was mediated by level of punishment concern.
Pardini et al., 2007	120	9–12	59	High risk community	APSD	CU traits were negatively related to trait anxiety, controlling for level of conduct problems
Salekin, Lestico, Trobst, Schrum, & Lochman, 2005	114	11–18	70%	Adjudicated	APSD, CPS, PCL:YV	CU traits were negatively related to agreeableness, conscientiousness, and openness.
Hipwell et al., 2007	990	5–8	0%	Community	APSD	Ineffective parenting was less strongly related to conduct problems in children high on CU traits.
Oxford et al., 2003	243	Mn = 8.24	65	Community	APSD	Ineffective parenting was less strongly related to externalizing problems in children high on CU traits.
Vitacco, Neumann, Ramos, & Roberts, 2003a	136	10–15	0%	Community	APSD	CU traits were not related to poor parenting but impulsivity and narcissism were.
Wootton et al., 1997	166	6–13	78	Clinical	APSD	Ineffective parenting was not related to conduct problems in youth high on CU traits.

Note: APSD = Antisocial Process Screening Device (Frick & Hare, 2001); CPS = Childhood Psychopathy Scale (Lynam, 1997); PCL:YV = Psychopathy Checklist: Youth Version (Forth, Kosson, & Hare, 2003); SRP-II = Self-Report of Psychopathy-II (Harpur & Hare, unpublished instrument); <sup>a</sup>Psychopathic traits include CU traits with other dimensions such as impulsivity and narcissism.

aggressive situations with peers (Pardini et al., 2004). Further, a few studies have suggested that antisocial youth with CU traits are less likely to show verbal deficits than other antisocial youth (Loney et al., 1998; Salekin, Neumann, Leistico, & Zalot, 2004).

As also indicated in Table 1, seven studies have indicated that CU traits were associated with distinct personality correlates compared to general measures of antisocial behavior or conduct problems. Two of the most consistent findings is that CU traits tend to be positively correlated with measures of fearless or thrill-seeking behaviors (Essau et al., 2006; Frick et al., 1999; Pardini, 2006) and negatively correlated with measures of trait anxiety or neuroticism (Andershed, Gustafson, Kerr, & Stattin, 2002; Frick et al., 1999; Lynam et al., 2005; Pardini et al., 2007), whereas conduct problems tend to be unrelated to thrill-seeking behaviors and positively correlated with measures of trait anxiety. Importantly, the negative correlation between measures of CU traits and trait anxiety/neuroticism are generally only found controlling for the level of conduct problems (Frick et al., 1999; Lynam et al., 2005). That is, children with CU traits tend to show less trait anxiety *given the same level of conduct problems*. This pattern of results suggest that children with CU traits are less distressed by the consequences of their behavior problems on themselves and others compared to youth with comparable levels of conduct problems (Frick et al., 1999; Pardini et al., 2003).

### Theoretical implications of the distinct correlates

This body of research suggests that antisocial youth with CU traits show a number of distinct cognitive, emotional, and personality characteristics supporting the contention that the causal processes leading to their antisocial behavior are different from those operating for other antisocial youth. Specifically, youth with CU traits seem to show a temperament that is characterized by deficits in their emotional arousal to fear and distress in others and abnormalities in their responses to cues of punishment and danger. These temperament characteristics could lead to personality traits characterized by a reduced level of distress over the consequences of their behavior and a tendency to display thrill- and novelty-seeking behaviors. This conceptualization has a number of important implications for developmental models of severe antisocial and aggressive behavior.

First, these temperamental characteristics could provide clues to distinct neural mechanisms that may be involved in the development of the antisocial behavior in this group of youth and these neural pathways could help to explain the genetic diathesis to their antisocial behavior. Specifically, both Blair

et al. (2005) and Viding (2004) have suggested that these specific emotional and cognitive deficits could implicate deficits in amygdala functioning and related neural circuitry. Fear and sad expressions in others activate the amygdala in normal subjects (Blair, Morris, Frith, Perret, & Dolan, 1999) and the amygdala is involved in several types of instrumental learning tasks involving the use of punishment information (Blair et al., 2005). Further, there is evidence that adults with psychopathic traits show reduced amygdala activation during a task involving affective memory (Kiehl, Smith, & Hare, 2001).

