Journal of Abnormal Child Psychology, Vol. 31, No. 4, August 2003, pp. 457–470 (© 2003)

Callous-Unemotional Traits and Conduct Problems in the Prediction of Conduct Problem Severity, Aggression, and Self-Report of Delinquency

Paul J. Frick,[1,3] Amy H. Cornell,[1] Christopher T. Barry,[2] S. Doug Bodin,[2] and Heather E. Dane[2]

Received April 26, 2002; revision received July 22, 2002; accepted October 2, 2002

The role of callous-unemotional (CU) traits and conduct problems in predicting conduct problem severity, severity and type of aggression, and self-reported delinquency at a 1-year follow-up was investigated in a sample of 98 children (mean age 12.43; $SD = 1.72$) recruited from a community-wide screening. Children with both CU traits and conduct problems had a greater number and variety of conduct problems at follow-up than children who at the screening had high levels of conduct problems alone. However, this poorer outcome for children with CU traits could largely be accounted for by differences in initial level of conduct problem severity. Children with CU traits and conduct problems were also at risk for showing higher levels of aggression, especially proactive aggression, and self-reported delinquency. Importantly, these outcomes could not be solely explained by initial level of conduct problem severity. Finally, CU traits predicted self-reported delinquency in some children who did not initially show high levels of conduct problems and this predictive relationship seemed to be strongest for girls in the sample who were high on CU traits but who did not show significant conduct problems.

KEY WORDS: callous-unemotional traits; aggression; delinquency; conduct problems.

One major focus of research on childhood conduct problems has been to define potentially important subgroups of children with conduct problems who differ on (a) the types and severity of conduct problems they display, (b) the course and trajectory of their problem behavior, and (c) theoretically important characteristics that could suggest different causal processes underlying their behavioral disturbance (see Frick & Ellis, 1999 for a review). Despite the general recognition that children with conduct problems represent a very heterogeneous group, few methods of subtyping have gained widespread acceptance in research and practice. The one notable exception is the distinction made between youth with conduct problems who differ on the age at which their serious antisocial and aggressive behaviors begin to emerge (American Psychiatric Association, 2000).

Specifically, there appears to be one group of children with conduct problems who begin showing severe problems prior to adolescence, usually as a continuation of behavior problems that start very early in development and steadily increase in rate and severity across childhood (Lahey & Loeber, 1994). In contrast, there is a second group of children whose severe conduct problems emerge with the onset of puberty without an earlier history of problem behavior (Hinshaw, Lahey, & Hart, 1993; Moffitt, 1993). Importantly, children with early onset conduct problems have proven to have poorer outcomes, such as being more likely to show antisocial and criminal behavior in adulthood, compared to their adolescent-onset counterparts (Frick & Loney, 1999; Moffitt, 1993). In addition, children in the childhood-onset group are characterized by more aggression, more cognitive and neuropsychological disturbances, greater impulsivity, greater social alienation,

[1]University of New Orleans, New Orleans, Louisianoa.
[2]University of Alabama, Alabama.
[3]Address all correspondence to Paul J. Frick, Department of Psychology, University of New Orleans, 2001 Geology & Psychology Building, New Orleans, Louisiana 70148; e-mail: pfrick@uno.edu.

0091-0627/03/0800-0457/0 © 2003 Plenum Publishing Corporation

P1: ZBU
Journal of Abnormal Child Psychology pp874-jacp-466277 April 24, 2003 22:26 Style file version May 30th, 2002

and more dysfunctional family backgrounds compared to children in the adolescent-onset group (Frick, 1998a; Moffitt, 1993; Moffit, Caspi, Dickson, Silva, & Stanton, 1996). These differences in the developmental trajectories and correlates of severe conduct problems in these two subgroups of children suggest that the childhood-onset subtype may be a more characterological disturbance, resulting from a transactional process between a vulnerable temperament in the child and his or her experience of an inadequate rearing environment (Frick, 1998a; Moffitt, 1993).

In an attempt to expand on this basic two-trajectory model, another line of research has attempted to divide children in the childhood-onset pathway into even more homogenous subgroups. Specifically, children in the childhood-onset group seem to be characterized by poor emotional and behavioral regulation (Frick, 1998a; Moffitt, 1993). However, the transactional developmental processes leading to this poor emotional and behavioral regulation may be different for subgroups of children within the childhood-onset subtype. A marker for these different patterns of emotional dysregulation may be the presence or absence of callous and unemotional (CU) traits. CU traits refer to a specific affective (e.g., absence of guilt, constricted display of emotion) and interpersonal (e.g., failure to show empathy, use of others for one's own gain) style that is characteristic of a subgroup of children with severe conduct problems (Christian, Frick, Hill, Tyler, & Frazer, 1997; Frick, Barry, & Bodin, 2000; Frick, O'Brien, Wootton, & McBurnett, 1994). Children with conduct problems who also show CU traits tend to be more thrill and adventure seeking (Frick et al., in press; Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999), are less sensitive to cues of punishment when a reward-oriented response set is primed (Fisher & Blair, 1998; Frick et al., in press; O'Brien & Frick, 1996), and are less reactive to threatening and emotionally distressing stimuli(Blair, 1999; Frick et al., in press; Loney, Frick, Clements, Ellis, & Kerlin, in press). In addition, their conduct problems appear to be less strongly associated with dysfunctional parenting practices (Wootton, Frick, Shelton, & Silverthorn, 1997) and with deficits in verbal intelligence (Loney, Frick, Ellis, & McCoy, 1998).

The characteristics of children with conduct problems who show CU traits are consistent with a temperamental style associated with low emotional reactivity to aversive stimuli that is characterized physiologically by underreactivity in the sympathetic arm of the autonomic nervous system, and behaviorally by low fearfulness to novel or threatening situations and poor responsiveness to cues to punishment (Kagan & Snidman, 1991). This temperamental style can impair the development of the affective components of conscience (Blair, 1999; Frick, 1998b; Frick et al., in press; Frick, Barry, et al., 2000; Kochanska, 1993). Further, both the presence of CU traits and the associated emotional deficits in this subgroup of children with conduct problems are consistent with the construct of psychopathy that has been used to designate a subgroup of antisocial adults (Hare, 1998; Hart & Hare, 1997).

One critical finding in the adult literature is that, not only do antisocial individuals who show psychopathic traits show characteristics that could suggest different causal processes underlying their antisocial behavior, but these traits seem to have important predictive utility. Of most importance is the finding that psychopathic traits predict recidivism, especially violent recidivism, when an individual is released from an institution (Hart, Kropp, & Hare, 1988; Serin, 1993; Serin, Peters, & Barbaree, 1990). Also, research on adult forensic samples suggests that antisocial individuals who show psychopathic traits are more aggressive than other antisocial individuals, exhibiting a higher rate of aggression both inside and outside of forensic institutions and showing aggression that results in more severe harm to their victims (see Hart and Hare, 1997 for a review). Further, antisocial individuals high on psychopathic traits show more premeditated and instrumental (e.g., to obtain goods or services, for social dominance) violent acts, whereas antisocial individuals who are low on psychopathy tend to show violence that is limited to situations involving high emotional arousal (e.g., a fight; Cornell et al., 1996).

Unfortunately, the predictive utility of the construct of psychopathy and its relation to violence severity and type has not been extensively studied in youth (Edens, Skeem, Cruise, & Cauffman, 2001). There are several notable exceptions using samples of institutionalized adolescents. These studies have documented that the presence of CU traits predicts subsequent delinquency, aggression, number of violent offenses, and a shorter length of time to violent reoffending in antisocial youth (Brandt, Kennedy, Patrick, & Curtin, 1997; Forth, Hart, & Hare, 1990; Toupin, Mercier, Dery, Cote, & Hodgins, 1995). Despite these notable exceptions, much of the research attempting to extend the construct of psychopathy to youth has not been prospective in nature but has been cross-sectional. These cross-sectional studies have generally focused on the usefulness of CU traits for designating a particularly severe subgroup of antisocial youth. For example, antisocial youth who show CU traits have been shown to exhibit a greater variety and severity of crimes than other youth with conduct problems (Lynam, 1997). Further, children with conduct problems who show CU traits show a greater number and variety of conduct problems,

P1: ZBU
Journal of Abnormal Child Psychology pp874-jacp-466277 April 24, 2003 22:26 Style file version May 30th, 2002

more police contacts, and stronger family histories of antisocial personality disorder than other children with conduct problems (Christian et al., 1997). Also, consistent with research on adults, there seems to be an especially strong link between CU traits and severity and type of aggression in antisocial youth. For example, CU traits have been associated with violent sex offending (Caputo, Frick, & Brodsky, 1999) and with more severe and pervasive patterns of violence that include instrumental (i.e., violence for monetary or social gains) and sadistic violent acts (Kruh, Frick, & Clements, in press) in institutionalized adolescents.

