

# Factors differentiating callous-unemotional children with and without conduct problems

Tina D. Wall,<sup>1</sup> Paul J. Frick,<sup>2,3</sup> Kostas A. Fanti,<sup>4</sup> Eva R. Kimonis,<sup>5</sup> and Alexandros Lordos<sup>4</sup>

<sup>1</sup>Department of Psychology, University of New Orleans, New Orleans, LA; <sup>2</sup>Department of Psychology, Louisiana State University, Baton Rouge, LA, USA; <sup>3</sup>Learning Sciences Institute Australia, Australian Catholic University, Melbourne, Vic., Australia; <sup>4</sup>Department of Psychology, University of Cyprus, Nicosia, Cyprus; <sup>5</sup>School of Psychology, The University of New South Wales, Sydney, Australia

**Background:** Callous-unemotional (CU) traits are a risk factor for a severe, aggressive, and persistent pattern of conduct problems (CP). This study investigated characteristics that might differentiate children with elevated CU traits with and without CP in an effort to identify factors that may reduce the risk for CP in children with limited prosocial emotions. **Methods:** Utilizing a sample of 1,366 children from Cyprus, five groups were identified for further study based on latent profile analysis: low-risk (67.2%), high-CP/low-CU (7.9%), high-CU (9.4%), moderate-CP/CU (8.4%), and high-CP/CU (7.2%). The identified groups were compared on behavioral and social measures. **Results:** There were significant main effects of group for: impulsivity and executive functioning; parenting; and connectedness to school. The high-CU group had significantly lower hyperactivity-impulsivity and executive functioning deficits, significantly higher self-regulation, and their mothers reported more maternal involvement and positive parenting than those in the high-CP/CU group. Also, the high-CU group showed more school connectedness than those in the high-CP/CU group. **Conclusions:** These findings highlight several factors in the child and in his or her social environment that are associated with CU traits in the absence of serious CP and that may suggest targets for intervention for youth who may lack prosocial emotions. **Keywords:** Conduct problems; callous-unemotional traits; parenting; executive functioning; impulsivity.

## Introduction

Callous-unemotional (CU) traits are defined by a lack of guilt, lack of empathy, and a basic poverty of emotions. Among youth with conduct problems (CP), those high on CU traits engage in more severe and persistent patterns of antisocial behavior, and they differ from other youth with CP on a number of important social and emotional risk factors (Frick, Ray, Thornton, & Kahn, 2014). Although CU traits are typically studied in the presence of CP, there is emerging research to suggest that some children who are high on CU traits may not display significant CP (Fanti, 2013; Rowe et al., 2010). This group is important to study because they could provide insight to factors that can inhibit behavior that harms others or that violates the rights of others in persons who do not show the prosocial emotions that normally help to inhibit such antisocial behaviors.

A greater understanding of what might inhibit antisocial behavior in youth with elevated CU traits can be obtained from research on adults with significant levels of psychopathic traits (which include CU traits) but who do not commit serious antisocial behaviors. These individuals have been reported to show better executive functioning than those with significant psychopathic traits who are also antisocial (Ishikawa, Raine, Lencz, Bihrlé, & LaCasse, 2001; Sellbom & Verona, 2007). Gao and

Raine (2010) suggested that better executive functioning leads to better impulse control in individuals who lack guilt and empathy and help the individual to make decisions that are less likely to result in negative consequences to them. Two studies of community youth reported results that would be consistent with this possibility (Fanti, 2013; Rowe et al., 2010). For example, Fanti (2013) reported that young adolescents (age 12) who were elevated on CU traits without CP had significantly lower scores on measures of hyperactivity and impulsivity than a group high on both CU traits and CP. Similarly, Rowe et al. (2010) reported that youth (ages 5 to 16) with CU traits but without significant CP were less likely to have a diagnosis of Attention-deficit Hyperactivity Disorder (ADHD) than those with both elevated CU traits and CP. Thus, the evidence suggests that children with CU traits in the absence of CP show better impulse control. However, both of these studies limited their focus to impulse control and did not test differences in executive control.

Another factor that may differentiate youth with elevated CU traits but without CP is whether the child experiences warm and responsive parenting that emphasizes positive change strategies (i.e., use of positive reinforcement) over punishment and coercion. Positive parenting is important for children with CU traits who often are relatively insensitive to punishment and thus require parenting that relies on other means for socialization (Waller, Gardner, & Hyde, 2013). In support of this possibility, CP are

Conflict of interest statement: No conflicts declared.

more highly associated with harsh and punitive discipline in youth with normative levels of CU traits, but are more highly associated with low parental warmth in youth with elevated CU traits (Pasalich, Dadds, Hawes, & Brennan, 2012). Fanti (2013) provided evidence that adolescents (age 14) elevated on CU traits but without CP reported higher levels of family support than those adolescents elevated on both CU traits and CP. Thus, although this study did not directly measure parental use of positive reinforcement or warmth, it is highly likely that perceived family support would be associated with these positive parenting qualities.

