University of Cyprus

DEPARTMENT OF PSYCHOLOGY

CAN 'LIMITED PROSOCIAL EMOTIONS' BE CHANGED IN EARLY CHILDHOOD? AN EXAMINATION OF THREE TREATMENT PROGRAMS

DOCTOR OF PHILOSOPHY

ELENI MILTIADOU

May 2018

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CAN 'LIMITED PROSOCIAL EMOTIONS' BE CHANGED IN EARLY CHILDHOOD? AN EXAMINATION OF THREE TREATMENT PROGRAMS

ELENI MILTIADOU

A Dissertation Submitted to the University of Cyprus in Partial Fulfillment of the

Requirements for the Degree of Doctor of Philosophy

May 2018

VALIDATION PAGE

Doctoral Candidate: Eleni Miltiadou

Doctoral Thesis Title: Can 'Limited Prosocial Emotions' be changed in Early Childhood?

An examination of three treatment programs.

*The present Doctoral Dissertation was submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy at the **Department of Psychology** and was approved on the 9th of May 2018 by the members of the **Examination Committee**.*

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The present doctoral dissertation was submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy of the University of Cyprus. It is a product of original work of my own, unless otherwise mentioned through references, notes, or any other statements.

Eleni Miltiadou

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Abstract

Introduction: Children described at having callous unemotional (CU) traits are characterized by lack of remorse or guilt, callous/lack of empathy, unconcern about performance, and shallow or deficient affect. The continuing, severe and aggressive Conduct Problems (CP's) exhibited by this group, are developmental precursors to psychopathy and other antisocial behaviors in adulthood. This distinct group of children is resistant to traditional parent training interventions designed for children with CP's. The poor treatment response is attributed to the distinct emotional, cognitive and biological factors involved in the development of CP's in children with CU traits. The early years are a key period for early intervention for children with CU traits whereby missed moral development milestones can be achieved. *Objective:* The study examined three distinct interventions designed to target risk factors influencing children with CU traits, namely Child Directed Interaction for CU traits (CDI-CU) (n = 15), Coaching and Rewarding Emotional Skills (CARES) (n =16) and Emotional Engagement Intervention (EEI) (n = 19), against a Waitlist (WL) control group (n = 22). The first aim was to test whether interventions produced improvement in its specified treatment target. Primary outcomes involved positive parenting, parental warmth, empathy and eye gaze. The second aim was to test whether improvement in secondary outcomes was greater between intervention conditions and the control condition. Secondary outcomes were CP's and CU traits. *Method:* Seventy-two Greek-Cypriot children with CU traits and low empathy (*M* age 7.5 years, *SD* = 1.49) participated together with their parent in a quasi-experimental design where participants are allocated to four groups (three interventions and one control group) and were assessed at pre, post and 3-month follow-up. *Results:* Results showed that the CDI-CU produced the largest reductions in parent rated scores for CP's for boys at post assessment and girls across assessments. Sex differences showed large improvements in boys participating in the CARES group. The CDI-CU intervention indicated increases in parental warmth and in positive parenting 'Do Skills' by the DPICS coding tool demonstrating the effectiveness of intervention components. Improvements for CU traits and affective empathy were shown for children fulfilling the LPE specifier criteria that participated in intervention groups and not in the WL control group. *Conclusions:* The findings of this study showed that each intervention demonstrated distinct patterns of change in terms of primary and secondary processes, however results need to be regarded as preliminary given the small sample in each

intervention. Further research needs to focus on sex differences in intervention studies to evaluate the effectiveness of treatment components for either gender. The combination of treatment components enhancing parental warmth and emotion recognition training can lead to optimal results based on the findings of this study.