Second, these findings can be used to link developmental theories of temperament and conscience development with etiological theories of antisocial and aggressive behaviors (Dadds & Salmon, 2003; Frick & Morris, 2004). Specifically, there have been a number of studies of normally developing children documenting both concurrent (e.g., Fowles & Kochanska, 2000; Kochanska, Gross, Lin, & Nichols, 2002) and predictive (Rothbart, Ahadi, & Hershey, 1994) associations between a fearless temperament and lower scores on measures of conscience development. Further, this research has led to a number of theories to explain this link, such as fearless children being less likely to experience transgression-related arousal in response to behavior that has been punished by others (Newman, 1987; Kochanska, 1993) or being less likely to experience empathic arousal linked to distress in others (Blair, 1999). In short, the temperamental deficits in emotional reactivity could make it more difficult for a child to development appropriate levels of guilt, empathy, and other dimensions of conscience that, at its extreme, could result in CU traits. Consistent with this theoretical model, Pardini (2006) reported that the association between fearlessness and violent delinquency was mediated by the presence of CU traits in a sample of adjudicated adolescents.

Third, by investigating and understanding the developmental mechanisms that may lead to problems in conscience development, and potentially CU traits, this line of research could provide clues as to possible protective factors that may enhance conscience development in children who may have temperaments that make optimal development more difficult. For example, Cornell and Frick (2007) reported that preschool children who were behaviorally uninhibited showed enhanced conscience development if they experienced consistent discipline and a parenting style that emphasized a strong and obedience-oriented (i.e., authoritarian) approach to parenting. These authors suggested that the under-arousal exhibited by fearless children may require parents to incorporate stronger methods of socialization that bring arousal levels to an optimal range in order for the child to internalize parental norms for prosocial behavior (Kochanska, DeVet, Goldman, Murray, & Putnam, 1994). However, it is

also possible that certain parenting practices can lead to too much arousal from even fearless children and negatively affect the development of conscience (Kochanska, 1993). As a result, it has also been proposed that a parent-child mutually responsive orientation that encompasses shared positive affect, parent-child cooperation, and parental warmth and responsiveness may be critical for socializing fearless children (Kochanska, 1997; Kochanska & Murray, 2000). This type of parenting does not rely on punishment-related arousal for internalization but instead focuses on the positive qualities of the parent-child relationship (Kochanska & Murray, 2000).

Fourth, the use of CU traits to designate a distinct group of antisocial and aggressive youth could help to expand and integrate some past attempts to define important subgroups of antisocial youth (see Frick & Marsee, 2006 for a review). For example, an important distinction has been made between children who show largely reactive forms of aggression (e.g., in response to perceived provocation) and those who show both reactive and instrumental (e.g., premeditated aggression for some gain) forms of aggression (Poulin & Boivin, 2000; Salmivalli & Nieminen, 2002). There is evidence that children and adolescents who show both forms of aggression show higher levels of CU traits (Frick et al., 2003a; Kruh et al., 2005). Further, some research suggests that it may be the CU traits, and not the distinct patterns of aggression, that are most directly related to some of the social-cognitive (Pardini et al., 2003) and emotional (Munoz, Frick, Kimonis, & Aucoin, in press) deficits displayed by this group of aggressive youth. As another example of the potential for research on CU traits to advance past subtyping approaches, one of the most widely accepted methods for dividing children with conduct problems or adolescents with delinquent and antisocial behavior into important subgroups is by distinguishing between those who begin showing severe behavior problems in early childhood (i.e., childhood-onset) and those who begin showing severe conduct problems only after the onset of adolescence (i.e., adolescent-onset) (Frick, 2006; Moffitt, 2003). The presence of CU traits seems to be more highly associated with the childhood-onset trajectory (Silverthorn et al., 2001). However, these traits seem to designate a more severe (Christian et al., 1997), chronic (Frick et al., 2005), and aggressive (Frick et al., 2003a) subgroup within this trajectory, and a subgroup with distinct temperamental characteristics (Frick, 2006; Frick & Morris, 2004).

Fifth, by providing a method for defining a distinct subgroup of antisocial youth, this research can also help in developing models to explain other groups of antisocial youth by reducing some of the heterogeneity within antisocial samples (Frick, 2006; Frick & Morris, 2004). For example, youth with severe conduct problems who do not show high levels of CU

traits show high levels of impulsivity (Christian et al., 1997; Frick et al., 2003b), are more likely to show deficits in verbal intelligence (Loney et al., 1998), are more likely to show a hostile attribution bias in social situations (Frick et al., 2003b) and are more likely to come from families with high rates of dysfunctional parenting practices (Hipwell, Pardini, Loeber, Sembower, Keenan, & Stouthamer-Loeber, in press; Oxford, Cavell, & Hughes, 2003; Wootton, Frick, Shelton, & Silverthorn, 1997). Further, this group is less likely to be aggressive than the group with CU traits but, when they are aggressive, it is often confined to reactive forms of aggression (Frick et al., 2003a; Kruh et al., 2005). Also, this group seems to be highly reactive to emotional stimuli (Kimonis et al., 2006; Loney et al., 2003) and to the distress of others (Pardini et al., 2003), leading some theories to focus on their problems regulating emotion as being critical for understanding the causes of their behavioral problems (Frick, 2006; Frick & Morris, 2004).

