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Parent Training Outcomes among Young Children with Callous-Unemotional Conduct Problems with or At-Risk for Developmental Delay

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Abstract

School-aged children with conduct problems and high levels of callous-unemotional (i.e., lack of empathy, guilt, and lack of caring behaviors) traits (CP+CU) tend to yield less benefit from traditional interventions than do their low-CU counterparts, particularly with respect to CP outcomes. To date, little is known about treatment response among young children with CP+CU, particularly those with or at risk for developmental delay. Components of Parent-Child Interaction Therapy (PCIT), a parent training program effective at reducing CP in young children, have compelling theoretical support for addressing core deficits unique to children with CP+CU and have been used successfully with young children with developmental delay. Our first aim was to test the psychometric properties of a measure of CU traits in preschool children with and without developmental delay. Our second aim was to test whether CU traits predicted post-treatment CP after controlling for initial levels of CP. Participants were 63 families of young children (mean age = 3.87 years), with or at-risk for developmental delay, who presented with elevated CP and were treated in a hospital-based outpatient clinic. Results indicated that developmentally delayed children with high levels of CU traits, but not children at-risk for delay due to premature birth, showed significantly poorer CP outcomes following treatment with PCIT than did children scoring low on CU traits, even after controlling for initial CP severity. The implications of these findings with regard to treating and preventing severe disruptive behaviors among young children with CP+CU are discussed.

Keywords

callous-unemotional traits; conduct problems; assessment; parent training; psychopathy; developmental delay

Introduction

The presence of callous-unemotional (CU) traits (e.g., lack of empathy and guilt, uncaring attitudes and behaviors) designates a subgroup of children with conduct problems (CP; hereafter referred to as CP+CU) who show a more severe, stable, and aggressive pattern of concurrent and future antisocial behavior, compared with CP alone (Frick et al., 2003; Christian, Frick, Hill, Tyler, & Frazer, 1997; Frick & White, 2008). Loeber and Farrington (2000) suggest that aggressive behavior has its origins in the preschool years and preliminary research supports the construct validity of CU traits assessed at preschool age (Kimonis, Frick, Boris, et al., 2006). For example, Ezpeleta, de la Osa, Granero, Penelo, and Domenech (2013) found that among a community sample of 3 to 4 year old children ($n = 622$), teacher-rated CU traits showed the same factor structure to samples of older children and adults. CU scores also showed predicted associations with criterion measures of aggression, temperament, and CP, and predicted future disruptive behavior disorders. In consideration of the severity of antisocial behaviors associated with CU traits, and the fact that serious CP tend to be established by school entry, it is important to verify that CU traits can be reliably and validly identified in young children for whom preventive interventions will yield the greatest benefit (Reid, 1993).

Early-onset CP are often preceded by diagnoses of developmental delay (Benasich, Curtiss, & Tallal, 1993). Young children with developmental delays are particularly at-risk for engaging in CP due to limitations in their verbal communication skills (Emerson, Robertson, & Wood, 2005), and the robust link between verbal deficits and antisocial behavior is well-documented in the literature (see Moffitt, 1994). Overall, children with intellectual disabilities tend to be rated higher on CP by parents compared with non-delayed children (Dekker, Koot, van der Ende, & Verhulst, 2002). It is likely that the prevalence of CU traits would be greater among young children with developmental delay given the earlier onset to CP among children with CU traits (Frick, 1999), and documentation of similar deficits in empathic responding among developmentally delayed children (Dyck, Ferguson, & Shochet, 2001; Perry & Krebs, 1980). While not yet examined in preschool children, school-aged children high on CU traits showed poor reading achievement (Vaughn et al., 2011) and a trend towards weaker nonverbal abilities relative to clinic controls (Loney, Frick, Ellis, & McCoy, 1998). Beyond intellectual disabilities, the authors are aware of no prior studies that examine CU traits among children who also show deficits in adaptive skills. This study aimed to fill this gap in research by testing the reliability and validity of scores on a measure of CU traits for young children with versus without developmental delay.

Despite the clinical utility of CU traits for the prognosis of continued antisocial behavior, there are relatively few studies testing the effectiveness of interventions with children with CP+CU (Caldwell, Skeem, Salekin, & Van Rybroek, 2006; Haas et al., 2011; Kolko et al., 2009; McDonald, Dodson, Rosenfeld, & Jouriles, 2011; White, Frick, Lawing, & Bauer, 2011), and even fewer focused specifically on preschool-aged children (e.g., Hawes & Dadds, 2005, 2007; McDonald, Dodson, Rosenfeld, & Jouriles, 2011; Somech & Elizur, 2012). Generally, these studies find that children with CP+CU tend to yield less benefit from traditional interventions than do their non-CU counterparts, particularly with respect to CP outcomes. For example, Hawes and Dadds (2005) found that parents of boys (M age = 6.29 years) with higher levels of CU traits were more likely to rate the discipline component (i.e., time out) of a manualized parent management training program as ineffective at reducing their children's CP during treatment relative to parents whose children had oppositional defiant disorder (ODD) alone. Furthermore, in this study CU traits predicted a post-treatment diagnosis of ODD. Also, Waschbusch, Carrey, Willoughby, King, and Andrade (2007) found that CP in children (7-12 years) with versus without CU traits showed less improvement after behavior therapy. Children high on CU traits were also observed to be