A final possible factor that may differentiate CU youth with and without CP is their level of connectedness with peers and school. Social control theory proposes that a child who is connected to prosocial institutions (e.g., school) will be less likely to rebel against these institutions, and their connectedness with others could overcome individual predispositions to act in ways that harm others (Sampson, Raudenbush, & Earls, 1997). There is no study to our knowledge that has directly tested whether dimensions of social control differentiate children with elevated CU traits with and without CP.

In summary, there is accumulating empirical research suggesting that there are some children who show elevated CU traits but do not show CP. In this study, we predicted that children with elevated CU traits who do not show significant levels of CP would show better executive functioning and impulse control, would experience warmer parenting that relies on positive reinforcement, and would perceive being more supported by friends and more connected to school. Finally, in all analyses we tested the potential moderating role of the child's sex. This moderational test is important because girls with elevated CU traits may not express their antisocial behavior in ways that are captured by traditional definitions of antisocial behavior (Frick & Nigg, 2012; Loeber, Capaldi, & Costello, 2013). As a result, girls high on CU traits but without CP may, in fact, still engage in other types of antisocial behavior and would therefore not show the factors that inhibit antisocial behavior in boys.

## Methods

### Participants

Data were collected from a large sample of 1,366 families in Cyprus at three time points, 6 months apart. At study commencement children ranged in age from 7 to 11 (Mn = 9.38 years,  $SD = 1.04$ ) and half were girls (53.4%). There was a high degree of retention across the three time points, with 1,129 families participating at Time 2 (collected 6 months after Time 1) and 1,048 families participating at Time 3 (collected 12 months after Time 1).

### Procedure

Following study approval by the Cyprus Ministry of Education and Bioethics Committee and school boards of all participating schools, 26 schools (10 from rural areas) in the four school districts in Cyprus were randomly selected to ensure that the sample was representative of the population in Cyprus. Before data collection, signed parental consent and youth assent were obtained from all participating families (85% of parents and children agreed to participate). Children were given a sealed envelope that included the questionnaires to be completed by both parents. Parents were instructed to place the completed questionnaires in the sealed envelope and return them to the child's school. Children completed the questionnaires in their familiar school setting.

### Measures – group formation

**Callous-unemotional traits.** Callous-unemotional traits were assessed with the 24-item parent report Inventory of Callous-Unemotional Traits (ICU; Kimonis et al., 2008). Scores from the ICU correlate positively with antisocial behavior and correlate negatively with prosocial behavior (Fanti, 2013; Kimonis et al., 2008, 2014). The total score demonstrated good internal consistency ( $\alpha = .86$ ) in the current sample. Mother- and father-reported ICU scores were combined by taking the higher rating between parents (Frick & Hare, 2001). Mother and father reports were highly correlated ( $r = .68$ ).

**Conduct problems.** Conduct problems were measured with the Child Symptom Inventory for Parents-4 (CSI-4; Gadow & Sprafkin, 2002), which assesses the frequency of 15 symptoms of CD (e.g., 'Has stolen things from others using physical force') and the eight symptoms of ODD (e.g., 'Argues with adults'). Mother and father reports were highly correlated ( $r = .70$ ), and were combined at the item level by taking the higher rating ( $\alpha = .89$ ).

### Measures – dependent variables

**Impulsivity/executive control.** Two measures of impulsivity were included utilizing parent report. The first measure was the 5-item impulsivity subscale of the Antisocial Process Screening Device (APSD; Frick & Hare, 2001) that has been associated with other measures of poor impulse control in past samples (Colins, Bijttebier, Broekaert, & Andershed, 2014; Fanti, 2013). This scale was internally consistent across all time points ( $\alpha = .70$  to  $.74$ ) and was stable across time ( $\alpha = .63$  to  $.69$ ). The second measure of impulsivity was the Impulsive-Hyperactive symptoms score from the CSI-4. This scale was also internally consistent across all time points ( $\alpha = .87$  to  $.89$ ) and stable across time ( $\alpha = .72$  to  $.79$ ). Given the high correlations across time, scores across all three time points were averaged to provide a more stable and generalizable estimate of impulsivity.

Executive control was also assessed using two measures. However, these measures only involved parent report at one time point. First, self-regulation was measured with mother report on the Social-Emotional Assets and Resilience scale (SEARS; Merrell, 2011) at Time 1 to assess executive control as a correlate. The self-regulation subscale includes 22 items ( $\alpha = .94$ ) and has been associated with CD and ADHD symptoms (Fanti, 2011). Second, executive dysfunction was also measured as an outcome using the 33-item Executive Skills Questionnaire (ESQ; Dawson & Guare, 2010), which was administered to mothers at Time 3. The ESQ has three subscales measuring planning ( $\alpha = .95$ , 12 items), inhibition ( $\alpha = .91$ , 9 items), and organization ( $\alpha = .92$ , 5 items) deficits.

