Disentangling the Underlying Dimensions of Psychopathy and Conduct Problems in Childhood: A Community Study

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Mark R. Dadds, University of New South Wales
Jenny Fraser, Queensland University of Technology
Aaron Frost, Griffith University
David J. Hawes, University of New South Wales

The psychometric and predictive validity of callous-unemotional (CU) traits as an early precursor of conduct disorder and antisocial behavior were assessed. A community sample of children (4–9 years of age) were tested 12 months apart with the Antisocial Process Screening Device (APSD; P. J. Frick & R. D. Hare, 2002), a measure of early signs of psychopathy in children. Factor analysis supported the structure of the APSD. Given controversy surrounding construct overlap between psychopathy and conduct problems, a factor analysis was conducted on pooled items from the Strengths and Difficulties Questionnaire and APSD. A 5-factor solution resulted: antisocial, hyperactivity, CU traits, anxiety, and peer problems. CU traits added small but significant improvements in the 12-month prediction of antisocial behavior for boys and older girls, after controlling for Time 1 measures. These results indicate that although the dimensions of the APSD overlap with dimensions of the disruptive behavior disorders, CU traits have unique predictive validity in childhood.

The clinical and theoretical use of the psychopathy construct is controversial, particularly when applied to aggressive and antisocial behavior in children and adolescents. The essence of the construct is that specific trait-like characteristics can co-occur with antisocial behavior to produce a chronic and severely antisocial
type of offender (Harpur, Hakstian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989). The behavioral manifestations of aggression, impulsivity, and antisocial behavior and their developmental pathways have received considerable research attention (see Loeber & Farrington's, 2000, study). However, developmental aspects of the
putative trait factor are not well understood. A callous unemotional (CU) personality trait—characterized by lack of guilt, remorse, emotionality, and empathy, and thus the manipulative use of others for one's own gains—is held to differentiate the psychopathic subgroup within antisocial people in general. This personality-based approach of psychopathy is not included in the current psychiatric parlance (e.g., Diagnostic and Statistical Manual of Mental Disorders [4th ed.; DSM–IV; American Psychiatric Association, 1994]); however, the last decade has witnessed a dramatic resurgence in research into psychopathy, in large part because of progress in assessment via the Psychopathy Checklist— Revised (PCL–R; Hare, 1991) and adaptations made for children and adolescents. In the current study, we aimed to examine the utility of the psychopathy construct in childhood using one of the best-known measures, the Antisocial Process Screening Device (APSD; Frick & Hare, 2002).

Frick, O'Brien, Wootton, and McBurnett (1994) showed that the APSD captured the two dimensions of psychopathy similar to those found in studies of adults. The first dimension depicted the CU interpersonal style consisting of lack of guilt and lack of empathy or remorse. The second factor was named the Impulsivity/Conduct Problem (ICP) factor that included poor impulse control (e.g., becomes angry when corrected, acts without thinking) and delinquent behaviors (e.g., engages in illegal activities). Contrary to findings with adults, items focusing on narcissism (NAR) loaded on the impulsive rather than the CU dimension. Subsequent research has shown that children displaying both conduct problems and (high) CU traits are likely to manifest a pattern of antisocial behaviors that is more severe and persistent than those with conduct problems without CU traits (Capuato, Frick, & Brodsky, 1999; Christian, Frick, Hill, Tyler, & Frazer, 1997; Lynam, 1998). Furthermore, correlates of aggressive and antisocial behavior may differ according to coexistence of high CU traits. For example, children with high CU traits may be less sensitive to punishment or guilt–emotional arousal and may be more driven by sensation seeking, thereby making parental socialization practices less influential (Dadds & Salmon, 2003; Kochanska, 1993; Wootton, Frick, Shelton, & Silverthorn, 1997). Children with conduct problems and high CU traits are less likely to show intellectual deficits (especially verbal deficits), are more likely to have high levels of thrill-seeking behavior and lower levels of anxiety, and are less sensitive to emotional stimuli than children with conduct problems without CU traits. For a comprehensive review of this research, see Frick and Morris's (2004) study.

The majority of studies have been with clinically referred or incarcerated adolescents; to our knowledge only one study reported looking at the use of the APSD and the CU trait construct in community samples. Frick, Barry, and Bodin (2000) collected parent and teacher ratings on the APSD for a community sample of 1,136 elementary schoolchildren (mean age 10.6 years) and a comparison clinic sample (n = 160; mean age = 8.5 years). Factor analysis showed that either the two-factor solution described above, or a three-factor structure, in which ICP divided into impulsivity (IMP) and narcissism (NAR), were acceptable. The three-factor solution showed better fit in the community sample. In both these samples, correlations between the subscales were moderate to high. That is, considerable overlap existed between the CU, IMP, and NAR dimensions. Although this augurs for the practice of researchers using total APSD scores to designate high psychopathic traits (e.g., Blair, Colledge, Murray, & Mitchell, 2001), it raises questions about the distinctiveness and overlap of the CU and antisocial constructs, in terms of both their conceptual and measurement underpinnings.

In terms of measurement overlap, Burns (2000) criticized the APSD for containing multiple items that are similar to traditional features of disruptive behavior problems. In response, Frick (2000) emphasized the divergent theoretical bases of the different constructs. The debate highlighted the early stage of research with the APSD in children and that studies have tended to assess its reliability and validity in isolation. That is, few studies have assessed the unique characteristics of the APSD, especially its CU factor, against a background of other measures of child and parent adjustment. Thus, it is possible that many of the findings associated with high APSD scores could be due to the fact that the APSD shares considerable variance with aspects of common disruptive behavior problems. As both Frick (2000) and Burns (2000) have pointed out, a solution to this is to evaluate the APSD concurrently with other more established predictors of child outcomes. One of our aims in the current study was

to evaluate the measurement and predictive validity of the APSD, in particular the CU subscale, in conjunction with more generalized measures of child adjustment.

CU traits have been shown to predict antisocial outcomes in youths with the PCL–R's youth versions (e.g., Brandt, Kennedy, Patrick, & Curtain, 1997). However, we could locate only one study that examined the predictive use of CU traits prior to adolescence. Frick et al. (2003) looked at the predictive use of CU traits over a 12-month period in children (n 98) selected for high versus low levels of conduct problems and CU traits (mean age of 12.4 years). CU traits were confounded with initial conduct problems in predicting changes in conduct problems; however, CU
traits showed unique predictive power for measures of aggression and for girls showing their first signs of antisocial behavior. These findings indicate that the presence of CU traits may be important in prognoses of ongoing antisocial behavior.