less compliant to the 'time-out' component of the intervention (Haas et al., 2011). However, at least one study found that CU traits did not predict poorer post-treatment outcomes to an individualized modular treatment across a 3-year follow-up, in their study of clinically-referred children (6-11 years) diagnosed with ODD or conduct disorder (CD), even after controlling for CP severity (Kolko & Pardini, 2010; cf. Stadler, Kroger, Clement, & Grasmann, 2012).

Differences in treatment response between children with CP with and without CU traits have been attributed to the distinct developmental processes and related characteristics underlying their antisocial behaviors (Frick & Marsee, 2006). That is, children with CP+CU show a distinct temperamental style characterized by reward-dominance, fearlessness, and insensitivity to punishment and others' distress cues that is implicated in their weak conscience development (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Dadds et al., 2006; Fisher & Blair, 1998; Frick et al., 2003; Kimonis, Frick, Fazekas, & Loney, 2006; Loney, Frick, Clements, Ellis, & Kerlin, 2003; O'Brien & Frick, 1996; Stevens, Charman, & Blair, 2001). Kochanska (1997) proposed that the optimal socialization strategy for children with the fearless temperament characteristic of youth with CU traits is to foster mutual responsivity between the parent-child dyad by increasing emotional warmth and other positive qualities of the parent-child attachment, rather than relying on punishment-related arousal for the internalization of parental norms to prevent antisocial behaviors (see also Kochanska & Murray, 2000). Interestingly, young boys with disruptive behavior disorders showed more insecure attachment, and particularly the disorganized type, when they scored high on CU traits (Pasalich, Dadds, Hawes, & Brennan, 2012). In support of Kochanska's theory and the relevance of attachment to the antisocial behaviors of children with CU traits, several studies find that increased parental warmth is negatively associated with antisocial behavior in children with high compared with low CU traits (Kroneman, Hipwell, Loeber, Koot, & Pardini, 2011; Pasalich, Dadds, Hawes, & Brennan, 2011). Similarly, temperamentally fearless young children exposed to parenting practices that fostered greater attachment security showed improved conscience development—core to CU traits (Fowles & Kochanska, 2000; Kochanska, 1995; Kochanska, & Thompson, 1997). Theories of moral socialization suggest that greater experience of moral emotions among CU youth would also inhibit future antisocial and aggressive behaviors (Blair, 1995).

An intervention that is purported to improve emotional warmth and attachment security in parent-child dyads is *Parent-Child Interaction Therapy* (PCIT). PCIT is a manualized PT intervention with extensive research demonstrating its efficacy and long-term maintenance in treating young children with CP (Eyberg, Nelson, & Boggs, 2008). PCIT typically progresses through two distinct phases, the first Child-Directed Interaction (CDI) phase and the second Parent-Directed Interaction (PDI) phase. The CDI phase appears particularly compelling for children high on CU traits given its focus on increasing positive parent-child interactions and parental responsivity within highly rewarding child-led play. In contrast, the PDI phase focuses on consistent use of punishment for noncompliance. Although attachment relationships begin early in development, the authors are aware of no studies to date that examine the effects of PT for children with CU traits under the age of four. The present study fills this critical gap in research by examining the efficacy of a theoretically-supported PT intervention among young children with this severe subtype of CP, with or at-risk for co-occurring developmental delays. It is not clear how such delays might influence treatment response among children with CP+CU. However, PT interventions and PCIT in particular have been found to be efficacious in treating CP among young children with developmental delays (Bagner & Eyberg, 2007; Baker, 1996; Handen, 1998; Roberts, Mazzucchelli, Studman, & Sanders, 2006).

Present Study

Although considerable research examines CU traits in middle childhood and adolescence, there is a dearth of literature on CU traits in early childhood. This is concerning given that antisocial-aggressive behavior and moral emotions, including empathy and guilt, begin to develop in the preschool years (Dunn, Brown, & Maguire, 1995). Even less is known about CU traits among children with or at-risk for developmental delay, despite the fact that these children are at risk for a pattern of early starting CP that is consistent with CU traits. Our first aim was to examine the psychometric properties of a measure of CU traits in the full sample and for children with developmental delay alone. This involved examining the reliability (i.e., internal consistency, split-half, test-retest) of its constituent items, and associations between scores on this measure and criterion variables (i.e., concurrent validity), with and without controlling for the child's intellectual level. Further, despite compelling theoretical support for the utility of components of PCIT for treating disruptive behaviors among children with CP+CU, and specifically those with developmental delay, its efficacy with this population has not yet been examined. A purpose of this study was to better understand whether treatment outcomes following PCIT differed for preschool-aged children with or at-risk for developmental delay who scored low versus high on CU traits. Thus, our second aim was to test whether CU traits predicted CP scores post-CDI and PDI treatment phases of PCIT, separately, and also controlling for pre-treatment levels of CP. We hypothesized that children scoring high on CU traits would show higher CP scores following the second (punishment-oriented) PDI phase, but not the first theoretically-supported CDI phase (focused on increasing parental reciprocity and responsiveness), of PCIT treatment compared with children low on CU traits, even after accounting for initial CP severity.