**Positive parenting.** Positive parenting was assessed by the average ratings of mothers and the average ratings of children using the Parental Involvement (10 items) and Positive Parenting (6 items) subscales of the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996). The Parental Involvement subscale measures parents' involvement in the child's activities [e.g., 'How often do you (does your parent) play games or do other fun things with your child (you)']. The Positive Parenting subscale measures how frequently the parent uses positive reinforcement to encourage appropriate behavior [e.g., 'How often do you (does your parent) praise your child (you) if he/she (you) behaves well']. Past research has suggested that these scales are negatively associated with CP (Shelton et al., 1996) and are positively correlated with direct observations of warm parenting behavior (Hawes & Dadds, 2006). These subscales were internally consistent across all time points ( $\alpha = .78$  to  $.86$ ) and they also were stable across time ( $\alpha = .75$  to  $.82$  for mother report and  $\alpha = .59$  to  $.76$  for child report). Similar to the impulsivity measures, parenting variables were combined across the three time points to provide a more stable estimate of the constructs.

**Connection to school and peers.** School Connectedness was measured using items from the National Longitudinal Study of Adolescent Health (Brookmeyer, Fanti, & Henrich, 2006). At each time point, children responded to items such as 'I feel close to people at this school,' and 'I feel like I am part of this school'. These five items have been shown to predict behavioral problems (Brookmeyer et al., 2006). They were internally consistent in the current sample ( $\alpha = .84$  to  $.87$ ) and were generally stable across time ( $\alpha = .56$  to  $.72$ ). Perceived support from peers was assessed with the peer subscale of the Multidimensional Scale of Perceived Social Support at each time point (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). These four items measure supportive relationships with peers (e.g., 'I can count on my friend when things go wrong') and have been negatively correlated with CU traits, impulsivity, bullying, and victimization (Fanti, Demetriou, & Hawa, 2012). These items were internally consistent in the current sample ( $\alpha = .91$  to  $.97$ ) and were generally stable across time ( $\alpha = .59$  to  $.71$ ). The composites of average scores across time points were used.

### Plan of analyses

In order to identify distinct subgroups of children scoring high on CU traits that differed on their level of CP, latent profile analysis (LPA) using Mplus 6.1 (Muthen & Muthen, 2010) was used. LPA is an extension of latent class analysis that accommodates continuous indicators. It identifies different latent classes by decomposing the covariance matrix to high-light relationships among individuals and clustering individuals that are similar on the constellation of indicators into latent classes (Bauer & Curran, 2004).

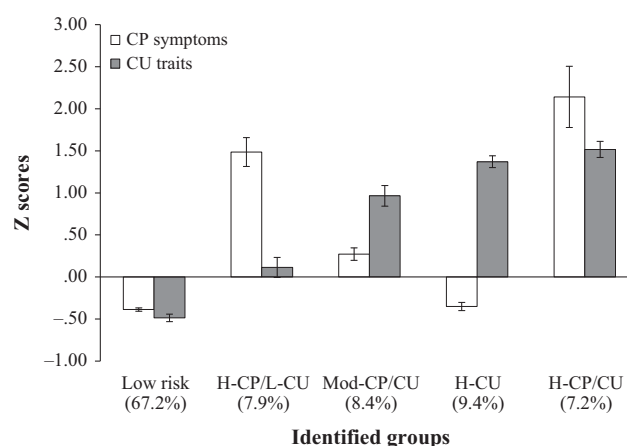
Multivariate analyses of variance (MANOVA) were used to compare the groups formed by the LPA on impulsivity/executive functioning and positive parenting. All indicators of these two constructs were entered together as dependent variables to obtain overall effect sizes for the construct. Significant MANOVA's were then followed by individual ANOVA's and pairwise comparisons using Least Significant Differences (LSD) procedure to determine whether group differences supported the study hypotheses. For the measures of connection to school and peer support, which were conceptualized as separate constructs, individual ANOVA's were conducted, followed by pairwise comparisons to test hypothesized group differences. In addition to main effects for groups, group by sex interactions were also tested in all analyses to determine if any group differences were modified by the child's sex.

## Results

### Latent profile analysis

To identify the optimal number of groups to retain, five LPA models were estimated, ranging from two to six groups. The Bayesian information criterion (BIC) and Akaike information criterion (AIC) statistics showed decreases from the 2-group to the 5-group models. Both model fit indices increased from the 5-group (BIC = 18,109.65, AIC = 18,010.45) to the 6-group (BIC = 18,190.96, AIC = 18,107.42) model. The Lo–Mendell–Rubin (LMR) statistic fell out of significance for the 6-group model ( $p = .39$ ) suggesting that the 5-group model better fit the data. The mean posterior probability scores for the five identified groups ranged from  $.79$  to  $.95$  and the entropy value was  $.77$ , suggesting that the groups were well separated. The identified groups are illustrated in Figure 1.