The applicability of prediction studies to younger groups of children may be particularly important. The evidence is clear that the origins of aggressive behavior can be traced to the preschool years (Loeber & Farrington, 2000). Furthermore, the most successful interventions for young children with conduct problems—
behavioral parent training—show maximum effectiveness with children in the preschool to elementary school years (Dadds, 1995). If the presence of high CU traits nullifies the powerful influence of parenting factors on conduct problems (Wootton et
al., 1997), then these traits may be a risk factor for failure to respond to parenting interventions. Clearly, the presence of a reliable measure of these traits in younger children may aid in the identification of effective treatments for diverse groups of children with conduct problems in the relevant early years of their development.

Our aim in the following study was to evaluate the measurement and predictive validity of the CU construct in community samples of children who were 4–9 years old. A confirmatory factor analysis was used to check the measurement structure of the APSD (i.e., two- and three-factor structures across two age groups, 4–6 years and 7–9 years) for boys and girls separately. Given the findings of Frick et al. (2000), we hypothesized that the three factor structure would show the better fit for these nonclinic children. We next subjected the CU construct to a more rigorous
evaluation. First, its conceptual and measurement distinctiveness were tested by subjecting items of the APSD to a joint factor analysis with items from a more general measure of behavioral and emotional functioning in children, the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). We hypothesized that items from the APSD IMP and NAR scales would not be distinct and would merge into conduct problems and hyperactivity scales from the SDQ. In contrast, we hypothesized that the CU construct would remain a unique aspect of child functioning, and thus, a CU
subscale would emerge from the comprehensive pool of items. Finally, we hypothesized that the new CU subscale would interact with level of conduct problems at Time 1 to predict growth in conduct problems at Time 2.

Method

Participants

The sample consisted of 1,359 children who were 4–9 years old (M = 6.3, SD = 1.1) and recruited from 21 elementary schools in Brisbane, which is Australia's third largest city. The schools were chosen by the state educational administration to represent the full range of

inner-city and suburban locations of differing socioeconomic status. Total family income ranged from less than $20,000 (4%), $20,000 –$30,000 (8%), $30,000– $70,000 (50%), to over $70,000 (38%). Education in parents consisted of completion of elementary school (1%), high school junior certificate (24%), high school senior certificate (26%), and tertiary education (university/ apprenticeship; 49%). The majority of families (87%) comprised two caregivers; 13% comprised sole parents. The average number of siblings reported by the children was 1.45, with 84% of children having two or fewer siblings. The majority of families were Caucasian and of European descent; minorities of Asian, Indigenous, and Pacific Island cultures were also present (less than 10%). Children were divided by gender and age into four groups: (a) 4–6-year-old boys (n = 404), (b) 7–9-year-old boys (n = 302), (c) 4–6-year-old girls (n = 398), and (d) 7–9-year-old girls (n = 255). There were no differences between these groups on any of the demographic measures or participation rates.

Permission to conduct research was obtained from the Griffith University Human Research Ethics Committee (Brisbane, Australia) and from education management systems. The test battery was distributed through the schools to all children within the relevant age ranges and sent home to parents. Information sheets and consent forms were included that explained the nature of the research and the requirements of the participants. Completed questionnaires were sent to the university in self-addressed envelopes with return rates ranging from 32.5% to 74.8% across schools (M = 67.3). To check whether variations in return rates were associated with sample characteristics, we examined means, standard deviations, and ranges of all demographic and child- and parent-adjustment measures on a school-by-school basis. Participation rates did not correlate with the mean education of parents (mother, r = .01; father, r = .02) or family income (r = -.03) across schools. Furthermore, mean school levels of antisocial behavior (r .03) and CU (r .002) traits did not correlate with participation rates, indicating that parents with low socioeconomic status and/or with relatively high levels of child behavior problems were not underrepresented in the sample.

Measures

APSD. The APSD (Frick & Hare, 2002) was used to assess for psychopathic traits. This is a 20-item behavior rating scale that can be completed by parents, teachers, and the children themselves in the older groups. In this study, it was completed by each child's parent, defined as the primary caregiver. It was designed to be a childhood extension of the PCL–R (Hare, 1991). Each item on the APSD is scored either 0 (not at all true), 1 (sometimes true), or 2 (definitely true). Frick et al. (1994) found that the APSD contained two factors: a six-item CU factor and a 10-item ICP factor. As noted, more recent factor analyses in both community and clinic samples have revealed better fit in which ICP split into IMP and a third factor, NAR, for the community sample. The NAR factor is highly correlated with the IMP factor, and both are highly related to DSM–IV diagnoses of oppositional defiant disorder, conduct disorder, and attentiondeficit/hyperactivity disorder. The coefficient alphas with composite parent–teacher ratings for the APSD subscales in the previous community sample (Frick et al., 2000) were as follows: IMP α = -.74, NAR α = -.83, and CU α = -.76. This study used the prekindergarten version of the APSD that has some modification of items to make it acceptable for younger children. We renamed the APSD version distributed to parents in this study to the Temperament Screening Device to avoid using stigmatizing constructs with children and their caregivers (see Frick et al.'s, 2000, study).

SDQ. The SDQ (Goodman, 1997) is a 25-item rating scale that includes child- and parent-report versions. The SDQ has been shown increasing popularity of usage because of its combination of brevity, broad measurement domain, and strong psychometric properties. It can be scored as a total difficulties score or into five subscales: Hyperactivity, Conduct Problems, Emotional Symptoms, Peer Problems, and Prosocial Behavior. In the current study, the SDQ was completed by the primary caregiver, predominantly the mother. The SDQ has been shown to have good psychometric properties and to converge well with other checklist measures and independent diagnoses of child disorders (Goodman, 2001; Goodman & Scott, 1999; Hawes & Dadds, 2004).