Method

Participants

This study was a secondary data analysis of two pilot randomized clinical trials evaluating effects of PCIT on children's CP (Bagner & Eyberg, 2007; Bagner, Sheinkopf, Vohr, & Lester, 2010). Participants were 63 families who had participated in one of two treatment studies for their young child (30 families in study A and 33 families in study B). The mean age of the sample was 46.48 months ($SD = 14.41$) and it was mostly comprised of boys (73%). Inclusion and exclusion criteria were similar for the two studies. Families were eligible if the child (a) had a developmental delay, as determined by a score of 75 or below on an IQ test (study A), or was at-risk for developmental delay due to premature birth, defined as < 37 weeks gestation (study B), and (b) was rated by his or her mother above the at-risk range on a measure of child CP. Families were excluded from the study if the child had major sensory impairments (e.g., deafness, blindness), autism spectrum disorders, and/or significant motor impairments (e.g., cerebral palsy) (for details see Bagner & Eyberg, 2007; Bagner et al., 2010).

Screening Measure

Child Cognition—The Wechsler Preschool and Primary Scale of Intelligence-Third Edition (Wechsler, 2002) was administered to assess cognitive ability in children ages 3 years and older, whereas the Bayley Scales for Infant and Toddler Development – Third Edition (Bayley, 2006) was administered to assess cognitive ability in children younger than 3 years. Both tools are widely used and reliable measures of cognitive functioning in young children. Across both studies, 61.9% ($n = 39$) of the sample achieved IQ scores of 75 or below. IQ scores were used as a covariate in all analyses conducted with the full sample.

Primary Measures

Eyberg Child Behavior Inventory (ECBI; S.M. Eyberg & Pincus, 1999)—The ECBI is a 36-item parent-rating scale of CP in children. The Intensity scale measures the frequency with which a variety of disruptive behaviors occur on a scale from 1 (“never”) to 7 (“always”) with the range of possible values between 36 and 252. The ECBI Intensity scale yields an internal consistency coefficient of .95 (Eyberg & Pincus, 1999); interrater (mother-father) reliability coefficient of .69 (Eisenstadt, McElreath, Eyberg, & McNeil, 1994); and test-retest reliability coefficient of .80 across 12 weeks and .75 across 10 months (Funderburk, Eyberg, Rich, & Behar, 2003). The ECBI has also shown sensitivity to treatment change (Taylor, Schmidt, Pepler, & Hodgins, 1998; Tynan, Schuman, & Lampert, 1999; Webster-Stratton & Hammond, 1997). Although no minimal difference score has been identified, most treatment researchers use the clinical cutoff of 132 (T-score of 60) as an index of clinical improvement. The ECBI Intensity scale scored by the parent post-treatment ($\alpha = .91$) was used as the outcome measure of child CP. To examine outcomes following the CDI phase of treatment, ECBI Intensity scores administered before beginning the second phase (i.e., PDI) were used in analyses.

Achenbach System of Empirically-Based Assessment, Preschool Forms (ASEBA; Achenbach & Rescorla, 2001)—The preschool version of the ASEBA is a standardized 99-item parent-rating scale designed to measure the frequency of children's behavioral and emotional problems. It has excellent 8-day test-retest reliability ($r = .68$ to $.92$), interrater reliability (mean mother-father $r = .61$), and success in discriminating between referred and nonreferred children (Achenbach & Rescorla, 2001). Children were required to score at or above the at-risk range (T-score ≥ 60) on the aggression or externalizing problems subscales of the ASEBA to be included in the studies.

Callous-Unemotional Traits—CU traits were assessed using the screening measure identified by Willoughby and Waschbusch (2011) using the following ASEBA items: item 27 “doesn't seem to feel guilty after misbehaving”, item 58 “punishment doesn't change his/her behavior,” item 67 “seems unresponsive to affection,” item 70 “shows little affection toward people” and item 72 “shows too little fear of getting hurt.” Analogous to the ASEBA, all items were rated on a 3-point scale (0 = not true, 1 = sometimes true, 2 = very true). This CU scale was originally derived from a study of 178 children in the Durham Child Health and Development study and was found to be distinct from Attention-Deficit/Hyperactivity disorder and ODD items, as well as comparably stable across two years ($\Phi = .84$). Children with ODD and CU traits identified using this measure were found to show a low fearful temperamental style, consistent with theoretical perspectives (see Willoughby & Waschbusch, 2011).

