

Treatment Response in CP/ADHD Children with Callous/Unemotional Traits

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Abstract The current study examines the role of callous/unemotional (CU) traits in response to treatment among children with conduct problems (CP) and attention-deficit/hyperactivity disorder (ADHD). Fifty-four children with CP/ADHD and 16 controls (age=9.48, $SD=1.58$) took part in a summer treatment and research program. Simple correlations showed that CU and CP were associated with a number of treatment outcome measures. When examined together in regression analyses, CU and CP were uniquely associated with three treatment outcomes each (CU—improvement in social skills and problem solving, negative behaviors in time-out; CP—time-outs per day, peer ratings, peer dislike). The implications for these findings with regard to treatment response in children with CP/ADHD with and without CU traits are explored.

Keywords Callous/unemotional traits · Conduct problems · ADHD · Treatment

Introduction

Children and adolescents with conduct problems (CP) experience a number of stressors including underachievement in school (see Hinshaw 1992 for a review), coercive interactions in the home (Pettit et al. 1993; Sanders et al. 1992), and a lack of positive relationships with peers (Coie 1990; Hinshaw and Lee 2003). Traditionally defined as either oppositional defiant disorder (ODD) or conduct disorder (CD; *DSM-IV-TR*; American Psychological Association 2000), CP has been estimated to occur within 5% to 14% of children in general community settings (Achenbach and Edelbrock 1991; Costello 1989). Behaviors consistent with CP have been shown to be associated with a number of later negative outcomes (e.g., Farrington 1994; Caspi et al. 1996). The cost for a child with CP has been estimated to be \$70,000 beyond expenses necessary for a typically developing child over a 7-year period (Foster et al. 2005).

These societal costs are alarming and understanding the diverse nature of CP may suggest for whom these outcomes are likely. Previous research has demonstrated that the age in which individuals initiate CP behaviors is an important predictor of outcome (Moffitt 1993). Childhood-onset CP, as opposed to adolescent-limited CP, is associated with more severe CP behaviors and worse long-term outcomes (Odgers et al. 2007). Also, nearly all children with CP also meet criteria for attention-deficit/hyperactivity disorder (ADHD; Loeber et al. 1995), and children with this comorbid condition that remain untreated often experience worse outcomes than children with either disorder alone (Hinshaw 1987; Waschbusch 2002). Consequently, devel-

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oping effective interventions for early starters of CP, especially those with comorbid ADHD, is imperative.

An important step towards this goal is to identify factors related to insufficient treatment response. Callous/unemotional (CU) traits may be one such factor. CU characterizes interpersonal and affective traits such as low empathy, shallow affect, and lack of guilt. Within childhood CP samples, CU is associated with more severe, frequent, and aggressive antisocial behaviors (Christian et al. 1997; Frick et al. 2003) including more proactive aggression (Waschbusch and Willoughby 2008). Children with CP and CU (CP/CU) experience deficiencies in several domains of functioning including emotional processing (e.g., Loney et al. 2003; Marsh et al. 2008), learning from punishment (e.g., O'Brien and Frick 1996), and social skills (Frick and Dantagnan 2005). Considering the risk factors and unique deficits associated with CU (see Frick and White 2008; Kotler and McMahon 2005; for reviews), and considering that approximately one-third of referred CP children exhibit high CU (Christian et al. 1997), CU may be an important consideration when examining response to treatment in children with CP.

Several empirically supported interventions for early onset CP have been identified (Eyberg et al. 2008). Meta-analytic reviews examining various intervention and prevention programs aimed at reducing CP behaviors in youth have concluded that behavioral treatments are among the most effective (Wilson et al. 2001; Wilson et al. 2003) and have been shown to be effective for the majority of participating families and children (e.g., Serketich and Dumas 1996). However, approximately 10% of children with CP do not show significant improvement from this type of treatment (Webster-Stratton and Hammond 1997), with this rate increasing to approximately 46% after 3 years post-treatment (Webster-Stratton 1990). Other studies suggest even higher rates of non-response to behavioral treatments (Patterson 1974). Collectively, these studies suggest that a considerable proportion of children treated for CP do not show clinically meaningful improvements which suggest that novel treatment approaches may be necessary for these children. Identifying factors that may be related to low response to behavioral treatment, like CU traits, is an important step toward this long-term goal.

One reason that CU may predict treatment response pertains to the degree of impairment experienced by CP/CU youth as compared to CP youth without CU (CP-only). As noted above, children with CP/CU tend to exhibit the most serious and persistent levels of antisocial behaviors. Given that there is some evidence suggesting that more serious levels of CP are most resistant to treatment (Drugli et al. 2009; Kazdin 1995), it may be that CU is also associated with poor treatment response.

Additionally, children with CP/CU have been shown to have impairments that disrupt socialization processes that typically discourage antisocial behaviors (Blair et al. 2006; Dadds and Salmon 2003) including decreased physiological responsiveness to negative emotional words (Loney et al. 2003), distress cues (Blair 1999), and to negative facial expressions like fearfulness (Dadds et al. 2006). Furthermore, children with CP/CU seem to demonstrate an over-focus on rewards to the exclusion of punishment cues (O'Brien and Frick 1996), and it has been hypothesized that individuals with CU are less responsive to punishment relative to non-CU children (Pardini 2006). If true, it would suggest that standardized behavioral programs that utilize both reward and punishment techniques may be less effective in decreasing antisocial behavior for children with CU.