Taken together, these results are promising in suggesting that antisocial youth who also show CU traits may show an especially severe, aggressive, and chronic type of disturbance. However, this research is limited by a number of factors including having only a few studies that employed a prospective design, the reliance on clinic-referred or forensic samples (except Lynam, 1997), and the focus on adolescent samples (except Christian et al., 1997). On the basis of these considerations, the main goal of the current study was to test the predictive utility of CU traits in a nonreferred sample of elementary school-aged children. The predictive utility of these traits was tested for a number of antisocial outcomes that have important practical and/or theoretical implications.

The first outcome focused on the severity and type of conduct problems, which is one of the strongest predictors of poor outcome for children with conduct problems (Frick & Loney, 1999). Given the association between psychopathic traits and the severity and variety of antisocial behaviors shown in adult samples (Hart & Hare, 1997), the current study tested the prediction that CU traits would also predict the severity and variety of conduct problems in children. The second outcome focused on aggressive behavior. There is also evidence to suggest that children with conduct problems who are aggressive also tend to form a severe and chronic subgroup of antisocial youth (Frick & Ellis, 1999). Even more importantly, research reviewed previously has suggested that psychopathic traits may be related to the severity of aggression and violence and may be specifically related to certain patterns of aggression and violence (Hart & Hare, 1997). Therefore, the current study tested the prediction that CU traits would not only predict more severe aggressive behavior but also would be associated with patterns of aggression that included instrumental aggression. The third outcome focused on the child's self-report of engagement in delinquent acts. Children with conduct problems are at risk for engaging in illegal activities, although only a small subgroup of children with conduct problems account for the majority of delinquent acts (Frick & Loney, 1999; Moffitt, 1993). Although the link between CU traits and involvement in illegal activities has been documented in a cross-sectional study using a clinic sample (Christian et al., 1997), this link has not been tested prospectively in a nonreferred sample. Therefore, the current study tested the prediction that the presence of CU traits would predict a higher level of self-reported delinquent acts in children with conduct problems and that these traits may be particularly related to aggressive and violent acts.

There are many reasons for studying the predictive utility of CU traits in nonreferred samples. For example, it is important to test whether findings from previous studies could have been influenced by referral biases or differential arrest and prosecution practices that can operate in clinic-referred and forensic samples. Also, it is important to determine whether the predictive utility of CU traits is confined to only the most severely antisocial youth and whether CU traits predict future antisocial behavior even in the absence of significant conduct problems. This latter possibility was not tested in previous studies, since children with CU traits without significant problem behaviors are not likely to be included in clinic-referred or forensic samples. However, there are a number of limitations in studying the predictive utility of CU traits in a nonreferred sample. Since only a minority of all children in a community sample show severe conduct problems, and only a minority of these children show CU traits (see Christian et al., 1997), it is necessary to collect data on a sufficient number of children to have a large enough sample to divide conduct problem groups into subgroups based on the presence or absence of CU traits and still have sufficient power to detect differences between these subgroups. Following such a large community sample over time to investigate the predictive utility of CU traits is quite costly.

As a result of these considerations, the present study recruited a community sample of children using a procedure that oversamples children with conduct problems and children with CU traits, similar to the method used in past research to recruit high risk community samples (Loeber, Farrington, Stouthamer-Loeber, Moffitt, & Caspi, 1998). The sample was composed of children in grades 3, 4, 6, and 7. These grades were chosen to ensure that a younger cohort (grades 3 and 4) included children who had not yet entered adolescence, given the importance of pre-adolescent onset to serious conduct problems in many models of severe and persistent antisocial behavior (Frick, 1998a; Moffitt, 1993). The second cohort was chosen to include a group of children who would be approaching the transition into adolescence. Given the short follow-up reported in this study (1 year), the test of the predictive utility of CU traits on the adolescent onset of antisocial, aggressive, and delinquent behavior could not be adequately tested

P1: ZBU
Journal of Abnormal Child Psychology pp874-jacp-466277 April 24, 2003 22:26 Style file version May 30th, 2002

and will be the focus of later follow-up investigations in this sample of youth.

METHOD

Participants

Selection of participants for this study was conducted in two phases. First, announcements were sent to approximately 4,000 parents of children in the 3rd, 4th (Younger Cohort) and in the 6th and 7th (Older Cohort) grades of two public school systems of a moderate sized city in the southern United States. Parents who agreed to participate and who completed an informed consent form were sent a questionnaire that assessed for CU traits and a questionnaire that assessed for the *DSM-IV* symptoms of Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD; American Psychiatric Association, 2000). Once the consent forms and questionnaires were received from the parents, the child's teacher completed analogous questionnaires. The child's classroom received $10.00 for educational supplies for each student participating in this screening project. This procedure resulted in a sample of 1,136 children that closely approximated the participating school districts in being 53% girls, 19% African-American/77% Caucasian, and 21% receiving special education services. There was a normative range of socioeconomic statuses represented in this sample with a mean Duncan's Socioeconomic Index (SEI; Hauser & Featherman, 1977) of 47.20 ($SD = 23.8$) ranging from 0 to 92.3 and with scores of 24 and 64 at the 1st and 3rd quartiles of the sample.

Participants for the current study were recruited from this community sample using a multistep stratified random sampling procedure designed (a) to oversample the groups that differed on their levels of CU traits and conduct problems, (b) to ensure that there was clear divergence between children high and low on these factors by taking those that were above the upper quartile for high levels of these factors but below the mean for low levels of these factors, (c) to ensure that these groups were similar in gender, racial, and socioeconomic representation to children from the larger community sample with similar levels of CU traits and conduct problems (e.g., the group high on conduct problems but low on CU traits included in the study had the same gender, racial and socioeconomic representation as that group in the larger community sample), and (d) to ensure that the four groups of interest were evenly divided between the two grade cohorts.

To accomplish these goals, the screening sample of 1,136 children was first divided into four groups based on the combined ratings of parents and teachers for CU traits and conduct problem symptoms which were significantly correlated ($r = .55$; $p < .001$). One group was below the sample mean on both dimensions ($n = 225$), one group was at or above the upper quartile on the measure of conduct problems but below the mean on the measure of CU traits ($n = 66$), one group was at or above the upper quartile on the measure of CU traits but below the mean on the measure of conduct problems ($n = 77$) and one group was above the upper quartile on both dimensions ($n = 128$). Second, each of these four groups was stratified on gender, ethnicity, and socioeconomic status. Third, a stratified random sampling procedure was used to recruit 25 children in each of the four groups to participate in the current study, with the four groups matching the group from which they were sampled on the stratification variables and with each group having approximately equal numbers of children from the younger and older grade cohorts (see Table I). Becaue of errors in data collection, two subjects were lost in the group high on conduct problems but low on CU traits.[4] This resulted in a study sample of 98 children that filled a $2 \times 2 \times 2$ study design with level of CU traits, level of conduct problems, and grade cohort forming the three between group factors. The follow-up assessment was conducted approximately 1 year after the initial screening, with a mean length of time of 12.99 months ($SD = 4.67$ months) between the two assessments.