Mean and cruel behavior is central to theoretical perspectives of childhood CU traits (Patrick, Fowles, & Krueger, 2009). In their original conceptualization of the ASEBA CU scale, Waschbusch and colleagues (2011) elected to exclude item 14 (“cruel to animals”) to avoid overlap with ODD/CD since it captured the cruel to animals symptom of CD in the DSM (D.A. Waschbusch, personal communication, February 1, 2012). However, in a recent study, Kahn and colleagues found that cruelty significantly distinguished clinic-referred children ($n = 566$) with CP+CU from children with CP alone (Kahn, Frick, Youngstrom, Findling, & Youngstrom, 2012). Thus, ASEBA item 14 was added to the CU scale in the present study to be consistent with the more recent theoretical and empirical literature.

Procedure

Both studies were approved by the affiliated Hospital Institutional Review Boards and included a randomized, controlled trial to determine the efficacy of PCIT compared to a waitlist (WL) control comparison group. To address our second aim of testing whether CU traits predict post-treatment CP after controlling for initial levels of CP (at pre-treatment), the immediate treatment (IT) and WL groups were combined (i.e., after the WL group had “crossed over” and completed treatment). For these analyses, the “pretreatment” scores were from the assessment immediately preceding the start of treatment (i.e., Time 1 for the IT group; Time 2 following a 4-month wait period for the WL group), and the “posttreatment” scores were from the assessment immediately after treatment completion (i.e., Time 2 for the IT group; Time 3 for the WL group). A total of 22 families dropped out of the studies after completing the Time 1 assessment (8 during the WL period and 14 during treatment). Seven families dropped out of the studies immediately following the screening and randomization but did not complete the Time 1 assessment (2 in WL group and 5 in IT group). The proportion of families that dropped out of treatment (35%) was lower than that reported in a prior study of PCIT with a demographically similar population (43%; Boggs, Eyberg, Edwards, Rayfield, Jacobs, Bagner & Hood, 2004).

PCIT sessions were conducted once a week for approximately one hour in length. The average length of treatment was 12.16 weeks ($SD = 3.43$) for treatment completers ($n = 43$). All sessions were videotaped, and 50% were randomly selected and coded for integrity by a research assistant uninvolved in coding behavioral observations. Accuracy, defined as the percent with which the therapist adhered to key elements of each session detailed in the treatment manual, was 97% for study A (range = 79 - 100%) and 94% for study B (range = 89 - 99%).

Data Analysis

The psychometric properties of our proxy measure of CU traits in this sample of children with or at risk for developmental delay were tested using reliability analyses to obtain Cronbach's coefficient alpha statistic and the mean inter-item correlation (MIC), as well as Pearson's correlations between CU scores measured at Time 1 and Time 2, and at Time 2 and Time 3 (i.e., test-retest reliability). Concurrent validity was assessed using zero-order correlations to examine the associations between CU scores and criterion measures, with and without controlling for the child's level of cognitive functioning. To address our second aim of testing whether CU traits predict CP outcomes after accounting for initial CP levels, hierarchical multiple regression analysis was used. Main effects for covariates were entered into the first step, pre-treatment CP into the second step, and CU traits into the third step of the model to predict ECBI Intensity scores measured immediately after completion of CDI, as well as after completing both CDI and PDI phases of PCIT (Time 2 for IT group; Time 3 for WL group). In addition to IQ scores, treatment group status was included as a covariate because children in the WL group showed less change in ECBI scores following treatment, which is likely attributable to regression to the mean following the four month waiting period.

Results

Preliminary Analyses

Demographic Characteristics and Group Differences—There were no significant group differences between IT and WL groups in pre-treatment ECBI Intensity scores. There were also no statistically significant differences between groups on initial CU scores, $t(56) = -.05$, and CU scores were not significantly associated with demographic factors, including child age, gender, ethnicity, or socioeconomic status. However, children enrolled in study A

(IQ scores at or below 75) scored higher on CU traits than those enrolled in study B (at-risk for developmental delay due to premature birth). Also, results of an independent samples *t*-test revealed a trend towards higher CU traits among delayed (IQ scores at or below 75) compared with nondelayed children, $t(56) = -1.81, p = .076$. Beyond having lower IQ scores, $t(60) = -7.69, p < .001$, children in study A were also significantly older than children in study B, $t(61) = 4.64, p < .001$. Based on these results, regression analyses to test our second study aim were run separately for children in studies A and B. Table 1 presents the demographic characteristics of children scoring low versus high on CU traits, according to a median split (Low CU = 5.00 < High CU), for the full sample and also separately by study. Participants who dropped out of treatment scored significantly higher on CU traits than treatment completers, $t(56) = 2.31, p < .05$.