## Methodological implications

In addition to these important theoretical implications of research on CU traits, there are a number of methodological implications for research investigating antisocial and aggressive behavior in youth. Most generally, it suggests that research cannot treat antisocial, aggressive, delinquent, or conduct problem behavior as a unitary outcome. That is, research has traditionally focused on documenting what risk factors are associated with antisocial behavior or which risk factors account for the most or the most unique variance in measures of antisocial or aggressive behaviors. However, these overall associations often obscure the fact that a risk factor may only be related to the behavior of a subgroup of antisocial and aggressive youth (see Richters, 1997 for a more extended discussion of this issue).

For example, in a sample of pre-adolescent children, a measure of dysfunctional parenting showed a moderate, but significant, relation to a measure of conduct problems after controlling for such demographic variables as age, gender, ethnicity, socioeconomic status, and intellectual level of the child (Wootton et al., 1997). However, this overall association obscured the fact that there was a rather strong association between ineffective parenting and conduct problems for children low on CU traits (Std. Beta = .47,  $p < .01$ ) but there was a non-significant negative association between ineffective parenting and conduct problems for children high on CU traits (Beta = -.14,  $p = n.s.$ ). Thus, the overall association underestimated the association between ineffective parenting and conduct problems for children low on CU traits but overestimated the association for youth high on these traits.

This differential association between parenting and conduct problems was detected through testing an interaction between a measure of parenting practices and a measure of CU traits in predicting conduct problems using multiple regression analysis. However, it is also important to test for potential suppressor effects in correlational analyses in which differential associations with important risk factors for CU traits and antisocial behavior may be obscured by the high correlation between these two constructs (see also Hicks & Patrick, 2006). For example, in a sample of clinic-referred children, conduct problems were significantly associated with anxiety ( $r = .30$ ,  $p < .001$ ) but this association increased (partial  $r = .41$ ,  $p < .001$ ) when the level of CU traits were controlled (Frick et al., 1999). Further, there was a non-significant negative correlation between CU traits and anxiety ( $r = -.12$ ,  $p = n.s.$ ) that became significant after controlling for conduct problems (partial  $r = -.31$ ,  $p < .001$ ). This suppressor effect was replicated in a community sample of children (Frick et al., 2003b) and an adjudicated sample of adolescents (Frick, Lilienfeld, Edens, Poythress, & McBurnett, 2000b). The reason for this suppressor effect was that children with conduct problems tend to have higher rates of anxiety. Further, children with CU traits tend to have higher levels of conduct problems. However, given the same level of conduct problems (i.e., controlling for level of conduct problems), children with CU traits tend to show less anxiety or, as stated previously, seem to be less distressed by the effects of their behavior on themselves and others.

These interactive and suppressor effects are just two examples of some of the complex multivariate associations that are often ignored in research that just focuses on univariate or main effects of risk factors. Because of the difficulty in detecting and interpreting these complex multivariate associations, some researchers have recommended greater use of person-centered analyses (Bergman & Magnusson, 1997). Specifically, this would involve using methods that explicitly divide children into theoretically meaningful subgroups with or without high levels of CU traits (see for examples Christian et al., 1997; Frick et al., 2003b). Such an analytic approach is somewhat antithetical to traditional recommendations that creating categorical distinctions from continuous measures results in a loss of power to detect associations (Cohen, 1983).

Unfortunately, interactions and suppressor effects are often difficult to interpret in general and, in particular, very difficult to apply their results to subgroups of individuals. Further, the loss of power that occurs with dichotomization assumes bivariate normality (Cohen, 1983). However, often measures of CU traits are not normally distributed, even in detained samples (e.g., Loney et al., 2003). More importantly, the overlap between CU traits and measures of antisocial behavior is typically asym-

metrical, with there being significant numbers of antisocial youth with and without CU traits but very few individuals high on CU traits but low on antisocial behavior (Frick et al., 2000a), which also violates the assumptions of bivariate normality. Finally, there is some evidence to suggest that youth high on CU traits may best be considered as being qualitatively distinct from those who score lower on these traits (Vasey, Kotov, Frick, & Loney, 2005), although conclusive statements on the taxonicity of the construct awaits further testing due to contradictory findings in adult samples (Marcus, John, & Edens, 2004).