Teacher ratings.
To check validity of the parent measures, class teachers completed a rating form for each child in the class participating in the study at Time 1. The measure consists of a Likert-type scale ranging from 1–5 points that assesses each child on dimensions of anxiety (e.g., shy, nervous, afraid, inhibited), aggressive, impulsive– hyperactive, language, reading, and writing problems. Research has supported the ability of teachers to accurately report on these dimensions (Strauss, Frame, & Forehand, 1987), and our own previous research has shown that the
measure converges well with independent child psychiatric diagnoses, collected in the context of large school-based studies (Dadds, Spence, Holland, Barrett, & Laurens, 1997).

Follow-Up Assessments
Two subsamples were selected to participate in follow-up assessment at 12 months. Of the initial 1,359 children, 900 were randomly selected to complete Time 2 parent-report measures of the SDQ and APSD. A total of780 (86.7%) completed and returned these measures. Of these, 450 were randomly selected and contacted by telephone to be interviewed regarding the child's adjustment. Interviews were completed for 328 (72.9%) participants of this sample. Interviewers used the Diagnostic Interview Schedule for Children, Adolescents, and Parents (DISCAP; Holland & Dadds, 1997), a semistructured interview that produces DSM–IV (American Psychiatric Association, 1994) diagnoses and symptom severity ratings of symptoms on a scale ranging from 1 (symptoms rarely apparent/problematic) to 7 (symptoms always apparent/problematic). Both categorical diagnoses and the severity ratings show high interrater reliability (Johnson, Barrett, Dadds, Fox, & Shortt, 1999). Interviewers were several clinical psychologists who had extensive training in the DISCAP. Of the interviews, 25% were conducted by two interviewers, positioned on separate telephone lines and kept blind to each other's written notes and diagnoses, to check interrater reliability of diagnoses. Given the use of a community sample in
the current study, our primary outcome measure was the 1–7 point continuous
variable of symptom severity, calculated for externalizing disorders of conduct disorder and oppositional defiant disorder. Symptom severity of internalizing disorders (e.g., social phobia, specific phobia, generalized anxiety disorder, separation anxiety) was also calculated but only used to validate parent-report measures.

Results
Sample Equivalence
As noted, demographic and adjustment profiles of the participants did not vary according to participation rates achieved in each school. Next, we checked that there were no demographic or adjustment differences among participants selected for follow-up parent-report measures and follow-up diagnostic interviews, participants

who completed these measures, and the larger pool. A series of analyses of variance comparing the complete sample with the smaller follow-up sample revealed no differences on demographic variables or scores on Time 1 parent-report measures.

Reliability of Outcome Measures

The correlation between diagnosticians' severity ratings for externalizing disorders was r = .96. These ratings converged in predictable ways, with parent reports using the SDQ and APSD collected at the same time. Severity of externalizing diagnosis correlated with SDQ as follows: Conduct Problems (r = .41), Hyperactivity (r = .50), Emotional Symptoms (r = .17), Peer Problems (r = .25), and Prosocial Behavior (r = -.26). Severity of internalizing diagnosis (e.g., anxiety, depression) correlated with SDQ as follows: Conduct Problems (r = .01), Hyperactivity (r = .01), Emotional Symptoms (r = .33), Peer Problems (r = .14), and Prosocial Behavior (r = -.01). Table 1 shows convergence between teacher ratings and parent ratings on the SDQ and APSD. Parent–teacher agreement is usually characterized by low positive correlations ranging from .2 to .3 (e.g., Offord et al., 1996). Results for the SDQ support its validity, with meaningfully similar constructs correlating in the low positive range (e.g., teacher anxious/shy with parent Emotional Symptoms, r = .21) and meaningfully dissimilar constructs failing to converge (e.g., teacher anxious/shy with parent Prosocial Behavior, r = -.03).

Psychometric Properties of the APSD

Table 2 shows means and standard deviations for the APSD. Analysis of variance showed main effects for gender on each of the subscales with boys scoring higher; however, Age or Age X Gender interactions were not evident. Means on each of the subscales were similar (within = .50 standard deviation) to those reported by Frick et al. (2000) for their community sample. Correlations between teacher ratings and parent APSD show similar meaningful relations (see Table 1), with the CU factor correlating in a low positive way with teacher ratings of aggression, hyperactivity, and learning problems; with NAR correlating with aggression and hyperactivity only; and with IMP correlating with aggression, hyperactivity, and all learning problems. The stabilities of three APSD subscales were impressive over the 1-year period: CU (r = .55), NAR (r = .63), and IMP (r = .64). However, the internal consistencies of the subscales were lower than those reported by Frick et al. (2000): CU (= -.56), NAR (= - .69), and IMP (= - .59; alpha coefficients ranged from a low of .44 for CU traits in young girls to .78 for NAR in older boys), suggesting that the subscale structure may not adequately reflect the nature of the constructs in this sample. To test this, we used confirmatory factor analysis to test two- and three-factor solutions of the APSD as described by Frick et al. (2000). LISREL 8.54 (Jo¨resko & So¨rbom, 2000) was used to fit and compare models with the constituent ordinal-scaled APSD-item data based on a scaled covariance matrix (and its asymptotic estimates) of the polychoric correlations with PRELIS 2.30 (Jo¨resko & So¨rbom, 1988).

Table 1

Correlations Between Teacher Ratings and Parent Ratings on the APSD, SDQ, and New Factor Analysis Measures

	Teacher ratings					
Parent rating	Anxious–shy	Aggression	Impulsive	Language problems	Reading problems	Writing problems
SDQ						
Conduct problems	.02	.35	.32	.19	.20	.20
Hyperactive	.03	.33	.42	.28	.30	.34
Emotional problems	.21	.06	.04	.08	.10	.13
Peer problems	.09	.15	.19	.15	.12	.13
Prosocial	−.03	−.24	−.24	−.13	−.09	−.09
APSD						
CU	.06	.23	.28	.21	.16	.17
NAR	−.02	.26	.18	.07	.07	.07
IMP	.01	.31	.31	.14	.16	.17
New factor structure						
Antisocial	−.05	.31	.20	.09	.06	.07
Anxiety	.20	.06	.04	.07	.08	.11
CU	.06	.21	.23	.15	.10	.10
Hyperactive	.03	.35	.44	.28	.31	.35
Peer problems	.05	.09	.15	.12	.09	.11

Note. Because of the large sample size, all correlations in the table greater than .04 are significant at $p < .05$. APSD = Antisocial Process Screening Device; SDQ = Strengths and Difficulties Questionnaire; CU = callous-unemotional traits; NAR = narcissism; IMP = impulsivity.