Evidence also suggests that social functioning is deficient in children with CP/CU. Research has shown that children with CP/CU have shown more impaired social skills than children with CP-only (Frick and Dantagnan 2005) and CU is uniquely associated with peer dislike nominations (Piatigorsky and Hinshaw 2004). Barry and colleagues (2008) have further demonstrated that larger deficits in social functioning are associated with more stable CU traits. Taken together, it seems possible that the combination of deficient social skills, peer rejection, and persistent antisocial behavior may lead children with CP/CU to experience less improvement in response to behavioral treatment as compared to their CP-only counterparts. However, no research currently has examined whether CU predicts treatment response on measures of peer functioning within a sample of CP children.

In fact, only two published studies have examined the role of CU in response to treatment among elementary age children with CP (Hawes and Dadds 2005; Waschbusch et al., 2007a). Of particular relevance, Hawes and Dadds (2005) examined whether young children with CP/CU showed a differential response to a behavioral parent training program as compared to children with CP-only. They found that CU was a significant predictor of decreased treatment response; children with higher CU at the start of treatment were more likely to receive an ODD diagnosis at a 6-month follow-up. These results also provided evidence that time-out was less effective (as evaluated by parents) for children with CP/CU, and that this was not a function of differential implementation of time-out. This study suggests that among children with clinically significant CP, CU is associated with worse response to behavioral treatment in general and to a decreased effectiveness of time-out procedures in particular. More research is needed to test this hypothesis, and it may be particularly informative to examine whether CU is associated with responsiveness to time-out as measured by children's behavior.

The current study examined CU as a predictor of response to behavioral treatment among elementary school age children with both CP (defined as ODD or CD) and ADHD based on three outcomes: (1) staff-rated child improvement, (2) behavioral responses to time-out, and (3) peer sociometric ratings. It was hypothesized that children with higher CU would show worse response to treatment on each of these outcomes.

Method

Participants

Participants were 70 children (21 females) between the ages of 7.04 and 12.78 years ($M=9.48$, $SD=1.58$), including 54 children with CP/ADHD (ADHD combined-type) and 16 children without CP or ADHD (controls). All children participated in an 8-week Summer Treatment Program (STP) between 2001 and 2003 conducted in Atlantic Canada. Controls participated solely for research purposes. The majority of the sample was Caucasian (84.3%). These data were collected as part of a larger study examining social and cognitive information processing and treatment response in children with disruptive behavior disorders and was approved by the IWK Health Centre Research Ethics Board. Although some of the children in this study were included in previous studies examining CU traits (Waschbusch et al. 2007a, b; Woodworth and Waschbusch 2008) the current study presents new data on treatment outcomes.

The medication assessment that occurred during these summers was randomized daily. For the purposes of the current study, only children who had non-medicated data from the STP were included in the sample. This resulted in 38% who were never medicated and 62% who participated in a medication assessment (placebo condition). Children who were medicated were free of medication for a minimum of 12 h before the next day of treatment. An additional 19% of children participated in the STP but were excluded because they were on stimulant medication continuously throughout the summer. Demographic and baseline data are summarized in Table 1.

Disruptive behavior disorders (CD, ODD, and ADHD) were diagnosed using DSM-IV-TR criteria (*Diagnostic and Statistical Manual of Mental Disorders*, 4th ed., text revision; American Psychological Association 2000) based on several sources of information. First, symptoms of CD, ODD, and ADHD were considered present if they were endorsed by either parent or teacher on the Disruptive Behavior Disorders (DBD) Rating Scale (Pelham et al. 1992) or by parents on the DSM-IV version of the Diagnostic Interview Schedule for Children (NIMH-DISC Editorial Board 1999). The DBD rating scale uses a 0 (not

Table 1 Summary of demographic and rating scale measures as a function of group

Characteristic	CP/ADHD (n=54)	Controls (n=16)	Significance
Male (%)	75.9	50	3.89*
Caucasian (%)	87	75	0.99
Age in years (SD)	9.46 (1.63)	9.62 (1.44)	-0.39
IQ (SD) ^a	100.07 (12.78)	100.81 (17.90)	-0.15
Annual Family Income	\$50–60 K	\$40–50 K	1.47
DBD subscales (SD) ^b			
Hyperactivity/impulsivity	2.10 (0.56)	0.26 (0.22)	19.44***
Inattention	2.29 (0.58)	0.20 (0.24)	21.24***
ADHD	2.20 (0.49)	0.23 (0.16)	25.15***
ODD	1.95 (0.67)	0.28 (0.32)	13.69***
CD	0.46 (0.35)	0.03 (0.04)	8.87***
Conduct Problems (ODD/CD)	0.98 (0.42)	0.11 (0.13)	13.10***
Callous/Unemotional (SD) ^c	69.37 (12.29)	47.00 (7.78)	8.72***
Impairment Rating (SD) ^d	5.31 (0.73)	0.36 (0.91)	19.91***