Measures: Time One Predictor Variables

Callous-Unemotional Traits

The Antisocial Process Screening Device (APSD; Frick & Hare, 2001), which was formerly known as the Psychopathy Screening Device (e.g., Frick, Bodin, & Barry, 2000), is a 20-item behavior rating scale that was completed by each child's parent and teacher during the

[4] Unfortunately, the errors in data collection were not detected until after the 1-year follow-up was completed and, therefore, the subjects could not be replaced by others in the same group with similar demographic characteristics. However, the loss of the two subjects did not change the match between the study sample of children high on conduct problems but low on CU traits with the demographic composition of this group in the larger community sample. As a result, the stratification procedure was not affected. In addition, because sampling was stopped as soon as 25 subjects in each group was obtained, participation rates are not informative because it is unclear what percentage would have participated in each group had they all been approached. As a result, the key test of the stratified sampling procedure is whether or not the demographic variables of each cell, representing the subgroups of interest, matched the demographic composition of the same group in the larger community sample. This information is provided in Table I.

Table I. Demographic and Diagnostic Characteristics of the Sample at Initial Screening

	Low CU Low CP ($n = 25$)	Hi CU Low CP ($n = 25$)	Low CU High CP ($n = 23$)	Hi CU Hi CP ($n = 25$)	Effects	Total ($n = 98$)
Age	12.20 (1.55)	12.68 (2.01)	12.26 (2.71)	12.28 (1.67)		12.36 (1.73)
SES	*54.07*/53.49a (12.38)	*39.29*/42.10ba (22.46)	*52.86*/54.53a (19.95)	*37.92*/37.17b (19.10)	CU[a]	46.67 (19.96)
K-BIT	109.68a (11.13)	102.72ab (14.55)	107.74a (11.48)	99.40b (12.10)	CU[b]	104.83 (12.88)
CU traits	1.16a (0.99)	7.28c (1.40)	3.13b (1.06)	7.76c (1.31)	CU[c], CP[d], CU × CP[e]	4.92 (3.09)
ODD/CD Symptoms	0 (0)	0.32 (0.48)	4.87 (2.03)	8.24 (2.62)		3.33 (3.83)
Cohort (% Young)	52%	52%	48%	48%		50%
Ethnicity (% Minority)	*15%*/8%	*40%*/36%	*17%*/9%	*35%*/32%	CU[f]	21%
Gender (% Female)	*68%*/68%	*45%*/40%	*50%*/48%	*33%*/36%	CU[g]	47%
ODD/CD Diagnosis	0%	0%	65%	92%		39%
ADHD Diagnosis	4%	16%	17%	48%		21%

Note. SES = Duncan's Socioeconomic Index (Hauser & Featherman, 1977); K-BIT = Composite Index from the Kaufman Brief Intelligence Test (Kaufman & Kaufman, 1990); ODD/CD symptoms and diagnoses and ADHD diagnoses are based on parent and teacher ratings from the Child Symptom Inventory-4 (CSI-4; Gadow & Sprafkin, 1995). Numbers in italics are included to show demographic representation of that group in the larger community sample. Effects are from either 2 × 2 ANOVA or 2 × 2 Logit Model analyses with level of CU traits and level of conduct problems, as the between groups factors; Effects for the presence of a conduct problem diagnosis and conduct problem symptoms could not be calculated because no symptoms or diagnoses were present in the control group.

[a] $F(3, 94) = 14.27$, $p < .001$.
[b] $F(1, 94) = 9.30$, $p < .01$.
[c] $F(1, 94) = 488$, $p < .001$.
[d] $F(1, 94) = 25.46$, $p < .001$.
[e] $F(1, 94) = 9.29$, $p < .01$.
[f] $\chi^2(df = 1, 98) = 8.29$, $p < .01$.
[g] $\chi^2(df = 1, n = 98) = 4.68$, $p < .05$.

initial screening. Factor analyses from the large screening sample found three dimensions underlying this rating scale: a 7-item Narcissism dimension, a 5-item Impulsivity dimension, and a 6-item Callous-Unemotional dimension (Frick, Bodin, et al., 2000). The CU dimension consists of the items "feels bad or guilty (R)," "concerned about the feelings of others (R)," "does not show emotions," "is concerned about schoolwork (R)," "keeps promises (R)," and "keeps the same friends (R)." It was the most stable dimension of the APSD across multiple samples (Frick, Bodin, et al., 2000) and it had an internal consistency of .76 in the full screening sample. Parent and teacher ratings on the APSD CU scale were correlated $r = .38 (p < .001)$ and similar factor structures were evident in the two sets of ratings (Frick, Bodin, et al., 2000).

Ratings from parents and teachers were combined by using the higher score from either informant for each item (Piacentini, Cohen, & Cohen, 1992). This method for combining ratings was used based on several considerations. First, the report of any single informant who may not see the child in multiple situations will be limited and, therefore, use of ratings of each informant individually would not provide the most accurate assessment of these traits. Second, there can be substantial motivation for persons to under-report a child's level of the traits assessed by the APSD, which are generally not socially desirable, but motivation for over-reporting of such behaviors appears less likely. Therefore, considering a trait as present only when multiple informants report it as present does not seem justifiable. Third, a child who is scored high by multiple raters may not be more extreme on these traits than a child who is scored high by only one rater. Discrepancies may be due to the fact that the situation in which one rater sees the child is not as likely to elicit these traits than another situation or it may be due to the fact that the child is able to mask such behaviors in certain situations. As a result, a simple summative or averaging approach to combining information across informants also did not seem justifiable.

Disruptive Behavior Disorder Symptoms

The Disruptive Behavior Disorders section of the Children's Symptom Inventory-4 (CSI-4; Gadow & Sprafkin, 1995) was included in the community screening and the symptoms of Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD) were used to form groups. Consistent with the procedure used to combine

P1: ZBU
Journal of Abnormal Child Psychology pp874-jacp-466277 April 24, 2003 22:26 Style file version May 30th, 2002

informants on the APSD, a multiinformant composite was formed by using the highest rating of each symptom. The parent and teacher correlations in the community sample were $r = .29$ ($p < .001$) for the CD symptoms and $r = .35$ ($p < .001$) for the ODD symptoms. Also, ODD and CD symptoms according to parent and teacher report were significantly correlated ($r = .60$; $p < .001$). Using a combination of parent and teacher reports on the CSI-4, Gadow and Sprafkin (1995) reported good correspondence between CSI-4 scores and clinician diagnoses in a clinic sample of school-aged children ($n = 63$), with sensitivity rates for predicting the diagnoses of ODD and CD of .93.

To estimate the severity of conduct problems experienced by the two conduct problem groups, the percentage of children who met *DSM-IV* criteria based on the number of symptoms rated as "Often" or "Very Often" on the CSI-4 by either parent or teacher is reported in Table I. On the basis of this research criterion, 65% of the children with conduct problems who were low on CU traits and 92% of the children with conduct problems who were high on CU traits met this diagnostic threshold. Using the same method for determining symptom presence, the rate of ADHD diagnoses was estimated and is also reported in Table I. Overall, 21% of the sample met this research criterion for ADHD, with the majority falling in the group high on CU traits and conduct problems. However, the 2×2 logit model analysis testing whether an ADHD diagnosis was related to the primary variables of theoretical interest (CU traits and conduct problems) did not reveal any significant main effects or interactions.

Measures: Time Two Outcome Variables

Conduct Problem Symptoms

The NIMH Diagnostic Interview Schedule for Children—Version 4 (DISC-4; Shaffer & Fisher,1996), developed to correspond to the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (*DSM-IV*; American Psychiatric Association, 1994), was used to assess for all symptoms of ODD and CD at the 1-year follow-up assessment based on child and parent report. The DISC-4 is a highly structured interview designed to be administered by lay interviewers with appropriate training and has proven to be highly reliable on both the symptom and diagnostic level (Lahey et al., 1994). Interviewers were a licensed psychologist or advanced graduate students in psychology who completed a course on the psychological assessment of children and who were trained in standardized administration procedures for the DISC.

Consistent with other measures, symptoms were considered present if endorsed by either the parent or child. The correlation between parent and child report of ODD symptoms was $r = .13$ ($p = ns$), for CD symptoms was $r = .31$ ($p < .001$), and for a combination of ODD/CD symptoms was $r = .25$ ($p < .01$). Also, the correlation between parent/child report of ODD symptoms and CD symptoms was $r = .64$ ($p < .001$). In addition to determining the number of conduct problems as an indicator of severity, the symptoms of ODD and CD were divided into the four symptom types (Frick et al., 1993): Oppositionality, Aggression, Status Offenses, and Property Violations. An index of conduct problem variety was determined by summing the number of categories in which a child displayed a symptom, which could range from 0 to 4.