We tested the structure using the whole sample as one and by simultaneously testing four groups formed by dividing into gender and two age groups (4–6 years, 7–9 years). Given significant skew and kurtosis in the data, we used Satorra–Bentler chi-square tests (Satorra & Bentler, 2001) to fit and compare models. For the whole sample, the best fit was obtained for the three-factor solution on all fit indices: $X^2(87, N = 1,359) = 329.17$, $p < .001$ (chi-square divided by degrees of freedom [CMIN/DF] = 3.78, comparative fit index [CFI] = .91, rootmean-square error of approximation [RMSEA] = .04). Satorra–Bentler's (2001) scaled difference showed a significant improvement in fit of the three-factor over the two-factor model (scaled difference = 87.41, df = 1, $p < .001$). The overall fit was roughly equivalent to that reported by Frick et al. (2000) using an older sample. Next, we tested the fit of this original three-factor model across the four gender and age groups, with regression weights free to vary across groups, and then with regression weights con-strained to be equal across groups. With unconstrained weights, the model fit was marginally lower than that achieved for the sample considered as a whole (CMIN/DF = 1.88, CFI = .88, RMSEA = .03) and did not drop substantially when regression weights were constrained across groups (CMIN/DF = 1.85, CFI = .86, RMSEA = .04). Thus, the original APSD three-factor structure showed adequate psychometric fit across our sample of children 4–9 years old. Regression weights and errors, respectively, for the item–scale fit are shown in Table 3.

Table 2
Means and Standard Deviations of the Original Antisocial Process Screening Device (APSD) and New Factor Scores Across Age and Gender Derived From Combined Items From the Strengths and Difficulties Questionnaire and the APSD

	Boys		Girls	
Age	*M*	*SD*	*M*	*SD*
4–6 years				
APSD–CU	2.66	1.77	2.11	1.58
APSD–NAR	2.88	2.10	2.68	2.00
APSD–IMP	3.04	1.62	2.39	1.40
Antisocial	4.18	3.33	3.73	2.99
Anxiety	1.85	1.86	1.89	1.74
CU	5.57	2.55	4.63	2.15
Hyperactive	6.85	4.01	5.32	3.30
Peer problems	1.77	1.67	1.51	1.53
7–9 years				
APSD–CU	2.69	1.98	2.15	1.55
APSD–NAR	3.11	2.64	2.55	2.28
APSD–IMP	3.09	1.67	2.58	1.46
Antisocial	4.57	4.07	3.65	3.36
Anxiety	2.21	2.19	2.30	2.19
CU	5.32	2.59	4.49	2.23
Hyperactive	7.01	4.09	5.72	3.53
Peer problems	1.55	1.66	1.51	1.57

Note. CU = callous-unemotional traits; NAR = narcissism; IMP = impulsivity.

Disentangling the Predictive Use of Psychopathy and Conduct Problems

All items from the SDQ and the APSD were subject to a principal components analysis to test for a set of independent factors. Both parallel analysis and Velicer's minimum average partial (MAT) test (O'Connor, 2000) supported a five-factor solution; theoretically, these were clear and interpretable factors, which accounted for 38.9% of the total variance (several items failed to load on any factor). Table 3 shows the resultant structure matrix after oblique rotation with Kaiser normalization. The first factor accounted for 20.3% of the variance, consisted of items from the Conduct Disorder scale of the SDQ and the NAR scale of the APSD, and reflected deliberate violation of the rights of others. Consistent with previous research with young community samples (Frick et al., 2000), items that measured narcissism loaded on this scale. Thus, we termed this factor Antisocial (e.g., bullies, lies, cheats, thinks is better than others, brags, teases). The second factor (5.6%) was identical to the Emotional Symptoms subscale of the SDQ and, given the high relative prevalence of anxiety to depression in this age group, was termed Anxiety. The third factor (5.2%) took a combination of items from the SDQ's Prosocial Behavior scale (loading negatively) and the APSD's CU scale. The scale reflected the child's propensity to be uncaring to others and, to be consistent with the literature, was termed CU.[1] Factor 4 (4.5%), termed Hyperactivity, took items from both the SDQ's Hyperactivity scale and the APSD's IMP scale. Finally, Factor 5 (3.4%) took items from the SDQ's Peer Problems scale as well as one item that reflected inability to keep friends from the APSD's CU scale; this factor was termed Peer Problems.

The five-factor structure produced model fit statistics comparable with the original APSD (CMIN/DF 4.23, CFI = .90, RMSEA = .05). Table 2 shows means and standard deviations for the scores derived from the new factor structure broken down across gender and age. A multivariate analysis of variance showed main effects for gender, $F(5, 1351) = 15.40$, $p = .001$, and age, $F(5, 1351) = 4.29$, $p = .01$, but no interaction. Follow-up univariate tests (at $p = .01$) showed that gender effects were evident with boys being higher on Antisocial, CU, and Hyperactivity. Age effects were only found for Anxiety, in which

older ages were associated with higher levels. Stability of factor scores over the 1-year period was as follows: Antisocial (r = .71), Anxiety (r = .65), CU (r = .62), Hyperactivity (r = .78), and Peer Problems (r = .59). The size of these correlations did not vary substantially across age or gender.

Table 3
Regression Weights and Standardized Errors for Confirmatory Factor Analysis of Antisocial Process Screening Device (APSD) Items (A) and Pattern Matrix Showing Five-Factor Solution to Items From the Combined Strengths and Difficulties Questionnaire and the APSD (B)