This analysis led to the adoption of the five group model, with the groups showing the following characteristics: low-risk (67.2%;  $n = 919$ , 524 female;  $Mn$  age = 9.27 years,  $SD = 1.65$ ), high-CP/low-CU (7.9%;  $n = 108$ , 39 female;  $M$  age = 9.09 years,  $SD = 1.62$ ), high-CU (9.4%;  $n = 128$ , 65 female;  $M$  age = 9.46 years,  $SD = 1.61$ ), moderate-CP/CU (8.4%;  $n = 114$ , 60 female;  $M$  age = 9.14 years,  $SD = 1.70$ ), and high-CP/CU (7.2%;  $n = 97$ , 34 female;  $M$  age = 9.32 years,  $SD = 1.73$ ). According to  $\chi^2$  analyses, boys were more likely to be identified in the high-CP/low-CU and high-CP/CU groups, whereas girls were more likely to be identified in the low-risk group,  $\chi^2(4, N = 1,366) = 31.11, p < .001$ . As evident from Figure 1, two groups high on CU traits were identified: one group who were also elevated on CP and a second group who showed CU traits without elevated levels of CP. The level of CU traits did not differ significantly between these two groups ( $t(218) = -.50, p = .62, \eta^2 = .001$ ). Although the primary comparisons of interest were between the high CU, high CP/CU, and low-risk



**Figure 1** Latent profile analysis model based on youth scores on conduct problems and callous-unemotional traits, including 95% confidence intervals

groups, we also included all five identified groups in analyses.

### Primary group comparisons

Table 1 shows the results of the 2 (Sex) by 5 (Group) MANOVAs comparing the identified groups on impulsivity and executive functioning variables. The overall MANOVA showed significant main effects of group [Pillai's Trace = .32,  $F(24, 2632) = 9.74$ ,  $p < .001$ ,  $\eta^2 = .08$ ] and sex [Pillai's Trace = .04,  $F(6, 655) = 4.92$ ,  $p < .001$ ,  $\eta^2 = .04$ ] but no significant group by gender interaction [Pillai's Trace = .03,  $F(18, 1824) = .85$ ,  $p = .64$ ,  $\eta^2 = .01$ ]. Of the six individual ANOVAs, only two showed significant sex effects. Specifically, boys scored higher than girls on the measures of impulsivity and hyperactivity with effect sizes of  $\eta^2 = .02$  and  $\eta^2 = .03$ , respectively. All six individual

ANOVAs showed significant effects for group with effect sizes ranging from  $\eta^2 = .08$  to  $\eta^2 = .26$ . The pairwise comparisons also showed consistent group differences on the primary contrasts of interest (see Table 1). For all six variables, the high-CU group showed significantly less impulsivity or greater executive control than the high-CP/CU group, as predicted. Further, the high-CU group showed poorer executive control (i.e., SEARS self-regulation and planning deficits) than the low-risk group on two of the six variables.

When the four measures of parenting were included in the MANOVA, there was only a main effect of group [Pillai's Trace = .11,  $F(16, 1028) = 21.80$ ,  $p = .03$ ,  $\eta^2 = .03$ ]. Two of the four individual ANOVAs showed significant group differences, with effect sizes ranging from  $\eta^2 = .01$  to  $\eta^2 = .07$ . For both maternal report measures, the high-CU group showed higher rates of maternal

**Table 1** Results of multivariate analyses of variance comparing groups defined by levels of conduct problems (CP) and callous-unemotional (CU) traits