Values in table are means. ^a estimated from the block design and vocabulary subscales of the Wechsler Intelligence Scale for Children—3rd edition. ^b Disruptive Behavior Disorder rating scale; ^c T scores from the callous-unemotional scale of the Antisocial Process Screening Device. CP conduct problems. ^d Average impairment ratings from Impairment Rating Scale. Chi-square analyses were conducted for dichotomous demographic variables (gender and ethnicity) and *t* tests for continuous variables. Independent sample *t* tests with equal variances not assumed were used. * $p < .05$, ** $p < .01$, *** $p < .001$

at all) to 3 (very much) Likert rating and symptoms rated as a 2 (pretty much) or above indicate endorsement. Impairment was evaluated using parent and teacher ratings on the Impairment Rating Scale (IRS; Fabiano et al. 2006). The IRS assesses problems in functioning and need for treatment in six domains of daily life (e.g., peer relationships, academics). The IRS was completed using visual-analogue scales anchored on the low end by “no problem/definitely does not need treatment or special services” and anchored on the high end by “extreme problems/definitely needs treatment or special services”. Responses are scored using a 0 to 6 scale, with higher scores indicating greater impairment and scores of 3 or above indicating significant impairment (Fabiano et al. 2006). Diagnoses were determined by MD or Ph.D. clinicians (a clinical child psychiatrist and a clinical child psychologist) using symptom count (number of CD, ODD, and ADHD items endorsed) and impairment criteria (IRS) as determined by the DSM-IV. The remaining participants ($n=16$) did not meet diagnostic criteria for CD, ODD, or ADHD as determined by this procedure. Children with evidence of current or past behavior or learning problems, as deter-

mined by MD or Ph.D. clinicians as a result of IQ, achievement testing, and informal questions to parents, were excluded from the control group.

Procedures

Behavioral treatment was delivered in the context of a STP (Pelham et al. 2005; Pelham et al. 1998; Pelham and Hoza 1996). The STP refers to an intense behavioral intervention for children with CP, ADHD, and related disorders. Through a naturalistic setting, the STP seeks to improve children's social skills, academic achievement, compliance to adult requests, behaviors, and develop competencies needed for daily functioning. This is accomplished by increasing prosocial behaviors and decreasing antisocial behaviors while children are interacting with adults and peers. The STP combines empirically supported treatment components that have demonstrated effectiveness and that can be tailored to each child's specific difficulties (behavioral and academic). These components include a point system to denote positive and negative behaviors, positive reinforcement (and appropriate commands), time-out, peer interventions, sports skills training, group problem solving, and daily report cards. STP counselors are intensely trained on these procedures prior to the start of treatment and are routinely observed and provided feedback over the course of treatment to maintain fidelity to treatment.

In this study, all children attended the STP weekdays from 8:00 a.m. to 5:00 p.m. Their daily schedule included two academic classes, an art class, three sports activities, swimming, lunch, and recess. Prior to the start of the STP, children were placed in one of three groups that remained intact throughout treatment based on age similarity. Each group consisted of 12 children and 5 counselors including one lead counselor who was a graduate student in a relevant field (e.g., psychology, education, counseling), and four undergraduate counselors.

Details about the point system, social skills training, and time-out procedures are provided here for additional information about STP protocols pertinent to treatment outcome analyses. Counselors implemented a behavioral point system throughout treatment in which children earned points for positive, prosocial behaviors and lost points for negative, antisocial behaviors. Children were provided immediate verbal feedback stating their behavior and how many points they earned/lost for that behavior. Simultaneously, behaviors were recorded by a designated counselor each time a child received verbal feedback about a behavior throughout the day.

Treatment included a social skills component in which children were taught a social skill of the day (validation, cooperation, communication, and participation) each morn-

ing. Counselor-led questions prompted a discussion of the social skill by encouraging children to provide a description of the social skill (e.g., definition, examples) and to model and role play good and bad examples of how to use the social skill. Counselors provided feedback about the correctness of the child responses. The social skill was reviewed throughout the day including at the start of every new activity, and children were socially reinforced for displaying them. In addition, counselors modeled and engaged children in social problem solving skills during the program. Social skills were standardized across groups and were rotated in a pre-determined order throughout treatment.

Time away from positive reinforcement (time-out) was used as a consequence for three serious antisocial behaviors: repeated noncompliance, intentional aggression, and intentional destruction of property. Counselors recorded the reason for the time-out, the number and types of negative behaviors engaged in during time-out, and the total length of the time-out (see pages 132–137 in the STP manual; Pelham et al. 1998). Children's total time-out length was based on their behavior during the time-out; the time-out length doubled if children displayed negative behaviors and the time-out length was reduced by half if children behaved appropriately. This procedure (increasing time-out length with the opportunity to earn time off) was repeated if the child continued to engage in negative behaviors. Although a maximum time-out length was reached if they engaged in three negative behaviors, a fourth behavior resulted in serving the maximum time-out length with no opportunity to earn time off for appropriate behavior. Although this protocol was used for all children, the time-out length started at 10 (for younger children) or 20 minutes (for older children) based on the child's age to account for developmental abilities. To end a time-out the child had to serve the last 30 seconds or 1 minute (age-dependent) of their time-out without engaging in negative behaviors. More details about the point system, social skills, and time-out procedures, as well as other procedures, are available in the STP manual (Pelham et al. 1998).