Abstract in Greek

Εισαγωγή: Παιδιά με Χαρακτηριστικά Σκληρότητας (ΧΣ) αποτελούν πρόκληση αφού δεν ανταποκρίνονται στις εμπειρικές θεραπείες που επιφέρουν αποτελέσματα στην αντικοινωνική συμπεριφορά παιδιών χωρίς ΧΣ. Αυτό αποδίδεται σε ιδιαίτερους αναπτυξιακούς παράγοντες που συνθέτουν διαδικασίες για την ανάπτυξη και διατήρηση αντικοινωνικών συμπεριφορών στα παιδιά με ΧΣ. Θεραπείες που εστιάζουν στα παιδιά με ΧΣ χρειάζεται να σχεδιαστούν έχοντας ως βασικό στόχο τους παράγοντες κινδύνου και την πιο αποτελεσματική αντιμετώπιση αντικοινωνικών συμπεριφορών. *Στόχος:* Η παρούσα μελέτη εξετάζει τρείς θεραπείες που έχουν ως στόχο την βελτίωση παραγόντων κινδύνου που επηρεάζουν παιδιά με ΧΣ. Οι τρείς ομάδες θεραπείας αποτελούνται από την Αλληλεπίδραση Κατευθυνόμενη από το Παιδί για παιδιά με ΧΣ (CDI-CU), την Θεραπεία Εξάσκησης και Επιβράβευσης Συναισθηματικών Δεξιοτήτων (CARES) και την θεραπεία Συναισθηματικής Εμπλοκής, έναντι μίας ομάδας ελέγχου. Ο πρώτος στόχος αποτελεί την εξέταση της αποτελεσματικότητας της κάθε θεραπείας όσο αφορά τα πρωτεύων αποτελέσματα. Τα πρωτεύων αποτελέσματα αφορούν την θετική γονική στάση, γονική ζεστασιά, ενσυναίσθηση και οπτική επαφή. Ο δεύτερος στόχος της έρευνας είναι η εξέταση βελτίωσης των δευτερεύων αποτελεσμάτων που αφορούν την αντικοινωνική συμπεριφορά και ΧΣ, μεταξύ των θεραπειών και της ομάδας ελέγχου. *Μέθοδος:* Εβδομήντα-δύο Ελληνοκύπρια παιδιά με ΧΣ και χαμηλή ενσυναίσθηση (ΜΟ ηλικίας = 7.5) συμμετείχαν μαζί με τον γονέα τους στην πειραματική μελέτη όπου κατανεμήθηκαν στις τέσσερις ομάδες και αξιολογήθηκαν πριν, μετά την θεραπεία και στους 3 μήνες μετά την δεύτερη αξιολόγηση. *Ευρήματα:* Σε αντίθεση με προηγούμενα ευρήματα η παρέμβαση CDI-CU παρουσίασε τα καλύτερα αποτελέσματα όσο αφορά την βελτίωση αντικοινωνικής συμπεριφοράς. Επίσης, παρουσίασε ιδιαίτερη αύξηση στην γονική ζεστασιά και σε δεξιότητες θετικού γονικού στυλ. Διαφορές μεταξύ φύλου κατέδειξαν ότι αγόρια στην ομάδα CARES είχαν βελτίωση στην αντικοινωνική συμπεριφορά έναντι των αποτελεσμάτων των κοριτσιών. Παιδιά που υποδείχθηκε ότι εκπλήρωναν τα κριτήρια «με περιορισμένα προ κοινωνικά συναισθήματα» και συμμετείχαν σε ομάδα θεραπείας εκδήλωσαν βελτίωση στα ΧΣ και στην ενσυναίσθηση σε σχέση με τα παιδιά που συμμετείχαν στην ομάδα ελέγχου. *Συζήτηση:* Τα ευρήματα επιβεβαιώνουν ότι παρεμβάσεις που εστιάζουν στους παράγοντες κινδύνου αντικοινωνικής συμπεριφοράς σε παιδιά με ΧΣ υποδεικνύουν βελτιώσεις τόσο σε πρωτεύων όσο και δευτερεύων αποτελέσματα. Ο

συνδυασμός των παρεμβάσεων CDI-CU και CARES θα αποτελούσε ενδιαφέρον θεραπευτική επιλογή τόσο σε κλινικό πλαίσιο όσο και σε μελλοντικές έρευνες για μείωση αντικοινωνικής συμπεριφοράς και αύξηση ενσυναίσθησης. Έρευνες χρειάζεται να εστιαστούν στις διαφορές φύλου, όσο αφορά παρεμβάσεις, αφού έχουν παρουσιαστεί διαφορές στα αποτελέσματα αντικοινωνικής συμπεριφοράς.