Variable	Low risk ( <i>n</i> = 919)	H-CP/ L-CU ( <i>n</i> = 108)	Mod-CP/CU ( <i>n</i> = 115)	H-CU ( <i>n</i> = 128)	H-CP/CU ( <i>n</i> = 98)	F-value	df	$\eta^2$
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )			
Impulsivity/executive functioning								
Impulsivity	2.84 <sup>a</sup> (2.00)	5.29 <sup>b</sup> (2.34)	5.40 <sup>b</sup> (2.20)	<b>4.05<sup>c</sup> (1.86)</b>	<b>6.96<sup>d</sup> (2.33)</b>	58.68*	4	.26
Impulsivity/ hyperactivity	4.02 <sup>a</sup> (3.44)	7.45 <sup>b</sup> (4.36)	6.80 <sup>b</sup> (4.69)	<b>4.58<sup>a</sup> (3.50)</b>	<b>9.31<sup>c</sup> (5.44)</b>	25.14*	4	.13
Self-regulation	18.72 <sup>a</sup> (4.83)	14.50 <sup>b</sup> (4.51)	13.34 <sup>b</sup> (4.58)	<b>15.89<sup>b</sup> (4.58)</b>	<b>12.48<sup>c</sup> (5.26)</b>	35.88*	4	.18
Planning deficits	10.45 <sup>a</sup> (11.05)	16.48 <sup>b,c</sup> (12.92)	19.50 <sup>c</sup> (12.38)	<b>13.98<sup>b</sup> (12.75)</b>	<b>21.38<sup>c</sup> (13.99)</b>	15.08*	4	.08
Inhibition deficits	7.83 <sup>a</sup> (7.78)	12.47 <sup>b</sup> (8.23)	12.47 <sup>b</sup> (7.82)	<b>9.03<sup>a</sup> (8.16)</b>	<b>16.09<sup>c</sup> (8.43)</b>	14.45*	4	.08
Organization deficits	5.40 <sup>a</sup> (5.41)	8.92 <sup>b</sup> (5.64)	9.48 <sup>b</sup> (5.43)	<b>6.34<sup>a</sup> (5.43)</b>	<b>10.41<sup>b</sup> (6.36)</b>	15.90*	4	.09
Significant overall effects: Group, Pillai's trace = .32, $F(24, 2632) = 9.74$ , $p < .001$ , $\eta^2 = .08$ ; Gender, Pillai's trace = .04, $F(6, 655) = 4.92$ , $p < .001$ , $\eta^2 = .04$								
Positive parenting								
Parental involvement – M	30.84 <sup>a,b</sup> (4.11)	28.91 <sup>a,b,c</sup> (4.57)	30.26 <sup>a,b</sup> (4.41)	<b>30.75<sup>a,b</sup> (5.06)</b>	<b>26.41<sup>c</sup> (4.47)</b>	5.10*	4	.07
Parental involvement – C	28.33 (5.50)	25.61 (6.41)	29.27 (5.38)	28.08 (5.59)	25.56 (7.16)	2.37	4	.04
Positive parenting – M	21.23 <sup>a</sup> (2.38)	20.08 <sup>a,b</sup> (2.68)	20.82 <sup>a,b</sup> (3.14)	<b>21.05<sup>a</sup> (3.20)</b>	<b>19.56<sup>b</sup> (3.15)</b>	2.48*	4	.04
Positive parenting – C	18.73 (3.69)	17.73 (3.30)	19.02 (2.92)	18.98 (3.98)	17.30 (5.40)	0.89	4	.01
Significant overall effects: Group, Pillai's trace = .11, $F(16, 1028) = 1.80$ , $p = .03$ , $\eta^2 = .03$								
Connection to school and peers								
Friend support	8.19 (2.31)	7.79 (1.97)	7.97 (2.24)	7.56 (2.71)	7.63 (2.44)	1.10	4	.01
School connectedness	14.12 (2.97) <sup>a</sup>	13.21 (2.85) <sup>a,b</sup>	13.91 (2.90) <sup>a,b</sup>	<b>13.77 (3.46)<sup>a</sup></b>	<b>12.29 (3.58)<sup>b</sup></b>	2.85*	4	.03

F-value is the main effect for group in the individual 2 (sex)  $\times$  2 (Group) ANOVA's that were conducted for each significant MANOVA. \* $p < .05$ . Impulsivity and impulsivity/hyperactivity assessed as averages of maternal reports at Time 1, Time 2, and Time 3; self-regulation assessed with maternal report at Time 1; planning deficits, inhibition deficits, and organizational deficits assessed with maternal reports at Time 3; parental involvement and positive parenting assessed as averages at Time 1, Time 2, and Time 3; friend support and school connectedness assessed as averages of child report at Time 1, Time 2, and Time 3; CU, callous-unemotional traits; CP, conduct problems; H, high; L, low; Mod, moderate; M, maternal report; C, child report; means with different superscripts differ significantly from each other at the  $p < .05$  level. Bolded means highlight differences between the high-CU and high-CP-CU group, the primary contrast of interest.

involvement and positive parenting than the high-CP/CU group, as predicted. Further, the high-CU group did not differ from the low-risk control group on either of these maternal report measures. For child report of maternal involvement, the same pattern of scores emerged but the difference between the high-CU and high-CP/CU groups did not reach statistical significance.

For the ANOVA for school connectedness, there was a main effect for group [ $F(4, 460) = 2.85, p = .02, \eta^2 = .03$ ] and the pattern of findings was consistent with predictions. The high-CU group showed greater school connectedness than the high-CP/CU group and did not differ from the low-risk group. However, the ANOVA for friend support resulted in an unexpected interaction between sex and group [ $F(4, 460) = 2.87, p = .02, \eta^2 = .03$ ] that did not influence the findings for the high-CU and high-CP/CU groups. These two groups did not differ on friend support for either boys or girls. Instead, the interaction was due to the fact that both CP groups differed from the low-risk group by showing less perceived support from friends for girls but not boys.<sup>1</sup>

## Discussion

Our findings uncovered several characteristics that differentiated children with elevated CU traits with and without CP. Consistent with the findings of Fanti (2013) who used an independent sample of older children (ages 12–14), our results suggest that children with CU traits who do not show significant levels of CP show lower levels of impulsivity and higher levels of executive control than children with CU traits and CP. Our results are also consistent with research in adults with psychopathic traits, in that those who do not have histories of criminal behavior often show better levels of executive control than those who do (Ishikawa et al., 2001; Sellbom & Verona, 2007). These findings support the contention of Gao and Raine (2010) that executive control can lead to an improved ability to control impulses and, as a result, to inhibit behavior that may result in negative consequences to the individual and to others. These findings also align with research suggesting that stimulant medication, which can reduce a child's level of impulsivity, is effective in also reducing the level of CP in school-aged children with elevated CU traits (Waschbusch, Carrey, Willoughby, King, & Andrade, 2007). It is important to note that it is not clear from our findings whether or not the better impulse control actually results in lower levels of CP or whether it leads a child to act in more covert ways and avoid being rated by parents as showing CP. This would be an important focus of future research to determine if children with elevated CU traits and better impulse control self-report less covert CP that may not be detected by others.