Testing the Psychometric Properties of a Proxy Measure of CU Traits in Children with or at Risk for Developmental Delay

Cronbach's alpha was used to test the internal consistency of items comprising the ICU proxy measure, which yielded a coefficient of .66. This value does not fall within the acceptable range of .7 or greater, however, it is consistent with those values obtained for the CU scale of the most commonly used measure of these traits, Frick and Hare's (2001) Antisocial Process Screening Device (APSD; e.g., Kimonis et al., 2006; Vitacco, Rogers, & Neumann, 2003). Further, the MIC was .26, which falls within the optimal range of .2 to .4 recommended by Briggs and Cheek (1986, p. 114). Statistics were comparable when selecting only those children with developmental delay (IQ = 75, $n = 39$), $\alpha = .67$ and MIC = .27. Test-retest reliability was $r = .65$ ($p < .001$) from Time 1 to Time 2 and $r = .38$ ($p = .07$) from Time 2 to Time 3. Controlling for the child's IQ, test-retest correlations were similar from Time 1 to Time 2 ($r = .63, p < .001$) and from Time 2 to Time 3 ($r = .36, p = .09$). Zero-order correlations revealed that the CU scale was significantly associated with initial levels of CP, as assessed by baseline ECBI Intensity scores ($r = .51, p < .001$) and CBCL Externalizing scores ($r = .60, p < .001$). Partial correlations revealed similar associations when controlling for the child's level of cognitive functioning, $pr = .51, p < .001$ for baseline ECBI Intensity scores and $pr = .59, p < .001$ for CBCL Externalizing scores.

Testing Whether CU Traits Predict Post-Treatment CP

To determine whether CU traits predicted post-treatment ECBI Intensity scores after controlling for pre-treatment CP levels, multiple regression analyses were conducted for the full sample and then separately for Studies A and B. Covariates detailed above were entered into the first step (for the full sample only), pre-treatment ECBI Intensity scores (indexing initial CP levels) entered into the next step, and CU scores entered into the final step of the model as predictors. Results presented in Table 2 indicated that the main effect for CU was positive but nonsignificant in the full sample, but significant and of a large magnitude for children in study A. There was also a significant main effect for pre-treatment levels of CP in the full sample and study A; however, neither pre-treatment CP nor CU traits had a significant effect on post-treatment CP for children in study B. To illustrate the differences between children scoring low versus high on CU traits, mean scores on pre- and post-treatment ECBI Intensity scores are reported in Table 3 for the full sample and separately by study.

Testing Whether CU Traits Predict CP Scores Following Treatment with the First CDI Phase of PCIT

The analyses described above were repeated predicting CP scores after children completed the first CDI phase of PCIT. Results indicated that only pre-treatment CP scores predicted

post-CDI ECBI Intensity scores (Std. $B = .65, p < .001$) for the full sample and children in studies A (Std. $B = .54, p = .018$) and B (Std. $B = .75, p < .001$), separately. For illustrative purposes, Table 3 presents mean CP scores post-CDI for children scoring low versus high on CU traits, for the full sample and also separately by study.

Discussion

The current study addresses a novel and timely research question by examining the influence of CU traits on behavioral outcomes following PCIT among young children with CP with or at-risk for co-occurring developmental delays. This also necessitated conducting a test of the psychometric properties of a measure of CU traits for young children with developmental delay, filling a critical gap in the literature. This type of research is necessary given that young children with developmental delays are at risk for a pattern of early starting CP and show similar characteristics to older youth with CU traits. In the current study, children with developmental delays showed a trend toward greater CU traits than non-delayed children. Importantly, treated children scoring high on CU traits showed clinically significant improvement in CP post treatment. Although, CU traits predicted significantly higher post-treatment CP among delayed children, but not children at-risk for delay due to premature birth, and this main effect remained after accounting for the initial severity of CP. This study also examined CP scores following delivery of the first CDI phase of PCIT, which is theoretically-supported for treating youth with CP+CU because of its focus on fostering the positive qualities of parent-child attachment (i.e., mutual responsivity, emotional warmth). Consistent with hypotheses, CU traits were not associated with post-CDI CP.

Our findings add to the field's understanding of the measurement of CU traits in young children. The CU construct, as conceptualized using our ASEBA-based proxy measure, appears promising for identifying a subset of young children with more severe externalizing problems. We found that scores on our measure of CU traits were comparably internally consistent to scores obtained in a prior study of preschool children ($\alpha = .65$, Willoughby & Waschbusch, 2011) and in studies using more commonly used and better-validated measures of CU in older children, such as the APSD (e.g., Kimonis et al., 2006; Vitacco, Rogers, & Neumann, 2003). CU scores also showed expected associations with measures of externalizing behavior, even after accounting for cognitive ability. To address the possibility of criterion contamination since the CU measure included item 14 measuring cruelty to animals, which overlaps with a symptom of CD, we examined associations excluding this item. Results indicated that the internal consistency of the CU measure was lower when removing item 14 for the full sample ($\alpha = .62$), and also for children with developmental delay ($IQ = 75, n = 39$) alone, $\alpha = .63$. Furthermore, this 5-item CU scale remained significantly associated with Pre-treatment ECBI Intensity ($r = .46, p < .001$) and CBCL Externalizing scores ($r = .56, p < .001$), even after controlling for the child's level of cognitive functioning ($pr = .45$ and $pr = .55, p < .001$, respectively). These findings provide preliminary support for the concurrent validity of CU scores using an ASEBA-based proxy measure of CU traits among preschool children, irrespective of intellectual level.