ACKNOWLEDGEMENTS

DEDICATION

Dedicated to my everything,

Adonis and Aristaios.

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Introduction

Children grow in a world where adversity and life circumstances have a lasting effect on the way their future unfolds. These early years are especially prone to the way risk factors influence the varying expressions of Conduct Problems (CP) and the heterogeneity that results from these processes (Fanti & Henrich, 2010). Years of research has been directed to a subgroup of antisocial children with Callous-unemotional (CU) traits that are characterized by lack of remorse or guilt, callous use of others, shallow or deficient emotions and lack of concern about performance (Frick & Morris, 2004). CU traits are observed in 5 – 10% of children and characterize 12 – 50% of children diagnosed with Conduct Disorder (CD) (Frick, Ray, Thorton & Kahn, 2014). The continuing (Frick et. al., 2003), severe and aggressive (Pardini, 2006) CP's exhibited by this group, are developmental precursors to psychopathy and other antisocial behaviors in adulthood (McMahon et. al., 2010). The cost of psychopathy to society is over $400 billion per year, which is roughly 10 times the cost of depression (Kiehl & Hoffman, 2011), while the social impairments such as substance abuse, legal problems, educational, occupational, familial and health problems are immense (Odgers et al., 2008).

Identifying and distinguishing CP subtypes is critical in understanding the developmental course and prognosis of children with CU traits as well as determining effective interventions approaches (Frick & Loney, 1999). The varying characteristics of this heterogeneous group have proven so important they have been included in the newest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM- 5; American Psychiatric Association 2013) whereby children meeting the Conduct Disorder (CD) criteria are given the specifier "with Limited Prosocial Emotions" (LPE). Children must show at least two of the following symptoms over an extended period of time (i.e. at least 12 months) and in various settings: 1. Lack of remorse or guilt, 2. Callous/lack of empathy, 3. Unconcerned about performance, 4. Shallow or deficient affect. Diagnosis of CD with the addition of the specifier constitutes a risk factor for the development of stable future antisocial behavior, and as such it aims to guide clinicians into optimal individualized treatment planning. Interventions targeting this heterogenous group have been ineffective due to the lack of acknowledgment of these unique characteristics (Hawes, Price & Dadds, 2014).

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Over the last century, empirical work has highlighted certain key risk factors that are directly linked with the development and maintenance of CU traits. A primary risk factor for children with CU traits is their fearless temperament (Frick & Viding, 2009). This group lacks anxiety or inhibitions and thus parental efforts for discipline are ineffective, leading parents to exhibit adverse parenting behaviors such as increased harshness, inconsistent discipline and reduced parental warmth (Larsson, et al., 2008). These parental behaviors have been associated with increased problematic behaviors in children (Waller & Hyde, 2018). Furthermore, evidence suggests that children with CU traits frequently display difficulties in emotion recognition (Blair et al., 2001) and attention to eye gaze (Dadds et al., 2012), characteristics which act as risk factors since they can contribute to antisocial behaviour by impairing the child's ability to act prosocially or create positive social connections (Baumeister & Lobbestrael, 2011). Theoretical and empirical research needs to be considered in the development of interventions. Targeting risk factors contributing to the development and maintenance of CU traits can lead to improvements of prosocial behavior thereafter in this difficult to treat population. The current study aims towards the advancement of intervention research by examining three distinct intervention programs that target CU trait risk factors in an experimental design.

Intervention outcomes.