Aggressive Behavior

The Aggressive Behavior Rating Scale (Brown, Atkins, Osborne, & Milnamow, 1996) was developed to distinguish between reactive and proactive forms of aggression. Brown et al. (1996) isolated a 10-item proactive aggression factor (e.g., "I have hurt others to win a game or context") and a 6-item reactive aggression factor (e.g., "I get mad when I don't get my own way") in a sample of 186 community children in grades 3 through 5. Parent and child report versions of this scale were used and these were correlated ($r = .25$, $p < .01$). Consistent with other measures, a composite index was formed by taking the highest rating for each aggressive behavior from either informant. The composites for the two aggressive subscales had internal consistencies of .81 (proactive) and .85 (reactive) and these internal consistencies were very similar in the younger (.83 and .84) and older (.78 and .86) cohorts. Also, the aggression subscales were significantly correlated ($r = .70$, $p < .001$).

Self-Report of Delinquency

The number and types of crimes committed were determined by youth self-report using the Self-Reported Delinquency Scale (SRD; Elliott & Ageton, 1980). The SRD lists 36 questions about illegal juvenile acts and was developed from a list of all offenses reported in the Uniform Crime Report with a juvenile base rate of greater than 1% (Elliott & Huizinga, 1984). Consistent with past uses of the scale (Krueger et al., 1994), a composite measure was created summing the number of delinquent acts committed (with a possible range of 0–36) and this composite had a coefficient alpha of .74. There are four additional subscales assessing for specific types of delinquent

acts, including only more serious offenses. These included property offenses (7 items; e.g, "have you ever purposely damaged or destroyed property belonging to school"), status offenses (4 items; e.g., "have you ever taken a vehicle for a ride without the owners' permission"), drug offenses (9 items; e.g., "have you ever sold hard drugs such as heroin, cocaine, and LSD") and violent offenses (8 items; "have you ever been involved in gang fights"). Importantly, the violent offense scale includes items that could include threats of physical violence, as well as actual violence (e.g., "have you ever hit (or threatened to hit) a teacher or other adult at school"). Because the subscales included only more serious offenses, the range of scores on most of these measures was somewhat restricted in this community sample and showed very skewed distributions, which led to low internal consistency estimates (coefficient alphas .32–.62). As a result, analyses with these subscales were conducted using only nonparametric tests, with the presence or absence of any offense in a given category as the dichotomous dependent variable (Krueger et al., 1994).

Procedures

Using the stratified random sampling procedure described previously, parents who participated in the community-wide screening were contacted and invited to participate in the follow-up assessment approximately 1 year later. Participants were tested in two sessions with the procedures standardized for all participants. Other measures included in this assessment are described elsewhere (Frick et al., in press). The first session started with an informed consent procedure conducted with the parent and child together. They were then separated and parents were administered a semistructured interview to obtain demographic information followed by the DISC interview. Following the DISC, the parents completed all of the behavior rating scale measures. In a separate room, children were administered the K-BIT as an intellectual screening, and the DISC interview. During the second testing session, children completed the self-report rating scales. Parents were provided with a $65.00 check and children were given a $15.00 gift certificate to a music store or book store for their participation.

RESULTS

Descriptive Statistics and Overview of Primary Data Analysis

The means and standard deviations of the primary continuous outcome measures and percentage of participants with each type of self-reported delinquent offense are reported in Table II. Also reported in this table are the correlations among outcome measures. These correlations revealed that the conduct problem measures and aggression measures were highly intercorrelated ranging from .59 to .82 (all $p < .001$). These high correlations are likely due to both the relatedness of these constructs, as well as shared method variance, given that they were both based on a combination of parent and child report. There was more divergence between these two constructs and the delinquency measures, with correlations ranging from $-.05$ ($p = ns$) to .44 ($p < .01$). In particular, the status offense and drug offense variables were only minimally associated with the measures of conduct problems and aggression.

The primary data analyses were organized around the three main constructs of interest: conduct problems, aggression, and self-reported delinquency. The method of

Table II. Descriptive Statistics for and Intercorrelations Among Outcome Variables

	Mean	*SD*	Variety of Sx	Total Agg	Proactive Agg	Reactive Agg	Total Del	Violence	Property	Status	Drug
ODD/CD Sx	2.82	3.56	.82***	.73***	.67***	.67***	.26**	.15	.35**	.11	−.05
Variety Sx	1.27	1.21		.70***	.59***	.72***	.41***	.31**	.44**	.41***	.02
Total Agg	9.50	5.86			.94***	.90***	.35***	.30**	.36***	.19*	−.01
Proactive Agg	4.52	3.52				.70***	.35***	.27**	.35***	.15	.00
Reactive Agg	4.98	2.84					.28**	.29**	.31***	.21*	−.03
Total Del	1.55	2.17						.75***	.68***	.59***	.50***
Violent		30%							.45***	.44***	.38***
Property		23%								.35***	.10
Status		25%									.25**
Drug		8%									

Note. ODD = Oppositional Defiant Disorder; CD = Conduct Disorder; Variety = Number of different types of conduct problems; Proactive Aggression and Reactive Aggression scores are all from the Aggressive Behavior Rating Scale (Brown et al., 1996). Delinquency measures were based on the child's self report using the Self-Report of Delinquency scale (Elliott & Ageton, 1980). The total delinquency scale sums the number of delinquent acts reported, whereas the individual offense categories are scored present or absent based on whether any act within the category was endorsed.

Table III. CU Traits and Conduct Problems in the Prediction of Conduct Problem Symptom Severity at Follow-up

	Low CU Low CP ($n = 25$)	Hi CU Low CP ($n = 25$)	Low CU High ($n = 23$)	Hi CU Hi CP ($n = 25$)	Significant Effects $F(1, 86)$
Measures of conduct problem severity					
ODD/CD Sxs	0.65 (0.86)a	1.46 (1.66)ab	3.20 (3.00)b	5.92(4.71)c	CU, 6.47**; CP, 32.40***
Variety of Sxs	0.28 (0.52)a	0.93 (0.75)ab	1.51(0.97)b	2.33(1.49)d	CU, 10.83***; CP, 43.77***
Measures of aggression severity and type					
Total aggression	6.65 (4.58)a	6.70 (3.41)ab	10.11 (4.77)b	14.49 (5.77)c	CU, 4.51*; CP, 36.87***; Cohort, 4.01*; CU × CP, 5.57*+; CU × Cohort, 5.57*+
Proactive	3.25 (2.92)a	2.95 (1.35)a	4.67 (2.54)a	7.16 (3.89)b	CP, 22.20***; CU × CP, 5.53*+
Reactive	3.40 (2.03)a	3.74 (1.86)ab	5.44 (2.76)b	7.33 (2.61)c	CU, 4.71*; CP, 37.78***; CU × Cohort, 8.50**

Note. CU = Callous-unemotional Traits; CP = Conduct Problems; ODD = Oppositional Defiant Disorder; CD = Conduct Disorder; Variety = Number of different types of conduct problems; Proactive Aggression and Reactive Aggression scores are all from the Aggressive Behavior Rating Scale (Brown, Atkins, Osborne, & Milnamow, 1996). Effects are based on 2 × 2 × 2 ANCOVA with level of CU traits, level of conduct problems, and grade cohort as the two factors with SES, gender, race, and intelligence used as covariates; Means are least squared means (Std) adjusted for the covariates and different letters denote significant differences in pairwise comparisons using Tukey's procedure for pairwise comparisons.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$ (All effects designated at $p < .05$ were not significant using the modified Bonferroni method unless accompanied by +).

sample formation led to a 2 × 2 × 2 experimental design with CU traits (Hi vs. Low), conduct problems (Hi vs. Low) and grade cohort (3rd/4th grade vs. 6th/7th grade) as the three predictors, with approximately equal numbers of children in each of the cells. Because demographic variables were not equivalent across groups (see Table I) sex, intelligence, socioeconomic status, and race were used as covariates in all analyses to ensure that these potential confounds could not solely account for associations between predictors and outcome variables. To control for family-wise error rates within the 2 × 2 × 2 ANCOVA's for each outcome domain, the modified Bonferroni method recommended by Jaccard and Guilamo-Ramos (2002) was used.[5] All of these analyses were repeated controlling for number of conduct problems present at the initial screening, to determine whether or not the effects could be explained by differences in the initial level of conduct problem behavior across groups.