Our finding that CU traits predicted greater CP prior to and following treatment with an empirically supported PT intervention is consistent with prior research (Hawes & Dadds, 2005). Hawes & Dadds (2005) were able to isolate the poor treatment response to the disciplinary components (i.e., timeout) of a somewhat briefer PT intervention (10-week). They found that whereas parents perceived that time out was ineffective as CU scores increased, the relationship was not significant for reward-based strategies. This suggests that reward-based parenting strategies (e.g., descriptive praise) might be particularly effective in reducing CP in children with CU traits, which is consistent with their characteristically reward-dominant response style (O'Brien & Frick, 1996). Similarly, our findings suggest

that for younger children with CP+CU and co-occurring developmental delays, PT that includes time out (i.e., punishment) is less effective at reducing CP than it is for children low on CU traits. In the present study, for children in Study B who were selected on the basis of premature birth (< 37 weeks gestation), there was no significant main effect for CU traits. The smaller proportion of children scoring high on CU traits in Study B (27% vs. 50% in Study A) and their relatively higher drop-out rate (50%) compared with children born premature scoring low on CU traits (18%) may have limited power to detect an effect. This difference in the rate of CU traits between studies may be an artifact of the lower threshold for CP required for inclusion of the younger children into Study B (T-score = 60 on ASEBA externalizing problems scale) compared with the older children in Study A (T-score = 65 on ASEBA aggressive behavior subscale) who likely showed more aggressive CP consistent with CU traits (Frick & Marsee, 2006). Exploratory post-hoc analyses confirmed that results were not specific to children with developmental delay (IQ = 75 or 80), and also that age did not have a significant moderating effect on the relationship between CU traits and post-treatment CP in the full sample.

Given research supporting the importance of strong, positive parent-child attachment to reducing antisocial behaviors among children high on CU traits (Kochanska, 1997; Pardini, Lochman, & Powell, 2007), Dadds and colleagues have called for research adapting PT interventions to emphasize attachment (Dadds & Rhodes, 2008; Hawes & Dadds, 2005). Importantly, in the present study we are the first to test the efficacy of the CDI phase of PCIT for treating children with CP+CU, which is partly rooted in attachment theory (Eyberg & Bussing, 2010). We find that outcomes following training of parents in CDI strategies that are designed to foster more positive parent-child relationships were not contingent upon CU traits. Specifically, when examined separately, CU traits did not significantly predict ECBI Intensity scores following completion of the first CDI phase of treatment. However, it is possible that the relatively small sample size may have resulted in a lack of power to detect a significant main effect. Notwithstanding issues of low power, these findings provide preliminary support for comparable treatment response between children with CP+CU and children with CP alone to this attachment-building phase of the intervention. Importantly, this is the first study to test the efficacy of PT among children with CP+CU who are under the average age of six, when moral development begins. It will be important to test whether increasing the attachment focus of this treatment phase (e.g., by explicitly training and reinforcing parents' use of affection) will improve treatment outcomes for children with CP+CU.

It is important to note that in the present study PCIT was efficacious for most of the treated sample of young children, a finding that is described in more detail in the main outcome studies (Bagner & Eyberg, 2007; Bagner et al., 2010). That is, only four children out of 34 (12%) families who completed treatment maintained clinically significant levels of CP post treatment (ECBI > 132, T-score > 60), and none fell above the median CU score. Therefore most children, regardless of their level of CU traits, benefited from PCIT. Nevertheless, there were differentially less positive effects among children with high initial levels of CU traits. Although the present study did not include a long-term follow-up assessment to determine any differential maintenance of treatment effects, these findings support the clinical utility of assessing CU traits among young children presenting with CP.

Study Strengths and Limitations

The present study has several strengths. There is a dearth of literature on CU traits among preschool-aged children, the focal population of the present study. This study is the first to examine treatment outcomes among at-risk children under the age of four years with CP+CU using a sample size comparable to prior intervention studies with children ages four

years and older (e.g., Hawes & Dadds, $n = 56$; McDonald et al., $n = 32$). This was made possible by combining secondary data from two rigorous randomized controlled trials. This is also the first study to examine CU traits among children with or at-risk for developmental delay. Importantly, our findings suggest that CU traits were prevalent at a greater rate among this sample of children compared with a sample of non-delayed youth (Willoughby & Waschbusch, 2011). We also used validated and developmentally appropriate measures of CU traits and CP (Achenbach & Rescorla, 2001). Of note, few existing measures of childhood CU traits have been well validated among young children (cf. Kimonis, Frick, Boris, et al., 2006; see Kotler & McMahon, 2010).