Our results also suggest that children with CU traits but without significant CP came from families in which the mothers reported being more involved with their child and using more positive reinforcement than those with CP. These results need to be interpreted with caution as they were not replicated using child report. However, this finding is consistent with past research suggesting that children with CU traits are relatively insensitive to punishment compared to children with CP alone (Frick et al., 2014) and they would support other work linking warm parenting to improved CP in children with elevated CU traits (Waller et al., 2013). Furthermore, these results support findings from a treatment study of children with CP that reported that children with and without CU traits responded equally well to the first part of a parenting intervention that focused on increasing a parent's use of positive control strategies (Hawes & Dadds, 2005). Thus, interventions for youth with CU traits may be more effective if they focus on increasing warm and responsive parenting (Kimonis, Bagner, Linares, Blake, & Rodriguez, 2014).

The last set of factors that were the focus of this study involved the child's perceived connection to school and support from peers. For school connectedness, the results were consistent with predictions. Children high on CU traits without CP reported being more connected with school than those also high on CP. Thus, it is possible that another mechanism for reducing the level of CP in children with elevated CU traits would be to increase the child's connection to school, such as by intervening to help parents and schools work together more effectively (Conduct Problems Prevention Research Group, 2004) or by using reward-based contingency management strategies in the classroom (Frick 2012). Our analyses did not suggest that perceived support from peers differentiated among youth high on CU traits with and without CP, although this finding may have been due to the failure to distinguish between prosocial and antisocial peers (Kimonis, Frick, & Barry, 2004).

Given that the predictions for this study focused on the differences between the low-risk comparison, high-CU, and high-CU/CP groups, differences between the other groups for which we did not have a priori predictions should be interpreted cautiously. However, there were a substantial number of youth who fell into a group that was moderate on both CU traits and CP. A similar group was found by Fanti (2013) in his older sample of adolescents. This group often showed an intermediate level of the dispositional and contextual variables in comparison to the high-CU and high-CU/CP groups. Thus, it appears that the buffering effects of impulsivity/executive control, positive parenting, and school connectedness may be better considered along a continuum, rather than as

needing a certain level to reduce the risk for CP. In addition, the high-CP/low-CU group had significantly higher levels of CU traits than the low-risk comparison group and this again was consistent with the findings of Fanti (2013). Thus, it appears that elevated levels of CP in the absence of any CU traits are rare, although the level of these traits may vary within children with CP.

These interpretations need to be made in the context of several study limitations. First, the method of group formation used data from the initial Time 1 assessment only. As a result, our data could not be used to determine what factors may or may not inhibit the later development of CP. It is possible that low levels of positive parenting and low connectedness to school are consequences of CP, rather than predictors. Second, because the groups were formed at the first time point only and this prevented us from conducting predictive tests, we chose to take composites of most variables across the later follow-ups to provide the most generalizable estimates of the child's dispositional characteristics (i.e., impulsivity) and contexts (i.e., parenting, peer support, school connectedness). This methodology was supported by the high degree of stability across time for these variables. However, this methodology did not allow for tests of changes in these characteristics and contexts across time.<sup>2</sup> Third, our sample consisted of nonreferred school children in Cyprus and, as a result, it is not clear how well our findings would generalize to children in other countries or other ethnic groups, or how well they would generalize to children showing levels of CP that would meet diagnostic criteria. Fourth, our assessment of executive functioning and impulse control relied on report from the child's parent, and the findings would be enhanced through the use of other laboratory measures of executive functioning (Manly, Robertson, Anderson, & Nimmo-Smith, 1998). Similarly, our

report of parenting relied on parent and child report; other methods of assessment, such as observations of parent-child interactions, would have enhanced the confidence one could place in the results.

Within the context of these limitations, our findings suggest that children with elevated CU traits in the absence of CP can be identified in some samples (see also Fanti, 2013; Rowe et al., 2010) and constitute an important group for further study. Children in the high-CU group showed better executive control and lower impulsivity, were exposed to more warm and positive parenting, and were more connected to school than children with high CU/CP. All of these factors could help to explain why children with elevated CU traits alone inhibit their antisocial behavior, despite their lack of developmentally appropriate levels of guilt and empathy. As a result, these factors could form the basis for improved and targeted interventions for children with elevated CU traits that serve to reduce their risk for developing severe, aggressive, and stable patterns of CP. Such targeted interventions are critical for a group of children at risk for serious antisocial outcomes that often respond poorly to traditional interventions designed for other children with CP (Hawes, Price, & Dadds, 2014).