Primary Analyses

The analyses of the conduct problem variables assessed at the 1-year follow-up revealed fairly consistent findings. These are summarized in Table III. Specifically, for both the number of total conduct problems and variety of conduct problem symptoms, there were main effects for both initial levels of conduct problems and initial levels of CU traits. These results suggest an additive effect of CU traits and conduct problems which is apparent in the very high rate of conduct problem behavior in the group high on both CU traits and conduct problems. For both indices of conduct problem severity, the group high on both CU traits and conduct problems was higher at the 1-year follow-up assessment. None of the interactions between CU traits and conduct problems were significant, nor were interactions involving cohort significant. When these analyses were repeated controlling for initial levels of conduct problems, all of these effects for both CU traits and conduct problems were reduced to nonsignificance using the modified Bonferroni procedure. These results suggest that the effects found in the main analyses could largely be explained by differences in the initial level of conduct problem behavior across groups. Of note, the main effect for CU traits approached significance in predicting the variety of conduct problems displayed at follow-up, $F(1, 85) = 5.21$, $p < .05$, even after controlling for initial level of conduct problem behavior.

Analyses of the composite measure of aggression and the two aggression subscales showed a somewhat different pattern of results and these analyses are reported in Table III. First, for each aggression measure there was a main effect of conduct problems but the effect for CU traits did not reach the adjusted level of significance for any variable. Second, there was an unexpected interaction

[5]This procedure first determines if the smallest p-value exceeds the $.05/k$ Bonferroni-corrected alpha level, with k equaling the number of contrasts within the family of contrasts. If this p-value exceeds the corrected level, then all larger p-values within the family of contrasts are not considered significant. If the p-value does not exceed this level, the next largest p-value is evaluated against a $.05/k - 1$ criteria and so on until a nonsignificant difference is found (Jaccard & Guilam-Ramos, 2002).

Table IV. CU Traits and Conduct Problems in the Prediction of Self-Reported Delinquency

	Low CU Low CP ($n = 25$)	Hi CU Low CP ($n = 25$)	Low CU High CP ($n = 23$)	Hi CU Hi CP ($n = 25$)	Significant effects $F(1, 84)$
Mean number of delinquent acts					
Total	1.06 (2.29)	1.84 (2.39)	0.84 (0.94)	2.34 (2.36)	CU, 5.95**; Cohort, 5.64**; $\chi^2(df = 1, n = 98)$
Percentage showing a delinquent act					
Any	16%	40%	26%	64%	CU, 5.56**; CU × Cohort, 3.67*; CU × CP × Cohort, 4.45*
Violence	16%	36%	13%	53%	CU, 4.73*
Property	4%	28%	17%	40%	
Status	8%	32%	26%	36%	CU, 5.07*
Drug	8%	12%	4%	8%	

Note. CU = Callous-unemotional Traits; CP = Conduct Problems; Effects for continuous variables are based on 2 × 2 × 2 ANCOVA with level of CU traits, level of conduct problems, and grade cohort as the two factors with SES, gender, race, and intelligence used as covariates; Means are least squared means adjusted for the covariates. Effects for dichotomous delinquency variables are based on a logistic regression with CU, CP, grade cohort, their interactions, and demographic variables as predictors. Although logit analyses use odds ratios rather than percentages in determining effects, proportions are reported in the table for ease of interpretation.
* $p < .05$. ** $p < .01$. *** $p < .001$ (All effects designated at $p < .05$ were not significant using the modified Bonferroni method).

between CU traits and cohort for total aggression and reactive aggression, which was due to CU traits being associated with more reactive aggression but only in the older cohort. Third, there was a significant interaction between CU traits and conduct problems for the analyses of the composite measure of aggression and proactive aggression subscale. The cell means are provided in Table III to explain this interaction. Specifically, children with conduct problems tended to have higher levels of aggression than children without conduct problems. However, children with CU traits and conduct problems had much higher rates of aggression than any of the other groups and differed significantly from the group with conduct problems only in each case. Importantly, and consistent with predictions, the conduct problems only group did not differ from the control group on level of proactive aggression. When controlling for severity of conduct problems at the initial assessment, the main effects for CU traits and conduct problems in predicting each aggression measure was no longer significant. However, the interaction in the ANCOVA for proactive aggression approached significance, $F(1, 85) = 3.68$, $p < .05$, with the same pattern emerging across groups. The group high on CU traits and conduct problems showed higher rates of proactive aggression than the group high on conduct problems only, with the latter group not differing from the other groups on their level of proactive aggression.[6]

[6]The measures of conduct problems and aggression were all based on parent and child report at follow-up assessment. The groups were formed at screening based on parent and teacher report of CU traits and conduct problems. As a result, there was a potential problem with shared method variance in that both sets of variables shared parental reporting. To test for the effects of this method variance, the ANCOVA analyses for both conduct problems and aggression were repeated using only child report for the dependent variables. The effects were essentially unchanged in these analyses. The one exception to this trend is that a significant interaction between CU traits and conduct problems emerged as significant for all three aggression measures in these analyses, mainly due to the high rate of aggression found in the combined CU and conduct problem group.

Self-Reported Delinquency Outcomes

The last set of outcome measures focused on self-reported delinquent behaviors at the 1-year follow-up assessment. The results of these analyses are summarized in Table IV. A very different pattern of findings emerged from these analyses. Specifically, in no case did a main effect for conduct problems emerge in predicting self-reported delinquency. However, main effects for CU traits emerged for the total delinquency scale, whether analyzed continuously for the total number of delinquent acts or whether analyzed as the odds of a child showing a delinquent act in logistic regression analyses. Although none of the effects for the individual types of delinquency reached the corrected level for statistical significance, the main effect for CU traits for violent delinquency and status offenses approached significance ($p < .05$) suggesting that the higher rates of involvement in these two types of delinquency largely accounted for the main effect of CU traits in the overall analyses. The significant effects for self-reported delinquency were substantially unchanged when initial levels of conduct problems were controlled in analyses. Specifically, main effects for CU traits remained significant in the ANCOVA for the measures of general delinquency, $F(1, 83) = 6.19$, $p <$

P1: ZBU
Journal of Abnormal Child Psychology pp874-jacp-466277 April 24, 2003 22:26 Style file version May 30th, 2002

.01, and in the logistic regression analyses predicting any delinquent offense, $\chi^2(df = 1; n = 98) = 5.57$, $p < .01$, and approached significance in predicting any violent delinquency, $\chi^2(df = 1; n = 98) = 4.68$, $p < .05$, and any status offense, $\chi^2(df = 1; n = 98) = 5.38$, $p < .05$, after controlling for initial level of conduct problems.

Post Hoc Analyses: Potential Interactions With Gender and the Influence of ADHD Diagnosis

As noted in Table I, the sampling procedure used for this study led to differences across the conditions for several demographic variables. The linear effects of these variables were controlled in all of the main analyses by using them as covariates to ensure that the obtained associations could not be attributed solely to these group differences. However, these analyses would not detect potential interactions in which the pattern of findings were moderated by these demographic variables. Of most concern is potential interactions with sex, given questions as to whether or not developmental pathways to conduct problems are similar for boys and girls (Crick & Grotpeter, 1995; Silverthorn & Frick, 1999). To test for these potential interactions, a series of $2 \times 2 \times 2$ ANCOVA and logistic regression analyses, analogous to the ones reported above, were repeated. However, in these analyses, groups were collapsed across cohort and age was used as a covariate. Sex was added as the third factor.