Over the past years literature on intervention studies for children with CP's has shifted from viewing CP's as a homogenous group, which included both children with CP without CU and children with CP and CU traits (Hawes & Dadds, 2014), to more recently distinguishing between subgroups of children with CU traits (Kimonis et al., in press). Past research has shown that two thirds of children undergoing treatment for CP's had demonstrated clinically significant improvements both short term and long term (Beauchaine et al., 2005). Parent management treatments (PMT) have been well established and efficacious with this population as they are based on social learning theory. During PMT parents are coached in behavioral strategies including rewarding and reinforcing adaptive child behaviors in conjunction to prominent discipline strategies for unacceptable child behaviors (e.g. time out techniques). These skills aim to reinforce limit setting techniques and to alleviate the escalating coercive interaction cycles between parents and children by enhancing more positive relationships (Hawes & Allen, 2016). Results of intervention studies have shown that traditional interventions (PMT) are not as effective for the subgroup of children with CU traits

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compared to children with CP in general, especially with respect to the effectiveness of intervention of improving CP's (Frick et al., 2014).

A limited amount of research has tested the effectiveness of interventions that aim to target specific child characteristics, otherwise referred to as treatment outcomes, and findings to date demonstrate mixed results relating to treatment effectiveness for children with CU traits (Hawes, Price & Dadds, 2014). This heterogenous subgroup of children constitute a treatment challenge as they do not respond to the "gold standard" empirically – based-treatments that are commonly provided by mental health or other institutions (Frick et al., 2013). Previous reviews indicated similar conclusions regarding the effectiveness of treatment for children with CU traits. Frick et al (2014) demonstrated that 90% of intervention studies reported a lack of treatment effectiveness with regard to CP outcomes for children with CU traits compared to children with CP. A review of 33 clinical studies showed parallel results, as most of the reviewed studies confirmed that CU traits were positively associated with post – treatment CP's as children with CU traits continued to meet diagnostic criteria for a DBD after treatment (Hawes, Price & Dadds, 2014). These results direct towards a pessimistic attitude for the treatment effectiveness of children with CU traits and challenge intervention studies.

Indications of treatment effectiveness have been shown by studies that have alleviated from standard treatment. Kolko and Pardini (2010) showed that intensive treatment can reduce CP's in children with high CU traits. In their study 177 clinic-referred children (6 – 11 years) with high CU traits participated in individualized and comprehensive modular treatment involving medication for ADHD, parent management training, cognitive behavioral therapy, school consultation, peer relationship development and crisis management. Results from this intensive treatment indicated that children with high CU traits benefited in improving severe CP's as much as children with normal CU traits levels. As research evolves and studies take into account the unique characteristics of children with CU traits, improvements in treatment effectiveness are being reported. Hawes and Dadds (2005) have demonstrated this in their study whereby children with high CU traits were less responsive to parenting intervention than boys with normative levels of CU traits. However, the first part of treatment which involved positive reinforcement to encourage prosocial behavior demonstrated equal levels of improvements both for children with high and those with normative levels of CU traits. This study indicated that this phase of treatment was consistent with the reward-oriented response style of children with high CU traits. An additional study by Dadds et al, (2012) showed the

benefits of treatment when the unique characteristics of children with high CU traits are taken into account. This study compared an emotion recognition training intervention and a typical parenting intervention and showed that children with high CU traits showed poorer response to typical parenting treatment in terms of their change in CP's. On the other hand, children participating in the emotion recognition training showed improvements in terms of affective empathy and CP's (Dadds et al., 2012). Dadd's and colleagues (in press) have extended the study of the examination of interventions targeting children with CU traits. Recently, an emotion engagement intervention component was compared to a neutral child centered play condition as adjunctive components of PMT. The study showed that children with high levels of CU traits that participated in both interventions demonstrated improvements in CP's and parental warmth. A study by Kimonis et al, (in press) also showed encouraging results in terms of treatment effectiveness for children with CU traits. The study examined children with CP and CU traits that participated in the adapted version of Parent-Child-Interaction Treatment for Callous-Unemotional Traits (PCIT-CU). The intervention was developed to specifically target the characteristics of children with CU traits and showed decreases in CP's, CU traits and increases in empathy of huge effect sizes (ds = .7 – 2.0) which were maintained at 3-month follow-up. This study's findings provided support for the PCIT-CU intervention however due to the lack of control group comparison, the results of this study can be regarded as preliminary. These studies show that when the unique characteristics of children with CU traits are taken into account, treatments can lead to improvements in this heterogenous group.