### Acknowledgements

This work was supported by a grant from the Cyprus Research Promotion Foundation (CHILD/0308(BE)/18) awarded to K.A.F. The authors have declared that they have no conflicts of interest in relation to this article.

### Correspondence

Tina D. Wall, Department of Psychology, University of New Orleans, 2000 Lakeshore Drive., New Orleans, LA 70148, USA; Email: tdwall1@uno.edu

### Key points

- Despite high levels of callous-unemotional (CU) traits, some children do not display significant conduct problems (CP).
- Children high on CU traits without CP show significantly lower hyperactivity-impulsivity and executive functioning deficits, significantly higher self-regulation, and report more school connectedness than those children high on both CU traits and CP.
- Parents of children with elevated CU traits without CP, report more maternal involvement and positive parenting practices than parents of children high on both CU traits and CP.
- These factors in the child and in his or her social environment may help children who lack prosocial emotions to inhibit antisocial behavior and may suggest targets for the treatment of youth with elevated CU traits.

## Notes

1. We chose to use measures that averaged scores across time to provide more stable estimates of these constructs, given the high level of stability in these measures across time. However, when results were repeated using only time 1 measures (the time point used to form groups) the results were very similar to those reported for composite measures. That is, the high-CU group was rated as less impulsive and more self-regulated than the high-CP/CU group and they showed higher rates parent-reported maternal involvement and positive parenting than the high-CP/CU group. The one discrepancy was that group difference for school connectedness did not reach statistical significance ( $p = .07$ ).

2. Although we did not make predictions about changes across time-repeated measures, ANOVAs were conducted with each measure assessed longitudinally (i.e., Impulsivity, Impulsivity/Hyperactivity, Parental Involvement, Positive Parenting, Friend Support, and School Connectedness). Despite the large number of analyses, only two time by group interactions emerged as significant. There was a time by group interaction for impulsivity/hyperactivity, such that all groups, except the moderate-CP/CU group, decreased over time on their level of hyperactivity [Pillai's Trace = .04,  $F(8, 1330) = 3.50$ ,  $p = .001$ ,  $\eta^2 = .02$ ]. There was also a significant time by group interaction for school connectedness [Pillai's Trace = .04,  $F(8, 930) = 2.40$ ,  $p = .01$ ,  $\eta^2 = .02$ ], such that school connectedness decreased over time for the high-CU group.