The results of these analyses should be interpreted cautiously because (a) the sample was not collected specifically to address interactions with sex and, therefore, using sex as a factor in the design led to somewhat small cell sizes ($n = 8$ for boys in the low CU traits and low conduct problems cell) and (b) the number of additional analyses greatly inflates the experiment-wise rate for Type I errors. Given the low power to detect potential interactions, the Bonferroni correction was not employed in these exploratory analyses (Jaccard & Guilamo-Ramos, 2002). Within the context of these cautions, few significant interactions with gender emerged in these analyses. However, there was a significant three-way interaction between CU traits, conduct problems, and gender in predicting the general delinquency measure, $F(1, 84) = 5.51$, $p < .05$. The form of this three-way interaction is graphically presented in Fig. 1 for the general delinquency measure. Specifically, the highest rates of general delinquency for boys fell in the group high on CU traits and conduct problems. In contrast, the highest rates of delinquency for girls was found in the group high on CU traits without conduct problems. Therefore, the overall main effect for CU traits in predicting delinquency in the main analyses seems to have been influenced by girls with CU traits without conduct problems who reported high rates of delinquent acts.

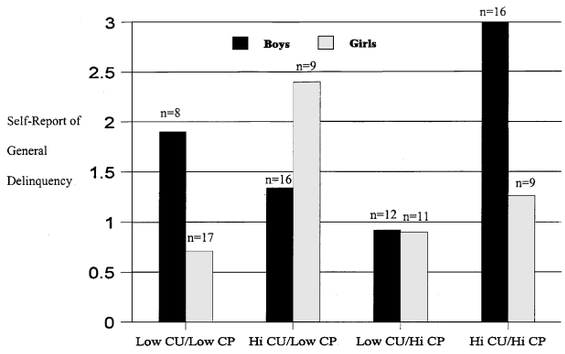

Fig. 1. The moderating role of participants' sex in the association among CU traits, conduct problems, and general delinquency.

Another characteristic of the four groups at the initial assessment that may have influenced the findings at the 1-year follow-up was the presence of a diagnosis of ADHD. As noted in Table I, although there were no significant effects in the 2×2 logit model analysis, 48% of the group high on CU traits and conduct problems had a research-based diagnosis of ADHD according to parent and teacher report at the initial screening. As a result, the comorbidity of ADHD and conduct problems in this group may have accounted for their more severe problems (e.g., Lynam, 1997). To test this possibility, this group was divided into those children with ($n = 12$) and without ($n = 13$) a diagnosis of ADHD and these groups were compared on all of the outcome measures using either an ANCOVA for continuous measures or logistic regression for dichotomous outcomes. Few differences emerged between these groups. The two exceptions were on the measures of total aggression, $F(1, 18) = 5.12$, $p < .05$, and the measure of proactive aggression, $F(1, 18) = 8.76$, $p < .01$. On these measures, the group without a diagnosis of ADHD had higher levels of aggression than the group that had a diagnosis of ADHD. These results suggest that the presence of ADHD could not account for the more severe outcome of the group high on both CU traits and conduct problems. They support previous findings that the presence of CU traits, rather than the presence of ADHD, is most important for designating a distinct pathway to conduct problems that may resemble adult conceptualizations of psychopathy (Barry et al., 2000).

DISCUSSION

These results support previous research in suggesting that the presence of CU traits in children with conduct

problems may designate an important subgroup of conduct problem children. Previous research (see Frick, 1998b; Frick, Barry, et al., 2000; Frick, Bodin, et al., 2000; Frick & Ellis, 1999 for reviews), including one study conducted with the same sample of children (Frick et al., in press), has largely focused on the different characteristics of children with conduct problems depending on the presence of CU traits, which could implicate different causal mechanisms in the development of problem behavior in the two groups. The current study suggests that, in addition to the theoretical importance for causal theory, the presence of CU traits may designate a particularly severe and aggressive pattern of conduct problems (Christian et al., 1997; Lynam, 1997) and it may enhance the prediction of later delinquency (Brandt et al., 1997; Forth et al., 1990; Toupin et al., 1995). The predictive utility of these traits has been one of the most clinically useful aspects of the construct of psychopathy in research on antisocial adults (Hare, 1998; Hart & Hare, 1997) but such utility has not been extensively tested in youth (Edens et al., 2001).

The analyses suggest that children with both CU traits and conduct problems show a greater number and variety of conduct problems, two indices of severity that have proven to be highly predictive of the stability of antisocial behavior in past longitudinal studies (Frick & Loney, 1999). These results are similar to those reported in clinic-referred children with conduct problem diagnoses in which CU traits designated a more severe pattern of conduct problems (Christian et al., 1997). In addition, the presence of CU traits was even more clearly predictive of higher levels of aggression at the 1-year follow-up, another factor related to stability of conduct problems (Frick & Loney, 1999). For conduct problems and for one of the aggression measures, reactive aggression, the association with CU traits and severity could largely be accounted for by differences in the initial level of conduct problems. That is, children with CU traits at the time of sample formation had higher rates of conduct problems than other children and this difference seemed to explain their more severe status at the follow-up assessment.

A somewhat different pattern of results emerged for the measure of proactive aggression. Children with conduct problems and CU traits were more likely to show high levels of proactive aggression (i.e., aggression that is used for instrumental gain and dominance), which is consistent with research on adults (Cornell et al., 1996) and adolescents (Caputo et al., 1999; Kruh et al., in press) high on psychopathic traits. Importantly, the relation with proactive aggression could not be accounted for entirely by differences in the initial level of conduct problem behavior, supporting the incremental utility of CU traits for predicting certain patterns of aggression. In addition, the findings on types of aggression support the differentiation of conduct problem children with and without CU traits. Specifically, although children with conduct problems but without CU traits showed more aggression than nonconduct problem children, their aggression seems to be primarily reactive in nature (Crick & Dodge, 1996; Dodge, Lochman, Harnish, Bates, & Pettit, 1997).

The different patterns of aggression across subgroups of children with conduct problems are important for a number of reasons. First, it is important for linking CU traits to research on subtypes of aggressive individuals, which has distinguished between those individuals who show only reactive forms of aggression from those who show both proactive and reactive forms (Crick & Dodge, 1996; Frick & Ellis, 1999). Second, these different patterns of aggression are consistent with the developmental model used to explain the causal processes involved in the development of the problem behavior in the subgroups of children with conduct problems outlined previously. Specifically, the hypothesized differences in emotional reactivity between conduct problem children with and without CU traits could lead to differences in how children in each group develop empathic concern for others (Blair, 1999; Kochanska, 1993) and to differences in their reactivity to perceived provocations in peer interactions (Crick & Dodge, 1996; Frick et al., in press) resulting in the different patterns of aggressive behavior.

Perhaps one of the clearest findings supporting the importance of CU traits for predicting problems at the 1-year follow-up was for self-reported delinquency. CU traits predicted self-reports of delinquency, especially violent delinquency, and the presence of conduct problems did not add significantly to this prediction. That is, children with conduct problems but without CU traits did not show higher rates of self-reported delinquency, whereas children high on CU traits and conduct problems and children high on CU traits alone both reported higher rates of delinquency. These findings suggest that CU traits may be important, not only for designating a group of conduct problem children who are at high risk for delinquent behavior, but they may also designate a group of children who may be at risk for later delinquency but who do not yet show significant conduct problems. These findings are important because many school-based interventions to prevent delinquency use measures of conduct problems as the sole method of determining risk (e.g., Conduct Problems Prevention Research Group, 2002).

A potentially important finding from post hoc analyses suggested that the predictive utility of CU traits in the absence of significant conduct problems was strongest for girls in the sample (see Fig. 1). This finding would support contentions that traditional conduct problem definitions

P1: ZBU
Journal of Abnormal Child Psychology pp874-jacp-466277 April 24, 2003 22:26 Style file version May 30th, 2002

may not be as accurate at capturing antisocial tendencies in girls, as they are for boys (Crick, 1996), and suggest that CU traits may be useful for detecting girls who are at risk for later delinquency. These findings would also be consistent with the contention that there may be many girls who show dispositional factors in childhood that place them at risk for developing antisocial behavior in adolescence (e.g., CU traits) but who do not start showing overt conduct problems and antisocial behavior until adolescence (Silverthorn & Frick, 1999). However, this latter possibility requires additional follow-up assessments of girls high on CU traits to determine if they eventually meet more traditional criteria for a conduct disorder later in adolescence.