In addition to the methodological strengths of the present study, the results must be considered within the context of some limitations. First, despite the unique sample of children with or at-risk for developmental delay, which fills an important research gap, the findings may not generalize to non-delayed children with CP. Also, this study only examined the reliability and CP correlates of the measure of CU traits in a select subsample of children with cognitive delay, and by no means provides an extensive examination of the psychometric properties of the measure of CU traits in this unique sample, which is an important goal for future research. Second, the current results may be limited to predominately middle-class samples, rather than children from lower SES backgrounds, who typically experience more proximal risk factors, such as maternal depression and a dysfunctional home environment (Pachter, Auinger, Palmer, & Weitzman, 2006). A third limitation to the study findings is the relatively small sample size and attrition of participants. A lack of statistical power may account for the failure to find a significant effect of CU traits in predicting post-CDI CP outcomes. Also, families that dropped out of treatment scored their children significantly higher on CU traits, so it is possible that these parents experienced less change in child problem behaviors subsequently leading them to prematurely drop out of treatment. Alternatively, these families may be characterized by other psychosocial risk factors not measured in this study that might create barriers to treatment progress and sustain problematic child behaviors. Unfortunately, families that dropped out of treatment did not respond to our attempts to contact them via regular weekly appointment reminder calls so we were unable to determine specific reasons for dropout. Given the characteristics of the current sample and its small size for detecting significant effects, the findings require replication in a larger and more diverse sample of children with CP before making widespread inferences.

Given the secondary analysis of existing data, we were unable to tease out the efficacy of the PDI phase alone as it is possible that its combination with CDI led to the successful outcomes for the majority of families detailed above. Exploratory posthoc analyses did not reveal a significant main effect for CU in predicting post-treatment ECBI Intensity scores controlling for levels post-CDI (Std. $B = .13$, $n.s.$), although it is possible that the sample size may have also limited power to detect this effect. Finally, measures of child CP and CU were based on parent report, which is subject to rater bias. Changes may reflect possible expectancy effects, and associations may have been inflated due to shared method variance. While it would have been beneficial to compare scores on our proxy measure of CU traits against other better-validated measures, such as the APSD or ICU, neither this nor other measures of emotional functioning were available to provide further validation. Future research could benefit from including such measures and also employing a multi-method assessment approach to overcome problems inherent in relying on parent report of child behavior alone.

Conclusions and Future Research Directions

Despite the preliminary nature of this study and its limitations, if results are supported in future research, the findings have important clinical implications. If children with CP+CU do not benefit as much from best practices for treating children with CP alone, this suggests a critical need to conceptualize and test novel interventions for children with CP and co-occurring CU traits. Importantly, children with CP+CU are uniquely characterized by emotional deficits in response to distress and punishment, which are proposed to interfere with normative moral development (Blair, 1995). One line of study attributes poor emotion recognition to problematic allocation of attention to critically salient environmental cues; namely, failing to focus on the eye region of the face when processing fearful expressions as determined by eye tracking (Dadds, El Masry, Wimalaweera, & Guastella, 2008). When youth with CU traits were instructed to attend to the eyes of stimulus faces, their deficits in fear recognition ameliorated, suggesting that altering the attentional focus of children with CU traits may, at least temporarily, modify impairments in emotion recognition (Dadds et al., 2006, 2008).

Whether or not such changes will affect CU traits and CP is an empirical question since there is no longitudinal evidence to suggest that eye-gaze deficits are associated with the stability of CU traits or CP over time. However, in a RCT of largely male youth referred for emotional and behavioral problems (6-16 years), those with elevated CU traits showed significant improvements in affective empathy and CP following a computerized emotional recognition training, which involved studying images of various human emotional expressions and then discussing them with parents during homework activities (i.e., MindReading), compared with a treatment-as-usual PT intervention (Dadds, Cauchi, Wimalaweera, Hawes, & Brennan, in press). It will be important to test whether incorporating similar interventions to improve emotional deficits in the child can enhance attachment-based interventions, such as the CDI phase of PCIT, which may be an ideal platform for the delivery of individualized interventions. For example, CDI may be adapted or tailored to address characteristics of low empathy, punishment insensitivity, and insensitivity to distress cues that distinguish children with CP+CU from those with CP alone. Adaptations that teach parents to foster greater emotional awareness and affective perspective taking skills in their children, and that capitalize on their reward-dominant response styles (e.g., use of a token economy system) may be most effective. Given the significantly higher drop-out rate among families of children high on CU traits in this study, adaptations may also address high attrition rates (e.g., incorporating motivational interviewing with parents). For example, training therapists to modify verbal behavior to increase supportive (i.e., praising, empathic) and facilitative statements (i.e., affirming patient comments) and reduce questioning, specifically that which is close-ended, may improve treatment completion rates (Harwood & Eyberg, 2004; Young, Fox, & Zahn-Waxler, 1999).