Measures

Baseline Measures

For the purpose of this study, diagnostic and CU measures completed by parents prior to the onset of treatment were used. These measures were collected as part of the intake evaluation for the STP. Table 2 summarizes simple correlations between these measures.

Antisocial Process Screening Device (APSD) The APSD consists of 20 items designed to assess narcissistic, impulsive, and CU traits (Frick and Hare 2001). Only the

Table 2 Simple correlations among baseline and demographic variables

	CP	CU	Age	Gender	Hyp/Imp
CP/ADHD (<i>n</i> =54)					
CP					
CU	0.64***				
Age	-0.14	-0.09			
Gender	0.04	0.18	0.12		
Hyp/Imp	0.44**	0.32*	-0.05	-0.16	
Inattention	0.35**	0.16	0.31*	-0.06	0.51***
CP/ADHD and Controls (<i>N</i> =70)					
CP					
CU	0.79***				
Age	-0.13	-0.06			
Gender	0.18	0.29*	0.11		
Hyp/Imp	0.74***	0.64***	-0.05	0.11	
Inattention	0.72***	0.59***	0.09	0.18	0.84***

CP conduct problems, CU callous/unemotional traits, Hyp/Imp hyperactivity/impulsivity. **p*<.05, ***p*<.01, ****p*<.001

six-item CU scale was used in the current study. Items are rated using Likert scales that include ratings of 0 (not at all true), 1 (sometimes true), and 2 (definitely true). Items on the CU scale were summed and converted to T scores using published norms (Frick and Hare 2001). The factor structure, validity, and reliability of the CU scale on the APSD have been well supported, with the internal consistency of the CU scale ranging from 0.70 to 0.79 (Frick and Hare 2001; Loney et al. 2003).

Disruptive Behavior Disorder Rating Scale (DBD) The DBD measures DSM-IV symptoms of ADHD, ODD and CD (Pelham et al. 1992). This scale includes 9 inattention symptoms, 9 hyperactive/impulsive symptoms, 8 ODD symptoms, and 15 CD symptoms. Parent ratings of ODD and CD items were averaged to compute a CP score that was used in the main analyses. Estimates of internal consistency have been shown to range from 0.62 to 0.83 (Masseti et al. 2005; Pelham et al. 1992).

Dependent Measures

Staff Improvement Rating Form (SIRF) The SIRF (Pelham et al. 2000) is designed to evaluate areas targeted during behavioral treatment in the STP and consists of 35 items (see Appendix). On this measure, items were rated using Likert scales that ranged from 1 (“very much worse”) to 7 (“very much improved”), with the midpoint (4) indicating “no change.” Each item also included a response option of “no problem” indicating that the behavior was never a

problem for the child. Each child was independently rated the day after the end of treatment by the four undergraduate counselors who had treated them throughout the summer. These counselors were naive to the CP and CU status of each child. Ratings were averaged on an item-by-item basis across counselors to determine the average treatment response on each item for every child, with higher scores indicating better response to treatment. Prior to computing these averages, “no problem” responses were recoded to “no change” (4) for three reasons. First, the lack of change indicates that the child did not get better but also did not get worse; that is, they were unchanged. Because it has been suggested that adults with CU may get worse in response to treatment (Harris and Rice 2006), capturing the lack of deterioration by recoding “no problem” as “no change” was warranted. Second, recoding is consistent with the directions provided on the scale: “If the child did not have any problems in an area at the beginning of the program **and therefore neither improved nor worsened**, please circle “no problem” (Pelham et al. 1998, p. 352; emphasis added). Third, recoding allowed the sample size to be maintained from item to item.

Of the 35 items, 11 items were excluded apriori from analyses given that previous research did not suggest that that these areas of functioning may differentiate CP-only and CP/CU children. Prior to analyses, 20 out of 24 items selected for analysis were conceptually grouped based on the functional domain the items assessed and based on the structure of the STP rules, and average scale scores were computed for each group of items. The four conceptual groups were severe CP, rule-following behavior, social skills, and sports behavior (see Appendix for items comprising these groups). Although severe CP was originally computed, this scale was dropped from the analyses presented here due a large proportion of children rated as “no problem” on severe CP items.

We included sports behavior based on the hypothesis that children with higher levels of CU may be in time-out more frequently due to higher levels of CP and due to decreased responsiveness to time-out (Hawes and Dadds 2005). Since children engaged in sport activities for a large proportion of their day, this may have decreased their opportunity to improve their sports skills. Four additional analyses were conducted on individual items that were not categorized into one of the four groups of behaviors resulting in seven analyses conducted for the SIRF data.

Time-out Data Three time-out measures were computed and used in analyses: (1) average number of time-outs each child received per day of camp; (2) average number of minutes spent in each time-out; and (3) average number of negative behaviors each child displayed per time-out. Only

data from placebo days were used to compute these averages for children who were medicated at any point during treatment ($n=43$) since medication decreases negative behaviors to comparable levels among these children (Waschbusch et al. 2007a). For non-medicated children, the mean number of days used to average time-out data was 25 (21 to 27) and their mean CU T score was 60 (47 to 73). For medicated children, the average number of days for time-out data was 8 (3 to 12) and their average CU T score was 72 (54 to 95).