The very limited follow-up period (12.99 months) is a significant limitation of the study's methodology. While providing an important starting point in evaluating the role of CU traits in predicting later aggression and delinquency, tests of the predictive utility of these traits over longer periods are clearly needed. Another limitation was that, while analyses controlled for initial level of conduct problem behavior, there were no measures of aggression or delinquency obtained at the initial assessment. Therefore, the role of CU traits in predicting aggression and delinquency can only be evaluated relative to initial levels of conduct problems, and not relative to initial levels of aggression and delinquency.

A third methodological issue that is important when interpreting these results is that the method of sample formation oversampled children high on CU traits and high on conduct problems and it ensured that these groups matched the population from which they were drawn on demographic variables. Although this methodology was important to ensure that sufficient numbers in each subgroup were represented in the sample and that the subgroups in the study were representative of the same group in the larger community sample, it did lead to demographic differences across groups. Also, in oversampling children high on CU traits and conduct problems, a sample dependent cut-off was used (e.g., above the upper quartile) which may not led to the same level of severity found in clinic-referred and forensic samples for either of these dimensions. This moderate cut-off was used to ensure sufficiently large groups from which to recruit subjects for the follow-up assessments. However, this cut-off may explain why the majority of children with conduct problems were high on CU traits, whereas in a clinic-referred sample, only a minority of children with severe conduct problems exhibited high levels of the traits (Christian et al., 1997). However, this methodology likely made the analyses more conservative in that, if the outcomes were studied for only those with the highest rate of CU traits (e.g., above the 90th percentile), the results may have shown even more impaired outcomes for these children.

An additional limitation of the study is that only self-reports of delinquent acts were obtained. There is good justification for this methodology, in that (a) self-report seems to capture a broader array of delinquent acts and is less susceptible to differential prosecution rates than official records (Krueger et al., 1994) and (b) it did not lead to shared method variance with the method of group formation which relied on parent and teacher report. However, it does make an alternative explanation for the results quite possible in that children with CU traits may be more likely to admit delinquent acts because they care less about the impressions of others. One final limitation of note is that the sample size was somewhat limited for detecting interactions, especially higher order interactions involving all three independent variables and interactions testing the potential moderating effects of gender. Therefore, additional interactions may have emerged with greater power afforded by a larger sample.

Within the context of these limitations, these findings support the potential utility of CU traits for designating subgroups of children with conduct problems who may be at particularly high risk for being aggressive and showing delinquency. In addition, our findings suggest that these traits may designate some children who are not considered at risk for delinquency through other approaches to screening that rely solely on the level of conduct problem behavior, especially at risk girls. A critical issue to consider in making these interpretations, however, is that any designation of "risk" has the potential for harmful effects. These potentially harmful effects occur because many children judged to be at risk may not show later problems and this is a particularly important concern with a designation associated with the construct of psychopathy that has such clear negative connotations (Edens et al., 2001; Frick, Barry, et al., 2000; Frick, Bodin, et al., 2000). Therefore, this area of research has great potential for both benefit and harm. We have been very careful to avoid labeling children with CU traits as "psychopathic" in this and other studies, and we have only made links to the research on psychopathy in adults to enhance the theoretical context for this subgrouping approach. This cautious approach to extending the construct to children is important because many of the negative connotations associated with the construct of psychopathy (e.g., strong stability across time, lack of response to interventions) may not apply to childhood precursors of this construct (Frick, 2002). In short, the results of this and other studies on CU traits in children clearly support the need for further research in this area. These traits seem to designate a group of children at high risk for serious antisocial behavior, especially

aggressive behavior, and interventions are sorely needed to target the processes involved in the development of problem behavior in these children (Frick, 1998, 2001). However, it is important that this research is conducted in a way that promotes a cautious application of the findings from the adult research literature to youth, to avoid its misuse in clinical settings (Seagraves & Grisso, 2002).

ACKNOWLEDGMENT

This work was supported by grant MH55654-02 from the National Institute of Mental Health made to the first author.

REFERENCES

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.—text revision). Washington, DC: Author.

Barry, C. T., Frick, P. J., Grooms, T., McCoy, M. G., Ellis, M. L., & Loney, B. R. (2000). The importance of callous-unemotional traits for extending the concept of psychopathy to children. *Journal of Abnormal Psychology*, *109,* 335–340.

Blair, R. J. R. (1999). Responsiveness to distress cues in the child with psychopathic tendencies. *Personality and Individual Differences*, *27,* 135–145.

Brandt, J. R., Kennedy, W. A., Patrick, C. J., & Curtin, J. J. (1997). Assessment of psychopathy in a population of incarcerated adolescent offenders. *Psychological Assessment*, *9,* 429–435.

Brown, K., Atkins, M. S., Osborne, M. L., & Milnamow, M. (1996). A revised teacher rating scale for reactive and proactive aggression. *Journal of Abnormal Child Psychology*, *24,* 473–480.

Caputo, A. A., Frick, P. J., & Brodsky, S. L. (1999). Family violence and juvenile sex offending: Potential mediating roles of psychopathic traits and negative attitudes toward women. *Criminal Justice and Behavior*, *26,* 338–356.

Christian, R. E., Frick, P. J., Hill, N. L., Tyler, L., & Frazer, D. R. (1997). Psychopathy and conduct problems in children: II. Implications for subtyping children with conduct problems. *Journal of the American Academy of Child and Adolescent Psychiatry*, *36,* 233–241.

Conduct Problems Prevention Research Group. (2002). The implementation of the Fast Track Program: An example of a large-scale prevention science efficacy trial. *Journal of Abnormal Child Psychology*, *30,* 1–17.

Cornell, D. G., Warren, J., Hawk, G., Stafford, E., Oram, G., & Pine, D. (1996). Psychopathy in instrumental and reactive violent offenders. *Journal of Consulting and Clinical Psychology*, *64,* 783–790.

Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial behavior in the prediction of children's future social adjustment. *Child Development*, *67,* 2317–2327.

Crick, N. R., & Dodge, K. A. (1996). Social information-processing mechanisms in reactive and proactive aggression.*Child Development*, *67,* 993–1002.

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social–psychological adjustment. *Child Development*, *66,* 710–722.

Dodge, K. A., Lochman, J. E., Harnish, J. D., Bates, J. E., & Pettit, G. S. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology*, *106,* 37–51.

Edens, J., Skeem, J., Cruise, K., & Cauffman, E. (2001). The assessment of juvenile psychopathy and its association with violence: A critical review. *Behavioral Sciences and the Law*, *19,* 53–80.

Elliott, D. S., & Ageton, S. S. (1980). Reconciling race and class differences in self-reported and official estimates of delinquency. *American Sociological Review*, *45,* 95–110.

Elliott, D. S., & Huizinga, D. (1984). *The relationship between delinquent behavior and ADM problems.* Boulder, CO: Behavioral Research Institute.

Fisher, L., & Blair, R. J. R. (1998). Cognitive impairment and its relationship to psychopathic tendencies in children with emotional and behavioral difficulties. *Journal of Abnormal Child Psychology*, *26,* 511–519.

Forth, A. E., Hart, S. D., & Hare, R. D. (1990). Assessment of psychopathy in male young offenders. *Psychological Assessment*, *2,* 342–344.

Frick, P. J. (1998a). *Conduct disorders and severe antisocial behavior*. New York: Plenum.

Frick, P. J. (1998b). Callous-unemotional traits and conduct problems: A two-factor model of psychopathy in children. In D. J. Cooke, A. Forth, & R. D. Hare (Eds.), *Psychopathy: Theory, research, and implications for society* (pp. 161–187). Dordrecht, Netherlands: Kluwer.

Frick, P. J. (2001). Effective interventions for children and adolescents with conduct disorder. *The Canadian Journal of Psychiatry*, *46,* 26–37.

Frick, P. J. (2002). Juvenile psychopathy from a developmental perspective: Implications for construct development and use in forensic assessments. *Law and Human Behavior*, *26,* 247–253.

Frick, P. J., Barry, C. T., & Bodin, S. D. (2000). Applying the concept of psychopathy to children: Implications for the assessment of antisocial youth. In C. B.Gacono (Ed.), *The clinical and forensic assessment of psychopathy* (pp. 3–24). Mahwah, NJ: Erlbaum.