			B: Combined SDQ and APSD factor pattern				
Item	Item source	A: Original APSD loadings (error)	Antisocial	Anxiety	CU	Hyperactive	Peer Problems
Often fights with other children or bullies	SDQ–CP		.53	.03	.05	.09	.07
Often lies or cheats	SDQ–CP		.59	−.04	.00	.16	.10
Steals from home and elsewhere	SDQ–CP		.39	.03	.01	.05	.13
Blames others	APSD–IMP	.56 (.31)	.45	.06	.10	.12	−.05
Breaks rules	APSD		.44	.04	.23	.20	−.04
Shallow emotions	APSD–NAR	.55 (.31)	.50	.07	.20	.05	.01
Lies easily	APSD		.67	−.09	.03	.08	.11
Brags	APSD–NAR	.44 (.19)	.52	−.01	.05	.01	.00
Cons other people	APSD–NAR	.59 (.34)	.58	.03	.01	−.05	.00
Teases	APSD–NAR	.50 (.25)	.46	.04	.20	.00	.05
Acts nice to get own way	APSD–NAR	.44 (.19)	.57	−.03	.10	.06	.00
More important than others	APSD–NAR	.56 (.32)	.56	.14	−.08	−.07	−.13
Headaches, stomach aches, or sickness	SDQ–EP		.05	.41	−.12	.12	.01
Many worries, often seems worried	SDQ–EP		.02	.75	−.06	.01	.09
Often unhappy, down-hearted or tearful	SDQ–EP		.09	.58	.03	.04	.06
Nervous or clingy in new situations	SDQ–EP		−.06	.59	.11	.02	.02
Many fears, easily scared	SDQ–EP		−.09	.69	.03	.06	.04
Unconcerned regarding others feelings	APSD–CU	.58 (.34)	.06	−.03	.71	.01	.00
No guilt	APSD–CU	.45 (.21)	.06	−.15	.42	.07	.05
Breaks promises	APSD–CU	.58 (.34)	.04	−.11	.37	.34	.10
Inconsiderate of other people's feelings	SDQ–PRO		.17	.00	.61	.09	.07
Does not share with other children	SDQ–PRO		.12	.00	.49	.03	.07
Unhelpful if someone is hurt, upset, or ill	SDQ–PRO		.02	.08	.74	.14	.00
Not kind to younger children	SDQ–PRO		.04	.04	.52	.02	.12
Does not volunteer to help others	SDQ–PRO		.10	.03	.65	.04	.01
Disobedient to adults	SDQ–CP		.11	−.05	.42	.30	.05
Restless, overactive, cannot sit still	SDQ–H		.09	.09	.05	.69	.08
Constantly fidgeting or squirming	SDQ–H		.01	−.15	.09	.72	.04
Easily distracted, concentration wanders	SDQ–H		.06	.08	.10	.80	.08
Does not thinks things out before acting	SDQ–H		.01	−.08	.24	.58	.00
Poor attention span	SDQ–H		.16	.02	.14	.72	−.13
Acts without thinking	APSD–IMP	.66 (.43)	.21	−.07	.09	.56	.01
Gets bored	APSD–IMP	.47 (.22)	.13	−.16	.06	.49	.07
Puts things off	APSD–IMP	.49 (.24)	.13	.08	.004	.44	.04
Not motivated in structured activities	APSD–CU	.42 (.17)	.12	.04	.24	.36	.24
Loses friends	APSD–CU	.27 (.07)	.06	−.12	.02	.08	.58
Rather solitary, tends to play alone	SDQ–PP		−.06	.27	−.09	.06	.44
Does not have at least one good friend	SDQ–PP		.00	.00	.16	.01	.65
Not generally liked by other children	SDQ–PP		.02	.08	.28	.07	.48
Gets on better with adults than children	SDQ–PP		.16	.15	.15	.06	.51
Items failing to load or cross loading							
Angry when punished	APSD–NAR	.49 (.24)					
Temper tantrums	SDQ–CP						
Picked on or bullied	SDQ–PP						
Dangerous activities	APSD–IMP	.40 (.16)					
Does not show feelings	APSD–CU	.25 (.06)					

Note. Values in bold indicate items belonging to each factor. SDQ = Strengths and Difficulties Questionnaire; CU = Callous-unemotional traits; CP = conduct problems; IMP = impulsivity; NAR = narcissism; EP = emotional problems; PRO = prosocial; H = hyperactivity; PP = peer problems.

Convergence of Parent, Teacher, and Diagnostic Ratings of Child Adjustment

Table 1 shows zero-order correlations between teachers' ratings of child anxiety, aggression, hyperactivity, and learning problems, with the new subscale scores. They support the validity of the new measures, such that parent and teacher ratings of externalizing and internalizing problems, respectively, correlated positively, whereas
cross correlations between anxiety– depression and the externalizing behaviors did not. Correlations were calculated between diagnostic severity data for externalizing (oppositional defiant disorder and conduct disorder) and internalizing (e.g., anxiety, depression) problems and parent scores on the new child adjustment indices at
Time 2. Severity of externalizing diagnosis correlated with parent reported adjustment was as follows: Antisocial (r = .42), Anxiety (r = .17), CU (r = .22), Hyperactivity (r = .46), and Peer Problems (r = .21). Severity of internalizing diagnosis correlated
was as follows: Antisocial (r=-.03), Anxiety (r = .33), CU (r = .06), Hyperactivity (r = .01), and Peer Problems (r = .12). Prediction of Outcomes at 1-Year Follow-Up

Regression analyses were used to test the prediction of change in antisocial behavior from Time 1 to Time 2. Scores on several scales were significantly abnormal and so raw scores were recomputed as normal scores (i.e., expected values from the standard

normal distribution according to ranks of the original scores in the form of normal equivalent deviates with MlwiN; Rabash, Browne, Healy, Cameron, & Charlton, 2000). We used hierarchical (mixed model) regression (SPSS 11.5) to model multiple levels of predictors in a nested design. In the current data set, participants were recruited from within schools, and it was possible that schools could function as a clustering variable in which students' scores from the same school were, in part, nonindependent. Table 4 shows variance partitioned according to between-school and within-school components for the main variables. Small amounts of variance in age and parental education were associated with school membership; however, these were insignificant compared with variance within schools.

Prediction of 1-year outcomes was tested with the Level-1 predictor of school and Level-2 predictors of the following: demographic variables of parental education and income; child antisocial problems at Time 1; the new factor structure variables of CU, Hyperactivity, Anxiety, and Peer Problems; and the interaction term of Time 1 CU = Antisocial, nested with school (Bryk & Raudenbush, 1992; Singer, 1998). Dependent variables were Time 2 parent reports of Antisocial and diagnostic severity for externalizing disorders, respectively. Regressions were performed separately for each gender and age group for the Antisocial dependent measures and for each gender for the diagnostic severity measure because of the smaller sample size of the latter.