## References

- Bauer, D.J., & Curran, P.J. (2004). The integration of continuous and discrete latent variable models: Potential problems and promising opportunities. *Psychological Methods, 9*, 3–29.
- Brookmeyer, K.A., Fanti, K.A., & Henrich, C.C. (2006). Schools, parents, and youth violence: A multilevel, ecological analysis. *Journal of Clinical Child and Adolescent Psychology, 35*, 504–514.
- Colins, O.F., Bijttebier, P., Broekaert, E., & Andershed, H. (2014). Psychopathic-like traits among detained female adolescents: Reliability and validity of the antisocial process screening device and the youth psychopathic traits inventory. *Assessment, 21*, 195–209.
- Conduct Problems Prevention Research Group (2004). The effects of the fast track program on serious problem outcomes at the end of elementary school. *Journal of Clinical Child and Adolescent Psychology, 33*, 650–661.
- Dawson, P., & Guare, R. (2010). *Executive skills in children and adolescents: A practical guide to assessment and intervention* (2nd edn). New York: Guilford Press.
- Fanti, K.A. (2011). The association of callous-unemotional traits to oppositional defiant disorder and attention deficit hyperactivity disorder: Taking resilience into account. In *Proceedings of the 15th European Conference on Developmental Psychology, Medimond International Proceedings*, pp. 551–557.
- Fanti, K.A. (2013). Individual, social, and behavioral factors associated with co-occurring conduct problems and callous-unemotional traits. *Journal of Abnormal Child Psychology, 41*, 811–824.
- Fanti, K.A., Demetriou, A.G., & Hawa, V. (2012). A longitudinal study of cyber-bullying: Examining risk and protective factors. *European Journal of Developmental Psychology, 9*, 168–181.
- Frick, P.J. (2012). Developmental pathways to conduct disorder: Implication for future directions in research, assessment, and treatment. *Journal of Clinical Child and Adolescent Psychology, 42*, 378–389.
- Frick, P.J., & Hare, R.D. (2001). *Antisocial process screening device: APSD*. Toronto: Multi-Health Systems.
- Frick, P.J., & Nigg, J.T. (2012). Current issues in the diagnosis of attention deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder. *Annual Review of Clinical Psychology, 8*, 77–107.
- Frick, P.J., Ray, J.V., Thornton, L.C., & Kahn, R.E. (2014). Can callous-unemotional traits enhance the understanding, diagnosis, and treatment of serious conduct problems in children and adolescents? A comprehensive review. *Psychological Bulletin, 140*, 1–57.
- Gadow, K.D., & Sprafkin, J. (2002). *Child symptom inventory-4 screening and norms manual*. Stony Brook, NY: Checkmate Plus.
- Gao, Y., & Raine, A. (2010). Successful and unsuccessful psychopaths: A neurobiological model. *Behavioral Sciences and Law, 28*, 194–210.
- Hawes, D.J., & Dadds, M.R. (2005). The treatment of conduct problems in children with callous-unemotional traits. *Journal of Consulting and Clinical Psychology, 73*, 737–741.
- Hawes, D.J., & Dadds, M.R. (2006). Assessing parenting practices through parent-report and direct observation during parenting-training. *Journal of Child and Family Studies, 15*, 555–568.
- Hawes, D.J., Price, M.J., & Dadds, M.R. (2014). Callous-unemotional traits and the treatment of conduct problems in childhood and adolescence: A comprehensive review. *Clinical Child and Family Psychology Review, 17*, 248–267.
- Ishikawa, S.S., Raine, A., Lencz, T., Bihrl, S., & LaCasse, L. (2001). Autonomic stress reactivity and executive functions in successful and unsuccessful criminal psychopaths from the community. *Journal of Abnormal Psychology, 110*, 423–432.
- Kimonis, E.F., Bagner, D.M., Linares, D., Blake, C.A., & Rodriguez, G. (2014). Parent training outcomes among young children with callous-unemotional conduct problems with or at risk for developmental delay. *Journal of Child and Family Studies, 23*, 437–448.
- Kimonis, E.R., Fanti, K., Goldweber, A., Marsee, M.A., Frick, P.J., & Cauffman, E. (2014). Callous-unemotional traits in incarcerated adolescents. *Psychological Assessment, 26*, 227–237.
- Kimonis, E.R., Frick, P.J., & Barry, C.T. (2004). Callous-unemotional traits and delinquent peer affiliation. *Journal of Consulting and Clinical Psychology, 72*, 956–966.
- Kimonis, E.R., Frick, P.J., Skeem, J.L., Marsee, M.A., Cruise, K., Munoz, L.C., ... & Morris, A.S. (2008). Assessing callous-unemotional traits in adolescent offenders: Validation of the inventory of callous-unemotional traits. *International Journal of Law and Psychiatry, 31*, 241–252.
- Loeber, R., Capaldi, D.M., & Costello, E. (2013). Gender and the development of aggression, disruptive behavior, and delinquency from childhood to early adulthood. In P.H. Tolan & B.L. Leventhal (Eds.), *Disruptive behavior disorders*. New York: Springer Science.
- Manly, T., Robertson, I.H., Anderson, V., & Nimmo-Smith, I. (1998). *Test of everyday attention for children*. Bury St. Edmunds: Thames Valley Test Company.
- Merrell, K. (2011). *SEARS professional manual*. Lutz, FL: Psychological Assessment Resources.

- Muthen, L.K., & Muthen, B.O. (2010). *Mplus user's guide* (6th edn). Los Angeles: Muthen & Muthen.
- Pasalich, D.S., Dadds, M.R., Hawes, D.J., & Brennan, J. (2012). Attachment and callous-unemotional traits in children with early-onset conduct problems. *Journal of Child Psychology and Psychiatry*, 53, 838–845.
- Rowe, R., Maughan, B., Moran, P., Ford, T., Briskman, J., & Goodman, R. (2010). The role of callous and unemotional traits in the diagnosis of conduct disorder. *Journal of Child Psychology and Psychiatry*, 51, 688–695.
- Sampson, R.J., Raudenbush, S.W., & Earls, F. (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science*, 227, 918–924.
- Sellbom, M., & Verona, E. (2007). Neuropsychological correlates of psychopathic traits in a non-incarcerated sample. *Journal of Research in Personality*, 41, 276–294.
- Shelton, K.K., Frick, P.J., & Wootton, J.M. (1996). Assessment of parenting practices in families of elementary school-age children. *Journal of Clinical Child Psychology*, 25, 317–329.
- Waller, R., Gardner, F., & Hyde, L.W. (2013). What are the associations between parenting, callous–unemotional traits, and antisocial behavior in youth? A systematic review of evidence. *Clinical Psychology Review*, 33, 593–608.
- Waschbusch, D.A., Carrey, N.J., Willoughby, M.T., King, S., & Andrade, B.F. (2007). Effects of methylphenidate and behavior modification on the social and academic behavior of children with disruptive behavior disorders: The moderating role of callous/unemotional traits. *Journal of Child and Adolescent Psychology*, 36, 629–644.
- Zimet, G.D., Dahlem, N.W., Zimet, S.G., & Farley, G.K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52, 30–41.

Accepted for publication: 14 March 2016

First published online: 2 May 2016