Peer Sociometrics At the end of camp, children nominated three other children in their treatment group they liked the most and three children in their treatment group they liked the least. Each child also rated every other child within their group using a Likert scale that ranged from 1 (“I don’t like at all”) to 5 (“I really like a lot”). These measures were collected during individual, confidential interviews conducted by a research assistant. Prior to completing the peer ratings, children were trained to use the Likert scale by completing sample ratings. Previous research has shown that children are not distressed by completing sociometric measures nor do they perceive differential treatment by peers after completing these measures (Mayeux et al. 2007).

Analytic Strategy

Two sets of analyses were computed. First, to evaluate whether CU was related to treatment response independent

of other factors, simple correlations were computed (Table 3). Second, to evaluate whether CU explained unique variance after taking CP symptoms into account, hierarchical regressions were computed with CP (first step) and CU (second step). In preliminary analyses the regressions included an interaction between CP and CU (third step), but this step was dropped because the interaction term was never significant. In addition, covariates (age, gender, and time-out length where appropriate) were initially included in the regression models as the first step but only 1 out of 16 models resulted in any covariate reaching significance (gender was a significant predictor of number of time outs per day—males received more time-outs). Therefore, covariates were dropped from final regression models (Table 4). A modified Bonferroni procedure was used to adjust for Type 1 family wise error effects in our regression models, using $p<0.05$ (Holm 1979). Those findings that are traditionally significant ($p<0.05$) and meet significance criteria as per the Holm procedure are considered significant whereas those that are traditionally significant but fail to meet significance criteria of the Holm procedure are discussed as marginally significant.

Prior to conducting regression analyses, all dependent measures were examined for skewness and kurtosis. Those outcome measures that violated normality (e.g., number of time-outs per day and negative behaviors in time-out) criteria for regression models were transformed using square root transformations to improve normality. Trans-

Table 3 Correlations of improvement ratings, time-out data, and peer likability outcomes with predictor variables and ADHD symptoms

Outcome	CP	CU	Age	Gender	Hyp/Imp	Inattn
Staff Improvement Ratings						
1. Social Skills ($n=50$)	-0.30*	-0.46**	-0.02	-0.02	0.03	0.07
2. Rule-Following Behavior ($n=51$)	-0.18	-0.10	-0.16	0.12	0.13	-0.12
3. Sports Behavior ($n=52$)	-0.37**	-0.33*	-0.10	-0.07	-0.04	-0.21
4. Follow through responsibility ($n=52$)	-0.06	0.02	-0.13	0.27*	0.15	-0.10
5. Noncompliance ($n=50$)	-0.03	0.03	-0.18	0.17	0.21	-0.14
6. Problem Solving ($n=51$)	-0.35*	-0.45**	-0.05	0.00	-0.03	-0.12
7. Overall Improvement ($n=50$)	-0.31*	-0.28	-0.15	0.08	-0.01	-0.16
Time-Out						
1. Number of TO/day ($n=51$)	0.41**	0.36*	-0.27	0.20	0.37**	0.05
2. Minutes/TO ($n=51$)	0.34*	0.29*	0.07	0.19	0.14	0.08
3. Neg. Behaviors/TO ($n=51$)	0.37**	0.47***	-0.07	0.21	0.18	0.01
Peer Sociometrics						
1. Peer Likert Ratings ($n=67$)	-0.44***	-0.28*	-0.02	0.02	-0.40**	-0.37**
2. Like Nominations ($n=67$)	-0.22	-0.11	0.07	0.10	-0.35**	-0.31*
3. Dislike Nominations ($n=67$)	0.34**	0.21	-0.08	0.02	0.34**	0.29*

Hyp/Imp hyperactivity/impulsivity, *Inattn* Inattention, *CP* conduct problems, *CU* callous/unemotional traits, *SIRF* Staff Improvement Rating form, *TO* time-out. CP scores and ADHD symptoms were rated by parents on the DBD. CU traits were rated by parents on the APSD psychopathy scale using the CU subscale only (Frick and Hare 2001). * $p<.05$, ** $p<0.01$, *** $p<.001$

Table 4 Summary of regression analyses predicting improvement ratings, time-out characteristics, and peer likability outcomes