The test of primary theoretical interest was that CU traits, and the interaction term of CU = Antisocial, would predict 1-year outcomes over and above the prediction from Antisocial at Time 1. As well as statistical significance, effect size estimates were given by presenting the amount of variance in Time 2 outcomes (i.e., change in R2 from traditional linear regression) that were attributable to CU over and above Time 1 Antisocial. When the interaction was found to be significant, Time 1 scores on CU and Antisocial were split into the lower 80% and top 20% of scores, and Time 2 scores compared for the resulting four cells of low CU-low Antisocial, low CU-high Antisocial, high CU-low Antisocial, and high CU-high Antisocial.

Prediction of antisocial parent reports at Time 2.

For younger boys, significant predictors were Time 1 Antisocial (estimate = .66, SE = .06, t = 10.01, p = .05) and the interaction term CU = Antisocial (estimate = .07, SE = .03, t = 2.29, p = .05), which added 4% explanatory variance over and above the 51% coming from Time 1 Antisocial. For older boys, the only significant predictor was Antisocial at Time 1 (estimate = .69, SE = .07, t = 10.01, p = .05). For younger girls, significant predictors were Time 1 Antisocial and Hyperactivity (Antisocial estimate = .48, SE = .08, t = 5.58, p = .05; Hyperactivity estimate = .14, SE = .06, t = 2.46, p = .05). For older girls, significant predictors were Time 1 Antisocial (estimate = .52, SE = .08, t = 6.59, p = .05), CU (estimate = .21, SE = .09, t = 2.15, p = .05), and Hyperactivity (estimate = .17, SE = .06, t = 2.71, p = .05). The CU variable added 6% extra explanatory variance over and above Time 1 Antisocial.

Table 4
Variance Components for Predictor and Criterion Variables Showing Proportions of Between-School and Within-School Parameter Estimates

		Between schools		Within schools	
Variable	Intercept	Slope	*SE*	Slope	*SE*
Age	−.010	.047	.018*	.79	.031*
Mother's education	.002	.042	.050*	.75	.029*
Father's education	−.008	.044	.018*	.81	.031*
Antisocial Time 1	.037	.008	.006	.80	.031*
Antisocial Time 2	.045	.011	.009	.79	.040*
CU	.021	.011	.007	.86	.034*
Anxiety	.011	.004	.003	.79	.032*
Hyperactivity	.032	.008	.006	.80	.028*
Peer problems	.020	.012	.008	.85	.032*

Note. CU = callous-unemotional traits.
*$p < .05$.

The interactions between CU and Antisocial in predicting Time 2 Antisocial for younger boys and older girls are shown in Figure 1. Prediction of diagnostic severity at Time 2. Insufficient power was available to break the Group = Gender and Age for externalizing symptom data, and thus, only gender groups were used. For boys, significant predictors were Time 1 education of father (negative predictor; estimate = =.07, SE = .03, t = -2.08, p = .05), Hyperactivity (estimate = -.03, SE = .01, t = -2.24, p = .05), and the interaction term CU = Antisocial (estimate = .04, SE = .01, t = 4.98, p = .05). The addition of the CU interaction term took the explanatory variance to 25% of Time 2 outcomes, over and above the 12% associated with Time 1 education of father, Hyperactivity, and Antisocial behavior. No significant prediction was found for girls who had very low levels of conduct problem symptoms. The interaction for boys is shown in Figure 2.

Discussion

Our aim in this study was to examine the structure and predictive use of constructs that are common to contemporary models of psychopathy and disruptive behavior problems in children. Specifically, we examined the structure and predictive validity of two aspects of psychopathy—CU traits and conduct problems/antisociality—
with community samples of children who were 4–9 years old. It is highly controversial to apply the idea of psychopathic traits to young children, and little previous work has examined whether such traits could be adequately measured with such a young sample. Furthermore, it is unknown whether measurement of such constructs could add value in the prediction of child antisociality over and above more established predictors of child adjustment. First, we examined the psychometric properties of a common measure of psychopathic traits in young people, the APSD, with the 4–9-year-old sample. The results were mixed but generally positive. Subscale scores were remarkably stable across the 12-month period of the study. The internal consistencies of the CU, IMP, and NAR subscales were all moderate in level and lower than those found for a slightly older community sample from the United States (Frick et al., 2000).

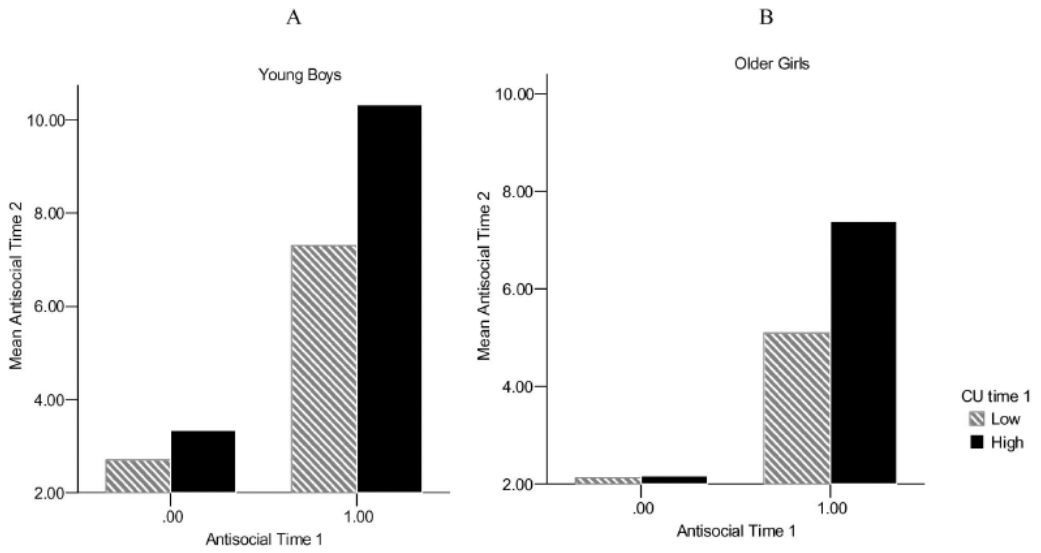

Figure 1. Interactions between antisocial problems and callous-unemotional (CU) traits at Time 1 predicting antisocial problems at Time 2.