Although CU traits have not been acknowledged as primary outcomes for intervention studies targeting CP's, it is important to take into account that existing interventions have produced promising results. Specifically, Hawes and Dadds (2007) showed that the implementation of their parent training intervention did not lead to reductions in CP's for children with high CU traits after treatment, however a decline in CU traits was indicated at post assessment. A study by McDonald et al, (2011) also indicated reductions in CU traits for children between the ages of 4 – 9 years that participated in an intensive intervention which focused on teaching parent's behaviour management skills and provided support for parents. In this study CU traits improved significantly for the children participating in treatment compared to those that participated in a no-treatment comparison group. Similarly, Somech and Elizur (2012) showed that an intensive parent-training program for young children with high CU traits (ages 3 – 5) demonstrated significant improvements in CU traits after treatment

which were maintained at 1-year follow-up. Thus, research has indicated that parent training programs that are delivered during the early years can produce and maintain improvements in CU traits (Hawes et al., 2014). Studies have suggested that the inclusion of CU traits as targets of intervention could lead to the reduction of CP's among children with high CU traits (Masi et al., 2013; Hawes et al., 2013; Salekin et al., 2010; McDonald et al., 2011; Hyde et al., 2013; Kimonis et al., 2014). Tailored and individualized interventions that target the unique risk factors leading to the development and maintenance of CU characteristics is critical in creating improved circumstances for this subgroup.

Targeting Risk Factors for Callous-Unemotional traits in Treatment

Absence of fearful inhibitions

Fearfulness is the tendency to experience anxiety or fear (i.e. distress about dangers in the physical world) and punishment sensitivity (i.e. fearful or distressed reactions when faced with the likelihood of being punished for wrongdoing) (Fanti, Panayiotou, Lazarou, Michael & Georgiou, 2015). Children with CU traits exhibit fearless characteristics such as, insensitivity to punishment and low behavioral inhibition that can lead to severe antisocial behavior associated to CU traits (Barker et al., 2011, Rothbart & Bates, 1998). Frick and Morris (2004) have suggested that temperamental fearlessness and deficits in response to cues of punishment are biological manifestations of CU traits. Additionally, conclusions from a longitudinal study demonstrate that in a population-based sample of 7000 children, fearless temperament at age 2 predicted CU traits at age 13 (Barker et al., 2011). These results contribute to the importance of acknowledging fearlessness as a key risk factor in the development of CU traits and the effect that this characteristic will have on treatment outcomes. Treatment planning needs to take account of salient temperamental risk factors in order to design and implement interventions that can lead to improvements behavioral and emotional outcomes.

Many theories emphasize the link between fearlessness and moral development. Kochanska (1993) believed that a very important aspect of discipline or "of an internal system that functions to inhibit misbehavior" is the emotional discomfort that follows an act of wrongdoing, even in the cases when there is no consequential punishment. This emotional discomfort or as she called it "deviation anxiety" acts as a protective factor as it teaches the child to behave in a socially accepted way. Fearful inhibitions encourage healthy socialization and internalization of moral beliefs, emotions and values, as children experience anxious arousal

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when being disciplined by their parents (Dadds and Salmon, 2003). A child that is behaviorally inhibited experiences higher deviation anxiety and is more likely to respond to discipline, whereas a child that is behaviorally uninhibited or fearless will experience lower levels of anxiety and therefore will not conform to discipline (Kochanska, 1991). Children learn to conform to parental rules and avoid misbehaving to avoid negative emotional experience (anxiety) associated with punishment, though children with CU traits are characterized as having punishment insensitivity, or a lack of deviation anxiety that is seen in normal controls.