In light of recent research findings suggesting that (a) patterns of physiological emotional responding moderate treatment response for children with CP (Bagner et al., 2012; Stadler et al., 2008) and (b) the combination of behaviorally-rated CU traits and deficits on laboratory measures of emotional responding predicts more severe and aggressive CP (Kimonis, Frick, Muñoz, & Aucoin, 2007), future research may test whether children with CP+CU who present with deficits on laboratory paradigms show differential treatment response and whether treatment leads to changes in emotional responding. However, Dadds et al. (in press) failed to find that improvements in emotion recognition and affective empathy accounted for the positive impact that their intervention had on CP for children high on CU traits, although results may differ for interventions with a stronger attachment building focus.

By addressing the individualized treatment needs of children with CU traits it may be possible to change characteristics typically perceived as being entrenched in the child, such as patterns of emotional responding. Challenging a history of psychotherapeutic pessimism (Salekin, 2010), this study and others provide encouraging evidence that the antisocial behaviors of children with CU traits are modifiable (e.g., Kolko et al., 2009). Our preliminary findings support the need for future clinical research with young children with CP+CU and hold promise for reducing the significant burden that they place on their families, schools, and communities.

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Table 1

Demographic Characteristics of Children Scoring Low Versus High on CU Traits for the Full Sample and Separated by Study

Study	Full Sample		Study A (IQ = 75)		Study B (premature)	
	Low CU (<i>n</i> = 37)	High CU (<i>n</i> = 21)	Low CU (<i>n</i> = 15)	High CU (<i>n</i> = 15)	Low CU (<i>n</i> = 22)	High CU (<i>n</i> = 6)
Characteristic	<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>)	<i>M</i> (<i>SD</i>)
Child Age (in months)	44.59 (16.04)	49.57 (9.95)	56.07 (11.70)	52.20 (8.29)	36.77 (13.85)	43.00 (11.45)
Child Sex (% female)	21.6%	33.3%	26.7%	20.0%	18.2%	66.7%
Child Ethnicity (% minority)	32.4%	28.6%	40.0%	26.7%	27.3%	33.3%
Child IQ	72.89 (16.95)	66.48 (16.04)	58.80 (11.20)	59.53 (11.31)	82.50 (13.06)	83.83 (12.83)
Hollingshead	42.36 (14.16)	42.21 (12.95)	39.87 (14.68)	42.73 (13.93)	44.07 (13.87)	40.92 (11.20)

Note: CU = Callous-unemotional traits; CP = Conduct problems (pre-treatment ECBI intensity raw scores); Groups were created using a median split on baseline CU and CP scores. Apart from lower IQ scores and older ages in Study A compared with B, there were no other significant differences between groups on demographic variables.

Table 2

Regression Analyses Predicting Post-Treatment ECBI Intensity Raw Scores for the Full Sample and Separated by Study

Model	Variable	Standardized Beta	R ² /ΔR ²
Full Sample (<i>n</i> = 36)			
1	Group	-.33, <i>p</i> = .057	R ² = .11
	IQ	-.02, <i>p</i> = .904	
2	Pre-treatment CP	.43, <i>p</i> = .006	ΔR ² = .19
3	CU	.18, <i>n.s.</i>	ΔR ² = .03
Study A (IQ 75; <i>n</i> = 15)			
1	Pre-treatment CP	.68, <i>p</i> = .006	R ² = .46
2	CU	.57, <i>p</i> = .006	ΔR ² = .26
Study B (premature birth; <i>n</i> = 21)			
1	Pre-treatment CP	.29, <i>n.s.</i>	R ² = .08
2	CU	-.15, <i>n.s.</i>	ΔR ² = .02

Note: Group = treatment group (IT vs. WL); CP = Conduct problems measured using the ECBI Intensity raw score; CU = Callous-unemotional traits.

Table 3

ECBI Intensity Raw Scores for Children Scoring Low Versus High on CU Traits for the Full Sample and Separated by Study

CU Group	ECBI Intensity Raw Score		
	Pre-treatment <i>M (SD)</i>	Post-CDI <i>M (SD)</i>	Post-treatment <i>M (SD)</i>
Full Sample			
	(<i>n</i> = 55)	(<i>n</i> = 42)	(<i>n</i> = 36)
	153.13 (36.05)	130.81 (36.10)	91.22 (31.80)
Study A (IQ = 75)			
Low CU	(<i>n</i> = 14)	(<i>n</i> = 10)	(<i>n</i> = 8)
	144.14 (32.73)	113.10 (38.80)	80.63 (27.08)
High CU	(<i>n</i> = 13)	(<i>n</i> = 9)	(<i>n</i> = 7)
	174.15 (33.95)	142.56 (19.60)	115.71 (22.14)
Study B (premature)			
Low CU	(<i>n</i> = 22)	(<i>n</i> = 18)	(<i>n</i> = 18)
	146.68 (36.16)	129.56 (38.56)	87.56 (35.82)
High CU	(<i>n</i> = 6)	(<i>n</i> = 5)	(<i>n</i> = 3)
	152.17 (37.87)	149.60 (36.64)	84.33 (3.512)

Note: CU = Callous-unemotional traits; Groups were created using a median split on baseline (Time 1) CU scores.