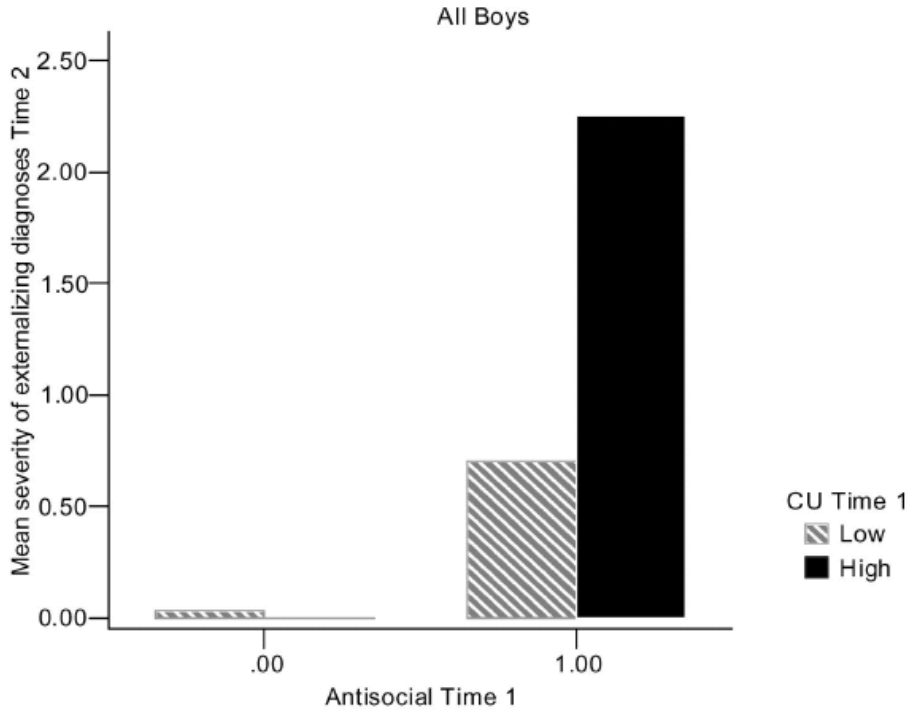

Figure 2. Interactions between conduct problems and callous-unemotional (CU) traits at Time 1 predicting
externalizing symptoms at Time 2.

A confirmatory factor analysis conducted across age and gender groups provided the most support for the three-factor solution (CU, NAR, IMP) as described by Frick et

al. (2000). The model fit was similar to that reported by Frick et al. (2000) with an older community sample. These indices indicate that the parent-report version of the APSD has adequate psychometric integrity for use with this younger group.

A more important question is whether the constructs of early psychopathy, such as CU, offer added value to more common models of the disruptive behavior disorders (e.g., Burns, 2000). Thus, the scales purporting to measure psychopathic traits were assessed against a broader model of child adjustment. We drew on statistical best practice for new measure development (e.g., Clark & Watson, 1995) and debates about the distinctiveness of the psychopathy construct and the APSD in particular (Burns, 2000; Frick, 2000); we then conducted a combined factor analysis on the pooled items of the APSD and the SDQ. The result was an appealing five-factor structure that showed substantial overlap between SDQ and APSD items but ultimately produced support for the common model of psychopathy that holds that antisocial behavior, hyperactivity–impulsivity, and CU traits are separate dimensions relevant to the development of antisocial behavior. Several aspects of this new factor structure are worth noting. The Antisocial subscale was heavily loaded with the more extreme signs of antisocial behavior (e.g., lying, stealing) but did not include less severe behaviors that are typically grouped with disruptive behavior in this age group (i.e., noncompliance, temper tantrums). Furthermore, the antisocial scale included most of the APSD's Narcissism items, supporting previous research into narcissism and antisociality (see Frick et al.'s, 2000, study). The result is a subscale that reflects a self-centered and proactive style of interpersonal aggression and manipulation that augurs well for its use in studying more severe antisocial pathways. The new CU subscale appears to have stronger face validity than the original APSD scale, in that two items that have only limited or indirect relevance to the CU construct ("keeps the same friends," "motivated to do best") moved to the more obvious subscales of Peer Problems and Hyperactivity, respectively. It is also interesting to note that most of the SDQ Prosocial Behavior items loaded here. To what extent prosocial behavior and CU traits can be considered ends of the same continuum is unknown. However, the Prosocial Behavior scale of the SDQ may be particularly useful in predicting antisociality when considered in this context. One problem with the CU scale used in this study was the inclusion of the disobedience item (however, see Footnote 1). We were concerned that this item may have been contributing to the significance of the CU subscale in predicting 12-month outcomes. To check this, we calculated partial correlations of the CU items with the 12-month outcome measures; the most consistently predictive items from the new CU scale were "inconsiderate of other people's feelings" and "does not feel guilt," reinforcing the importance of the core CU construct. The appeal of the five-factor structure was further reinforced by the low correlations between the factors, the largest being .38 between Antisocial and Hyperactivity. The area of developmental psychopathology has long been plagued by large overlap between measured dimensions of dysfunction in young people. The current analysis produced five factors that cover the domains of conduct problems and psychopathy while remaining largely uncorrelated. Of particular interest is the correlation of Antisocial and CU with Anxiety. Measures of externalizing or conduct problems usually correlate positively with emotional problems, largely reflecting an overlap of items measuring emotional dysregulation (e.g., gets angry, reacts badly to criticism). However, more severe antisocial behavior of the type associated with psychopathy, particularly the CU factor, is held to be unrelated to anxiety problems; that is, individuals high in CU have few emotion regulation problems (e.g., Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999). The

small, positive, and significant correlation between Antisocial and Anxiety, and the zero correlations of CU with Anxiety, support this emerging model. Second, it is important to note that the NAR items loaded with the Antisocial scale. In the adult psychopathy literature, NAR has tended to load with the CU factor (see Hare's, 1998, study). However, the small number of community studies with the APSD found that the NAR items loaded with the ICP factor (Frick et al., 2000). The results of the current analysis provide more rigorous support for this contention, given that we included a more comprehensive range of items and had a larger and younger sample.