Outcome	Step 1			Step 2				
	R ²	β _{CP}	F	R ²	Δ R ²	β _{CP}	β _{CU}	F
Staff Improvement Ratings								
1. Social Skills (n=50)	0.09	-0.30*	4.82*	0.21	0.12*	0.01	-0.47*	6.32**
2. Sports Behavior (n=52)	0.13	-0.37**	7.73**	0.15	0.01	-0.27	-0.16	4.25*
3. Problem Solving (n=51)	0.12	-0.35*	6.68*	0.21	0.09*	-0.10	-0.39*	6.28**
4. Overall Improvement (n=50)	0.10	-0.31*	5.26*	0.11	0.01	-0.24	-0.12	2.79
Time-Out Data								
1. Number of TO/day (n=51)	0.17	0.41**	9.75**	0.18	0.02	0.30	0.17	5.41**
2. Minutes/TO (n=51)	0.12	0.34*	6.42*	0.12	0.01	0.27	0.12	3.38*
3. Neg. Behaviors/TO (n=51)	0.14	0.37**	7.97**	0.23	0.09*	0.11	0.40*	7.22**
Peer Sociometric Ratings								
1. Likert (n=67)	0.19	-0.44***	15.49***	0.21	0.01	-0.60**	0.20	8.34**
2. Dislike Nominations (n=67)	0.12	0.34**	8.60**	0.13	0.01	0.47*	-0.16	4.63*

TO time-out, β standardized beta weights, CP Conduct Problems, CU Callous/Unemotional Traits, F-values in *bold* denote significance after Holm procedure, and F-values in *italics* denote marginal significance ($p < 0.05$, but not significant after Holm procedure). * $p < .05$, ** $p < 0.01$, *** $p < .001$

formed data produced results that were essentially similar to non-transformed data so we report results using the non-transformed data for ease of interpretation. Multicollinearity was examined using the variance inflation factor (VIF) statistic and was found to be acceptable (<0.10). Cook's D was used to examine influential cases in each of the 14 analyses. Then, influential cases were identified and excluded based on Fox's (1991) criteria ($4/n - k - 1$). The tables presented show the final results with these influential cases excluded.

Improvement ratings and time-out data were analyzed using the CP/ADHD subsample (n=54) because improvement was irrelevant to control participants and because controls did not experience any time-outs during the summer. Peer sociometric ratings were analyzed using children from the total sample (CP/ADHD and controls; N=70). Controls were included in analyses of peer data because the results can be interpreted most accurately if data from the full peer group is provided.

Results

Simple Correlations

Simple correlations between predictor and outcome variables are reported in Table 3. As shown, CU was significantly correlated with 9 of the 14 outcome measures, including 4 of the 8 staff improvement ratings, all 3 time-out measures, and 2 of the 3 peer sociometric ratings. In

each case, higher CU was associated with worse response to treatment.

Regression Analyses

Staff Improvement Rating Form Regressions were computed for the four measures that were significantly associated with CU in simple correlations: social skills, sports behavior, problem solving, and overall improvement. As summarized in Table 4, the overall equation was significant for social skills improvement ($F(2, 47) = 6.32, p < 0.01$) and problem solving improvement ($F(2, 48) = 6.28, p < 0.01$), and was marginally significant for sports behavior improvement ($F(2, 49) = 4.25, p < 0.05$). Overall improvement was not significant. Examination of regression coefficients showed that CU predicted unique variance in the social skills and problem solving models after controlling for CP such that children with higher CU had less improvement. As a block, CP and CU predicted sports behavior improvement, but neither CP nor CU was uniquely associated with this outcome after controlling for the other.

Time-out Data Regressions were conducted on all time-out measures. The overall regression equation was significant for the number of time-outs per day ($F(2, 48) = 5.41, p < 0.01$) and negative behaviors in time-out ($F(2, 48) = 7.22, p < 0.01$), and marginally significant for number of minutes in time-out ($F(2, 48) = 3.38, p < 0.05$). Regression coefficients showed that the number of time-outs per day

was uniquely yet marginally ($p < .10$) associated with CP (after including CU in the model) such that children with higher symptoms of CP received more time-outs. Negative behaviors in time-out, on the other hand, were significantly associated with CU after controlling for CP such that children with higher CU scores exhibited more negative behaviors during time out. As a block, CP and CU predicted the number of minutes in time-out, but neither CP nor CU was uniquely associated with this outcome after controlling for the other.

Peer Sociometrics Based on simple correlations, regression analyses were conducted on 2 of the 3 peer outcome measures. The overall regression equation was significant for both peer Likert ratings ($F(2, 64) = 8.34, p < 0.01$) and peer dislike ($F(2, 64) = 4.63, p < 0.05$). Examination of regression coefficients showed that CP was significantly and uniquely associated with both peer measures such that children with higher CP scores were more disliked by peers.

Discussion

The current study examined whether CU was significantly associated with response to behavioral treatment among CP/ADHD children. Response to treatment was determined by staff improvement ratings, characteristics of time-outs, and peer sociometrics. Results demonstrated that within a sample of CP children, CU predicted less treatment responsiveness when examined alone. When CP and CU were both taken into account, the unique associations of CU remained for 3 out of 9 outcomes and CP was uniquely associated with 3 out of 9 outcomes. Thus, for the remaining 2 (marginally) significant outcomes, CP and CU together predicted worse response to treatment, but neither CP nor CU was a unique predictor after accounting for the other.

Staff Improvement Rating Form The results showed that children with higher levels of CP and CU experienced less behavioral improvement in social skills, a finding consistent with past studies showing that high CU is associated with more deficient social skills (Frick and Dantagnan 2005). This study extends these findings by demonstrating that children with high rates of CP and CU experienced significantly less treatment gain in this domain which suggests that more intense or novel social skills intervention is necessary for children with CU.