### Assessment and treatment implications

In terms of assessment implications, the research on CU traits clearly argues for assessments that separate these traits from other antisocial dimensions. As noted previously in our review of past research, many studies have not separated these affective and interpersonal traits from other dimensions related to antisocial behavior, such as impulsivity, narcissism, or conduct problems (e.g., Blair, 1999; Lynam, 1997). One issue that makes this separation difficult is that most measures that assess these traits typically include only a limited number of items specifically assessing this dimension, often with as few as 4 (Forth, Kosson, & Hare, 2003) or 6 (Frick & Hare, 2001) items. Further, and possibly due to this limited item pool, measures of CU traits often have had some significant psychometric limitations, such as displaying poor internal consistency in many detained samples of adolescents (Poythress et al., 2006).

One attempt to overcome these limitations is the development of the Inventory of Callous-Unemotional Traits (ICU; Frick, 2004) that provides a more extended assessment (e.g., 24 items) of the construct of CU traits. The factor structure of this measure has been tested in a large ( $n = 1,443$ ) community sample of German adolescents ages 12 to 18 (Essau, Sasagawa, & Frick, 2006) and a moderate sized ( $n = 248$ ) sample of juvenile offenders ages 12 to 20 in the United States (Kimonis et al., in press). In both samples, a similar factor structure emerged with three factors (e.g., Uncaring, Callousness, Unemotional) loading on a higher-order CU dimension providing the best fit in both samples. The items on the ICU and the three factors are provided in Table 2. Importantly, the total scores proved to be internally consistent in both samples (coefficient alpha .77 to .81) and were related to antisocial behavior, aggression, delinquency, various personality dimensions, and psychophysiological measures of emotional reactivity in ways consistent with past research on CU traits.

Thus, the ICU could be a promising method for providing a more extended assessment of CU traits

**Table 2** Dimensions of callous-unemotional traits

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Uncaring	
	I work hard on everything I do. (I)
	I always try my best. (I)
	I care about how well I do at school or work. (I)
	I do things to make others feel good. (I)
	I apologize ('say I am sorry') to persons I hurt. (I)
	I feel bad or guilty when I do something wrong. (I)
	I easily admit to being wrong. (I)
	I try not to hurt others' feelings. (I)
Callousness	
	I do not care about doing things well.
	I do not like to put the time into doing things well.
	I do not feel remorseful when I do something wrong.
	I do not care about being on time.
	I do not care if I get into trouble.
	I seem very cold and uncaring to others.
	The feelings of others are unimportant to me.
	I do not care who I hurt to get what I want.
	I am concerned about the feelings of others. (I)
	I do not like to put the time into doing things well. <sup>a</sup>
	What I think is right and wrong is different from what other people think. <sup>a</sup>
Unemotional	
	I do not show my emotions to others.
	I express my feelings openly. (I)
	I hide my feelings from others.
	It is easy for others to tell how I am feeling. (I)
	I am very expressive and emotional. (I)

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Note: These are items from the self-report version of the Inventory of Callous-Unemotional Traits (ICU; Frick, 2004). The three dimensions emerged from factor analyses in non-referred German adolescents (Essau et al., 2006) and detained adolescents in the United States (Kimonis et al., in press). (I) designates items that are inversely coded. <sup>a</sup>denotes items eliminated from the factor analysis of Kimonis et al. due to poor item-total correlations.

(see also Andershed et al., 2002 for another more extended measure of CU traits). However, much further testing of this scale would be needed for it to be useful in many applied settings, especially in determining appropriate cut-scores for designating non-normative and problematic levels of these traits. Further, its format of relying on self-report or the report of others (i.e., parents and teachers) could limit its usefulness for a number of applied purposes (Johnstone & Cooke, 2004). In general, there is a need to go beyond single methods for assessing CU traits in both research and practice, given evidence that measures of CU traits, like many other constructs in psychology, do not show strong correlations across methods (Lee, Vincent, Hart, & Corrado, 2003). One example of the potential utility of combining across methods is a study of 88 detained adolescent boys ages 13 to 18 in which scores on the ICU and a laboratory measure of emotional processing of distress cues were used to statistically predict measures of aggression, self-report delinquency, and arrest records (Kimonis, Frick, Munoz, & Aucoin, 2007). The results indicated that the combination of high scores on the ICU and deficits in the processing of emotional

pictures enhanced the prediction of self-reported aggression and histories of violent arrests compared to either variable alone.