It should also be noted that no evidence was found for the specificity or usefulness of the narcissism construct in children of this age. All items pertaining to this construct merged with items characterizing conduct problems from the SDQ; we found no evidence of a unique factor. This is consistent with previous findings that, contrary to adult findings, narcissism is more highly correlated with antisociality than CU traits in children (Frick et al., 2000). However, it is in contrast to analyses of the APSD showing that narcissism can be differentiated out as a construct. There are a few possible reasons for this. First, our sample is younger than previously studied; narcissism may not be meaningful in this age group. Second, we assessed the narcissism items in tandem with broader indices of child adjustment; previous studies have evaluated narcissism within the confines of the two- and three-factor psychopathy model. In younger children, narcissism appears not to be differentiated from a broader aggressive–manipulative style. The follow-up design of this study provided evidence that CU traits did add value to the prediction of antisocial behavior in this young community sample. That is, CU traits were predictive of antisocial behavior 12 months later, after controlling for the Time 1 measures of antisociality. As expected, the predictive power of CU varied with age and gender. The most consistent finding was for the younger boys, for whom CU traits added prediction to antisocial outcomes as measured by both parent reports of Antisocial and diagnostic symptom severity. For girls, we were largely unsuccessful in predicting severity of diagnostic outcome, in part because of the low levels found. CU traits did add prediction to parental reports of Antisocial behavior at 12 months, but in contrast to the boys, this was found for the older girls. Gender differences in the age at which the interaction between CU and conduct problems predicted parent-reported outcomes are consistent with emerging models of antisocial behavior. For the older boys in this study, outcomes were predicted solely from level of conduct problems at Time 1. Thus, this group appeared to be quite stable in their antisocial behavior. CU traits added prediction for the younger boys, however, indicating that other variables may still be influencing the child's trajectory. In contrast, the older girls showed variance in outcomes according to the CU factor, providing indirect evidence that developmental pathways to antisocial behavior may be somewhat lagged in girls (e.g., Silverthorn & Frick, 1999). The contribution of the CU construct was consistent with Frick and Ellis's (1999) model in which CU interacts with the presence of conduct problems to predict outcomes. For boys, the contribution of CU to outcomes came from its interaction with conduct problems such that the multiplication term of the two constructs was positively associated with 12-month outcomes over and above any univariate prediction of the CU trait alone. Thus, CU traits appear to facilitate an escalating pathway of conduct problems over time.

A characteristic of the findings was that the most important and consistent predictor of Time 2 status was Time 1 status; children's antisocial behavior was remarkably stable over the 1-year period. This is consistent with a wealth of research pointing to the stability of aggression and antisociality through childhood and, to a lesser extent, adolescence (see Loeber &

Farrington's, 2000, study). The Time 1–Time 2 correlations in the current study were generally even higher than is usually found (i.e., r=-.6 –.7). Such stability makes it very difficult to find statistical support for other predictors; the fact that CU did add prediction against this background is impressive. There are a number of qualifications to be made to the findings of the current study. First, the effect sizes of the additive prediction afforded by CU traits were generally not large compared with the stability of the child's conduct problems. When we analyzed the data using traditional linear regression, the changes in R2 associated with the CU interaction term were small for the parent-report measures (4%–6%) and more impressive for the diagnostic severity measure (12% of extra prediction). There are a number of aspects about the current design that would have served to create an upper limit to the amount of variance that the CU measure could predict. First, indices of stability in the outcome measures were high across the 12-month period. For example, Time 1 and Time 2 indices of conduct problems correlated above .7 for boys. Given that we were trying to predict change across the 12-month period, there was precious little variance to explain. Second, psychometric properties of the CU construct (especially for the original APSD) were only moderate, and this would create another upper limit on how much predictive variance it could reliably contribute. Third, given previous findings about the relationship of CU to the more extreme forms of conduct problems, the use of parent reports of antisociality and symptom severity as dependent variables may not have been optimal. Unfortunately, measurement of more extreme antisociality is somewhat constrained in this age range. More severe acts such as vandalism, violence, and theft have low base rates. Without huge sample sizes, researchers are limited to measuring more common behavior problems. Notwithstanding this, future researchers might benefit from using a broader range of outcome measures more conceptually related to the psychopathy model, for example, predatory interpersonal aggression and crime. Our follow-up period was limited to 1 year; clearly, a longer time period would be required to map stable trajectories into severe antisocial behavior. The current study is also limited by the sole use of parent reports for the APSD and the SDQ. Goodman (1997) recommended using composite parent and teacher scores for the SDQ, and in the previous community study (Frick et al., 2000), parent and teacher reports on the APSD were both collected and combined to form a composite measure for each child. Research on behavior problems has a rich history of exploring the differential manifestations of conduct problems across home and school settings and the extent to which parents and teachers converge in their ratings of children.

Although there is consistent evidence that only low levels of agreement can generally be expected (e.g., Kolko & Kazdin, 1993), it might be that greater levels may be achieved given that the APSD is purporting to measure traits that would show some consistency across settings and time. Future researchers may benefit from using multiple adult informants and examining their convergence. It is unlikely that child reports will be useful in the younger age groups but those reaching middle childhood— namely, approximately 7 years or older—may also provide useful reports on their own style. In the current study, we went to the trouble of ensuring that school samples were representative of Brisbane, Australia (the site of the research). Being a rather homogeneous city, the sample is limited to working to upper-middle class and White urban– suburban families. The extent to which the results generalize to lower socioeconomic and rural groups is unknown. Finally, caution is needed when applying the constructs of psychopathy and antisocial behavior to children. The term clearly has pejorative connotations and, even to educated mental health workers, has

come to characterize a pattern of untreatable antisocial behavior.

We renamed the APSD to the Temperament Screening Device for all community usage to minimize these problems. For a more comprehensive discussion of the use of the psychopathy construct with children, see Frick et al.'s (2000) study. In conclusion, this study shows that measurement of CU traits can be achieved with children in the middle to late childhood period. Although substantial overlap can exist between measures of this construct and other standard measures of disruptive behavior,
pooled factor analysis revealed that the CU construct has the potential to contribute unique measurement and small but significant increments in predictive power in understanding the growth of antisocial behavior across the childhood period.

Footnotes
x

1 Disobedience seems anomalous with CU traits; however, this is a characteristic of the SDQ rather than the combined factor analysis that we conducted. We found that disobedience loaded onto the SDQ's Prosocial Behavior scale, rather than the Conduct Problems scale, in a confirmatory factor analysis of the SDQ that did not include the APSD items (Hawes & Dadds, 2004; available from Mark R. Dadds).

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