In this study, CU was uniquely associated with less improvement in problem solving skills. Problem solving is

a broad construct that could include several skills, including solving academic problems or social problems. Although no research that we are aware of has examined academic problem solving in children with CU, past research has examined social problem solving and found that social problem solving skills are less related to children with CP/CU as compared to CP-only (Waschbusch et al. 2007b). Thus, it may be that problem solving was less improved in CP/CU children because they had less room for improvement. This hypothesis cannot be evaluated in the current study and may be an area of interest for future research.

Time-out Data Analyses of the time-out measures demonstrated a differential impact of CP and CU in this sample. More specifically, results suggested that children may be more likely to get into a time-out because of their CP behavior (number of time-outs per day), but their behavioral response to time-out may be more related to CU (negative behaviors during time-out). To the extent that high rates of negative behavior indicate less effectiveness of time-out, these results are consistent with past research by Hawes and Dadds (2005) who also reported that CU predicted parent-rated ineffectiveness of time-out. The fact that children with CU engaged in more negative behaviors in time-out in the current study may suggest that punishment as a response to inappropriate behavior may be ineffective. It may be the case that a child with CP may get into time-out and behave more appropriately in time-out than a child who has CP/CU thus accounting for these findings. However, several questions remain about this finding and these questions must be answered before firm conclusions can be drawn. For instance, Dadds and Rhodes (2008) reported that the lack of response to time-out by CU children appeared to be because the children with CU showed little emotion during time-out ($p = .2568$) and appeared less outwardly perturbed ($p = .2573$) by time-out. In contrast, the results of this study suggest that children with CU were especially perturbed by time-out according to measures of negative behavior. One speculative explanation for these seemingly contradictory observations is that in this study, children with CU showed high rates of negative behavior even though they did not feel distressed by the time-out. We are unable to evaluate this possibility, but future research should consider examining the effects of time-out on the behavior and emotion of children with CU.

Peer Sociometrics In contrast to a previous finding (Piatigorsky and Hinshaw 2004), CU did not account for unique variance on peer sociometrics in the current study.

Instead, CP was uniquely associated with both peer measures. Piatigorsky and Hinshaw (2004) found that psychopathic traits in children (after controlling for other externalizing variables) were correlated with peer dislike nominations and uncorrelated with peer like nominations. Like the present study, Piatigorsky and Hinshaw collected peer measures after children took part in their summer research program. However, in this study CU was measured using parent report collected prior to treatment, whereas Piatigorsky and Hinshaw used counselor report collected at the end of the summer camp. Thus, the discrepant findings may be the result of differences in CU trait measurement.

Considering the treatment outcome findings collectively, it is interesting that CU was associated with less improved social skills and problem solving skills, but not peer rejection. More explicitly, this study demonstrated that children with higher CU appeared to experience less improvement with regard to social abilities; however, peer rejection was uniquely associated with CP (not with CU). Since the current study conflicts with a previous study examining peer relationships and the effect of CU (Piatigorsky and Hinshaw 2004), future studies addressing the exact nature of CU and peer rejection are needed.

Across all three domains of treatment outcome, about half of the measures showed that CU was associated with worse treatment response. It should be emphasized that the measure of CU was gathered prior to the onset of treatment. In addition, CP and CU ratings were completed by parents, who are the most common informants of pre-treatment evaluations whereas treatment outcomes were counselor report, peer report, and behavioral report. The fact that the predictors and the outcomes were collected using different methods removes the possibility that the associations were spurious due to method overlap. It should not be surprising that CU was not always a unique predictor of treatment response after controlling for CP considering that: (a) the children with high CU also tend to have high CP scores; and (b) the range of CP was (by design) restricted in that only children with high CP were included in the analyses (except for the peer data). Thus, the results may appear modest at first glance but may be highly meaningful. Clinically, finding CU to be significantly associated with poor treatment response suggests that the children with most severe levels of CP and/or CU are the least likely to benefit from treatment. This implies that additional treatments or approaches—or perhaps more intense versions of available treatments—are needed to meet the needs of these children, and developing and evaluating such treatments is important for future research.

Although there are a number of strengths to this study, some limitations should be noted. First, the CP/ADHD sample was relatively small ($n=54$) and consequently the power to detect trends was limited. Second, recoding the SIRF data so that “no problem” was represented as “no change” during treatment reduced variability in improvement ratings, particularly for the measure of severe CP where most children were unanimously rated by their counselors as having “no problem” within that domain. Third, as noted previously, a number of children included in this study were on medication for some (but not all) days during the summer. Although only unmedicated data was used for the time-out measures, peer rating and counselor ratings were likely influenced by both medicated and unmedicated behavior and it is not clear what effect this had on these measures. Finally, the sample included only children with high levels of CP and ADHD, and (for peer data) children with low levels of these behaviors. Different results may have emerged had a full range of CP and ADHD been represented so results can only be safely generalized to children with high CP and ADHD. On the other hand, given that these children presented for treatment they are arguably the most relevant sample for predicting treatment response. Given these limitations, all results should be interpreted cautiously.