Frick, P. J., Bodin, S. D., & Barry, C. T. (2000). Psychopathic traits and conduct problems in community and clinic-referred samples of children: Further development of the Psychopathy Screening Device. *Psychological Assessment*, *12,* 382–393.

Frick, P. J., Cornell, A. H., Bodin, S. D., Dane, H. A., Barry, C. T., & Loney, B. R. (in press). Callous-unemotional traits and developmental pathways to severe conduct problems. *Developmental Psychology*. **Q2**

Frick, P. J., & Ellis, M. L. (1999). Callous-unemotional traits and subtypes of conduct disorder. *Clinical Child and Family Psychology Review*, *2,* 149–168.

Frick, P. J., & Hare, R. D. (2001). *The antisocial process screening device (APSD)*. Toronto: Multi-Health Systems.

Frick, P. J., Lahey, B. B., Loeber, R., Tannenbaum, L. E., Van Horn, Y., Christ, M. A. G., et al. (1993). Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinic sample. *Clinical Psychology Review*, *13,* 319–340.

Frick, P. J., Lilienfeld, S. O., Ellis, M. L, Loney, B. R., & Silverthorn, P. (1999). The association between anxiety and psychopathy dimensions in children. *Journal of Abnormal Child Psychology*, *27,* 381–390.

Frick, P. J., & Loney, B. R. (1999). Outcomes of children and adolescents with conduct disorder and oppositional defiant disorder. In H. C. Quay & A. Hogan (Eds.), *Handbook of disruptive behavior disorders* (pp. 507–524). New York: Plenum.

Frick, P. J., O'Brien, B. S., Wootton, J. M., & McBurnett, K. (1994). Psychopathy and conduct problems in children. *Journal of Abnormal Psychology*, *103,* 700–707.

Gadow, K. D., & Sprafkin, J. (1995). *Manual for the Child Symptom Inventory* (4th ed.) Stony Brook, NY: Checkmate Plus.

Hare, R. D. (1998). Psychopathy, affect, and behavior. In D. J. Cooke, A. E. Forth, & R. D. Hare (Eds.), *Psychopathy: Theory, research, and implications for society* (pp. 105–138). Dordrecht: Kluwer.

Hart, S. D., & Hare, R. D. (1997). Psychopathy: Assessment and association with criminal conduct. In D. M. Stoff, J. Brieling, & J. Maser (Eds.), *Handbook of antisocial behavior* (pp. 22–35). New York: Wiley.

Hart, S. D., Kropp, P. R., & Hare, R. D. (1988). Performance of male psychopaths following conditional release from prison. *Journal of Consulting and Clinical Psychology*, *56,* 227–232.

Hauser, R. M., & Featherman, D. L. (1977). *The process of stratification.* New York: Academic Press.

Hinshaw, S. P., Lahey, B. B., & Hart, E. L. (1993). Issues of taxonomy and co-morbidity in the development of conduct disorder. *Development and Psychopathology*, *5,* 31–50.

Jaccard, J., & Guilamo-Ramos, V. (2002). Analysis of variance frameworks in clinical child and adolescent psychology: Issues and recommendations. *Journal of Clinical Child and Adolescent Psychology*, *31,* 130–146.

Kagan, J., & Snidman, N. (1991). Temperamental factors in human development. *American Psychologist*, *46,* 856–862.

Kaufman, A. S., & Kaufman, N. L. (1990). *Kaufman Brief Intelligence Test manual.* Circle Pines, MN: American Guidance Service.

Kochanska, G. (1993). Toward a synthesis of parental socialization and child temperament in early development of conscience. *Child Development*, *64,* 325–347.

Krueger, R. F., Schmutte, P. S., Caspi, A., Moffitt, T. E., Campbell, K., & Silva, P. A. (1994). Personality traits are linked to crime among men and women: Evidence from a birth cohort. *Journal of Abnormal Psychology*, *103,* 328–338.

Kruh, I. P., Frick, P. J., & Clements, C. B. (in press). Historical and personality correlates to the violence patterns of juveniles tried as adults. *Criminal Justice and Behavior.*

Lahey, B. B., Applegate, B., Barkley, R. A., Garfinkel, B., McBurnett, K., Kerdyk, L., et al. (1994). DSM-IV field trials for oppositional defiant disorder and conduct disorder in children and adolescents. *American Journal of Psychiatry*, *151,* 1163–1171.

Lahey, B. B., & Loeber, R. (1994). Framework for a developmental model of oppositional defiant disorder and conduct disorder. In D. K. Routh (Ed.), *Disruptive behavior disorders in childhood*. New York: Plenum.

Loeber, R., Farrington, D. P., Stouthamer-Loeber, M., Moffitt, T. E., & Caspi, A. (1998). The development of male offending: Key findings from the first decade of the Pittsburgh Youth Study. *Studies on Crime and Crime Prevention*, *7,* 141–171.

Loney, B. R., Frick, P. J., Clements, C. B., Ellis, M. L., & Kerlin, K. (in press). Callous-unemotional traits, impulsivity, and emotional processing in antisocial adolescents. *Journal of Clinical Child and Adolescent Psychology*.

Loney, B. R., Frick, P. J., Ellis, M., & McCoy, M. G. (1998). Intelligence, psychopathy, and antisocial behavior. *Journal of Psychopathology and Behavioral Assessment*, *20,* 231–247.

Lynam, D. R. (1997). Pursuing the psychopath: Capturing the fledgling psychopath in a nomological net. *Journal of Abnormal Psychology*, *106,* 425–438.

Moffitt, T. E. (1993). Adolescence-limited and life-course persistent antisocial behavior: A developmental taxonomy. *Psychological Review*, *100,* 674–701.

Moffitt, T. E., Caspi, A., Dickson, N., Silva, P., & Stanton, W. (1996). Childhood-onset versus adolescent-onset antisocial conduct problems in males: Natural history from ages 3 to 18 years. *Development and Psychopathology*, *8,* 399–424.

O'Brien, B. S., & Frick, P. J. (1996). Reward dominance: Associations with anxiety, conduct problems, and psychopathy in children. *Journal of Abnormal Child Psychology*, *24,* 223–240.

Piacentini, J. C., Cohen, P., & Cohen, C. (1992). Combining discrepant diagnostic information from multiple sources: Are complex algorithms better than simple ones? *Journal of Abnormal Child Psychology*, *20,* 51–63.

Seagrave, D., & Grisso, T. (2002). Adolescent development and the measurement of juvenile of psychopathy. *Law and Human Behavior*, *26,* 219–239.

Serin, R. C. (1993). Diagnosis of psychopathology with and without an interview. *Journal of Clinical Psychology*, *49,* 367–372.

Serin, R. C., Peters, D. V., & Barbaree, H. V. (1990). Predictors of psychopathy and release outcome in a criminal population. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *2,* 419–422.

Shaffer, D., & Fisher, P. (1996). *National Institute of Mental Health Diagnostic Interview Schedule for Children* (Version 4). New York: Columbia University.

Silverthorn, P., & Frick, P. J. (1999). Developmental pathways to antisocial behavior: The delayed-onset pathway in girls. *Development and Psychopathology*, *11,* 101–126.

Toupin, J., Mercier, H., Dery, M., Cote, G., & Hodgins, S. (1995). Validity of the PCL-R for adolescents. *Issues in Criminological and Legal Psychology*, *24,* 143–145.

Wootton, J. M., Frick, P. J., Shelton, K. K., & Silverthorn, P. (1997). Ineffective parenting and childhood conduct problems: The moderating role of callous-unemotional traits.*Journal of Consulting and Clinical Psychology*, *65,* 301–308.

Author's queries:

Q1: Au: Kindly note that this ref. has been changed to Frick, Barry, et al., 2000 and Frick, Bodin, et al., 2000 in the text. Please delete whichever is not applicable.
Q2: Au: Kindly update this reference.
Q3: Au: See QA2.
Q4: Au: See QA2.
Q5: Au: Kindly check the letters, a, b, and c attached with different values. What do these letters stand for?
Q6: Au: Kindly provide the values for *, **, and ***.