Finally, there are also a number of implications of this research on CU traits for prevention and treatment (Frick, 2006). First, by focusing on developmental pathways and by focusing on the developmental mechanisms that may have gone awry in different subgroups of antisocial youth, this research can help to designate important targets of preventive interventions that can focus on enhancing development, such as promoting the development of empathy (Chi-Ming, Greenberg, & Walls, 2003) or the development of emotional regulation (Larson & Lochman, 2003), even before the conduct problems and aggression are severe enough to warrant a psychiatric diagnosis. Second, the most successful interventions for children and adolescents with severe antisocial and aggressive behavior problems have two important characteristics: they tend to be comprehensive by focusing on a number of different risk factors that could lead to a child's behavioral problems and they tend to be individualized in that the focus of the comprehensive intervention is tailored to the child's unique needs (Conduct Problems Prevention Research Group, 2004; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998). Knowledge of the different characteristics of youth with CU traits compared to other antisocial and aggressive youth could aid in guiding these individualized treatments by helping to define the most important targets of intervention for an individual child (McMahon & Frick, 2005).

## Summary and conclusions

In summary, there now appears to be a rather substantial and growing body of research supporting the use of CU traits to designate a distinct subgroup of antisocial youth. These traits seem to be relatively stable across childhood and adolescence and they seem to designate a group of antisocial youth who show a more severe, aggressive, and stable pattern of antisocial behavior. Further, this subgroup of youth show a number of distinct cognitive, emotional, and personality characteristics such as showing abnormalities in their responsiveness to punishment cues, showing a diminished responsiveness to distress cues in others, and showing less trait anxiety when controlling for their level of antisocial behavior.

These results are quite promising and we have attempted to outline some of the potential implications of this research for causal models of antisocial and aggressive behavior, for research methods in this area of inquiry, and for assessment and treatment of antisocial youth. However, it is important to note some of the most critical limitations in this research as a guide for future work in this area. First, one area of great promise for this area of

research that was discussed previously is its potential to link research on the normal development of conscience with research on the development of antisocial and aggressive behavior. However, this link has largely been theoretical to date and based largely on data from cross-sectional studies. Much more longitudinal research is needed to track the trajectories of youth at risk for impairments in conscience development to determine factors that can make problems both more and less likely to occur. Further, this research needs to directly link variations in normal conscience development to CU traits to support the theoretical connection between these two constructs.

Second, although there is emerging research documenting distinct characteristics of youth with CU traits on the behavioral, personality, emotional, cognitive, and neurological levels, much more work is needed to refine at each of these multiple levels of analyses what characteristics are unique to children with these traits compared to other antisocial youth.

Third, there continues to be a need to develop and validate measures of CU traits that are useful for both research and practice. As noted previously, many of the measures currently being used in research have significant limitations (e.g., limited content related specifically to CU traits; no well-validated cut scores for making clinical decisions). We feel that one particularly promising area of work is the combination of multiple methods (e.g., rating scales, interviews, computer tasks) to enhance the assessment of youth with these traits.

Fourth, and perhaps most importantly, the treatment implications of this research have only recently begun to be explored. We have proposed that research on CU traits may be used to guide comprehensive and individualized approaches to treatment of antisocial youth. However, there have few studies that have directly tested the role of CU traits in moderating response to treatment. There are two notable exceptions.

Hawes and Dadds (2005) reported that clinic-referred boys (ages 4 to 9) 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 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. In another study of the differential response to treatment of

youth with CU traits, Waschbusch, Carrey, Willoughby, King, and Andrade (in press) reported that children (ages 7 to 12) with conduct problems and CU traits responded less well to behavior therapy alone than children with conduct problems without CU traits. However, these differences largely disappeared when stimulant medication was added to the behavior therapy, although the children with CU traits were still less likely to score in the normative range than those without these traits.

Clearly much more research is needed on the response to treatment of children with CU traits. However, these two studies provide strong motivation for such research. Both studies suggest that children with CU traits may be more difficult to treat but they are not unresponsive to treatment. They do respond to certain types of interventions. Research on the unique developmental mechanisms underlying their antisocial behavior could provide important clues as to what types of interventions may be most effective for this group of youth (Frick, 2006). Thus, there is some cause for at least cautious optimism that this research on CU traits could guide more effective interventions for a subgroup of youth who operate at a high cost to society because of their chronic and serious delinquent and aggressive acts.

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