Even with these limitations, this study provides a number of possibilities for future research. One question that this study raises is how “improvement” in behavioral treatment is best captured. Pre-post measures regarding functional domains or dichotomous yes/no problem behavior checklists may be more appropriate. Future research is needed to explore the role of CU in behavior related to treatment outcome. For example, Frick and Dantagnan (2005) suggested that although children with CU experience more peer rejection, affiliation with delinquent peers may decrease the stability of CP behaviors. This would be important to examine because it suggests that additional treatment should be more focused on peer interventions than severe CP behaviors. Given the current findings, examining the benefits of reward-only behavioral treatment as compared to reward and punishment behavioral treatment would be important in understanding how these children process and respond to each component in real-life settings. Consequently, pursuing treatment outcome research for children with high levels of CP and CU and determining each factors contribution is important for the next frontier of research in determining effective interventions for these children.

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Appendix

APPENDIX

Staff Improvement Rating Form

Child's Name: _____ Form Completed
 By: _____ Date: _____

Please rate the degree of improvement in the following areas for the child by circling the number on the scale that corresponds to your evaluation. **If the child did not have any problems in an area at the beginning of the program and therefore neither improved nor worsened, please circle 'no problem.'**

	No Problem	Very Much Worse	Much Worse	Somewhat Worse	Unchanged	Somewhat Improved	Much Improved	Very Much Improved
1) Following program rules ^b	0	1	2	3	4	5	6	7
2) Following through with responsibilities or directions (e.g., completing tasks, keeping track of belongings)	0	1	2	3	4	5	6	7
3) Using materials and possessions appropriately ^b	0	1	2	3	4	5	6	7
4) Respecting property and other people's belongings ^a	0	1	2	3	4	5	6	7
5) Adult directed defiance/noncompliance	0	1	2	3	4	5	6	7
6) Cooperation (works with other children, shares, compromises) ^c	0	1	2	3	4	5	6	7
7) Saying and doing nice things to other children ^c	0	1	2	3	4	5	6	7
8) Communication skills (e.g., starting conversations, expressing feelings, listening) ^c	0	1	2	3	4	5	6	7
9) Participating with other children (joining and sticking with activities) ^c	0	1	2	3	4	5	6	7
10) Interrupting others ^b	0	1	2	3	4	5	6	7
11) Name calling/teasing toward peers ^b	0	1	2	3	4	5	6	7
12) Dealing with anger/temper/frustration; accepting limits ^a	0	1	2	3	4	5	6	7
13) Bossiness toward peers ^a	0	1	2	3	4	5	6	7
14) Physical fighting with peers ^a	0	1	2	3	4	5	6	7
15) Stealing others' belongings ^a	0	1	2	3	4	5	6	7
16) Cheating in games or work ^a	0	1	2	3	4	5	6	7
17) Lying ^a	0	1	2	3	4	5	6	7
18) Swearing or using obscene language ^a	0	1	2	3	4	5	6	7
19) Inappropriate complaining and whining ^b	0	1	2	3	4	5	6	7
20) Paying attention ^d	0	1	2	3	4	5	6	7
21) Sports skills ^d	0	1	2	3	4	5	6	7
22) Good sportsmanship ^d	0	1	2	3	4	5	6	7
23) Problem solving skills	0	1	2	3	4	5	6	7
24) Self-esteem ^e	0	1	2	3	4	5	6	7
25) Happiness ^e	0	1	2	3	4	5	6	7
26) Morning routine (e.g., puts belongings in appropriate place, begins and engages in activities as directed) ^e	0	1	2	3	4	5	6	7
27) End of day routine (puts belongings in backpack, ends engagement in activities, receives feedback appropriately) ^e	0	1	2	3	4	5	6	7
28) Behavior in public settings (e.g., restaurants, shopping trips, recreational activities, field trips) ^e	0	1	2	3	4	5	6	7
29) Using good manners at mealtimes ^e	0	1	2	3	4	5	6	7
30) Behavior at mealtimes ^e	0	1	2	3	4	5	6	7
31) Overall Improvement	0	1	2	3	4	5	6	7

32) To what extent was this child's behavior toward peers at the end of the program like that of a normal child? ^e

0	1	2	3	4	5	6
Very much like a normal child						Not at all like a normal child

33) To what extent was this child's behavior toward adults at the end of the program like that of a normal child? ^e

0	1	2	3	4	5	6
Very much like a normal child						Not at all like a normal child

34) To what extent did you find interacting with this child at the end of the program a pleasant experience? ^e

0	1	2	3	4	5	6
Very pleasant						Very unpleasant

35) How hard did this child try to improve over the course of the program? ^e

0	1	2	3	4	5	6
Did not try at all						Tried very hard

Note. ^a Severe conduct problem behaviors ($M=4.18$; $SD=0.31$, $\alpha=0.82$); ^b Rule-following behavior ($M=4.72$; $SD=0.67$, $\alpha=0.92$); ^c Social skills ($M=4.94$; $SD=0.70$, $\alpha=0.95$); ^d Sports behavior ($M=5.24$; $SD=0.56$, $\alpha=0.76$). ^e Items were excluded from the current study. Items without a subscript were analyzed individually. Average intraclass correlations between counselor ratings (per summer, per group) were 0.77.

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