Traditional parent training programs are based on social learning theory (Comer et al., 2013) and typically involve skills training to increase desirable behavior through positive reinforcement while also incorporating discipline focused components such as time-out, to limit negative behavior (Kling et al., 2010). While children with CU do not respond optimally to these types of interventions, children characterized with CP do respond well (Kazdin, 2005; Hawes & Dadds, 2005). Hawes and Dadds (2005) demonstrated that among 4 – 8-year-old (*M* age = 6.3 years) clinic referred boys with CP, punishment oriented behavior modification programs that taught parents more effective discipline strategies (e.g. time out technique) reduced disruptive behaviors among boys with CP but not boys with CU traits. Results indicated that CU traits predicted the diagnosis of Oppositional Defiant Disorder (ODD) after treatment completion, concluding that a lack of acknowledgement of CU trait characteristics can lead to treatment ineffectiveness. Children with CU traits are characterized by fearlessness and low levels of anxiety (or punishment insensitivity), therefore components such as discipline in the form of punishment are expected to be ineffective with children in this group (Dadds & Hawes, 2005). Intervention studies can provide great insight into treatment components that are effective or have been ineffective in the past. The example mentioned (Hawes & Dadds, 2005) shows the importance of acknowledging heterogenous characteristics that affect intervention efforts. Taking account of risk factors that influence the development and maintenance of CU characteristics by designing interventions that can effectively lessen the impact of these characteristics on problematic and disruptive behaviours is key to intervention success. The present study examines interventions that have been developed through empirically based research which takes into account the unique characteristics of this subgroup of children.

Parenting Practices

Environmental contexts can potentiate the expression of biological vulnerabilities which are associated with the risk of psychopathy development (Hawes, Price and Dadds, 2014). Entrainment refers to the effect that the environment has in structuring neural pathways which are involved in automatic, overlearned behavior patterns (Lewis, 2000). Entrained biosocial traits consist of the domains of temperament, social–cognitive style and intelligence and act as key risk factors for antisocial behavior (Dishion & Patterson, 2006). Growing evidence is showing that CU traits, response perseveration, behavioral inhibition, hyperactivity and irritability can be shaped through interactions and routines in social contexts (family & broader social environment) (Hawes, Price, Dadds, 2014). This theory suggests a conceptualization whereby the parenting process contributes to the behavioral adjustment of children with CU traits and the way these characteristics are expressed over time. Recent studies are pointing to a developmental model of early CU behaviors which considers person by context interactions and the importance of early parental intervention targeting early demonstrations of CU behaviors. Specifically, the inherited temperamental risk for fearlessness and low emotional reactivity give rise to early CU behaviors. Consequently, these temperamental characteristics interact with contextual factors such as parenting practices which will either reduce or increase the risk of CU behaviors. Children exhibiting inherited low interpersonal emotional sensitivity and have difficulty emotionally connecting with their parents might evoke less warm parenting, while temperamental fearlessness (disinhibited behavior) would evoke harsher parenting. The consequential responses from parents are expected to lead to adverse changes and further child problematic behaviors (Waller & Hyde, 2018).

Recent studies, state that high levels of harsh parenting are positively associated to both normative and high levels of CU traits in children (Waller et al., 2015) as harsh negative parenting at ages 2 – 4 has predicted increases in CU traits later in development (Waller et al., 2012). These studies suggest that harsh negative parenting during this critical pre-school age has a non-specific effect on increases in CU-traits and general problematic behavior. One of the first RCT involving children with CU traits showed the effect of changes in parenting style, on both CU and CP outcomes. Specifically, McDonald et al (2011), evaluated a Project Support parenting intervention for children (n= 66) exhibiting clinical levels of CP's. The study showed steady decreases in CU traits for the families undergoing Project Support treatment, while families participating in the treatment as usual (TAU) group exhibited increases in CU traits.

Reductions in CU traits were mediated by improvements in parenting whereby the mothers' harsh and inconsistent parenting was improved. As a result, this line of work suggests that, despite high genetic influences in CU traits, calculated and theoretically based changes in external processes can play a pivotal role in ameliorating or exacerbating the emotional and behavioral problems of children with CU traits (Viding, Blair, Moffitt & Plomin, 2005). Kochanska and Thompson (1997) proposed strategies directed towards positive parenting and emotional warmth as a way of developing and enhancing positive socialization rather than the use of punishment strategies for parental discipline.

Conscience development in under aroused/fearless children is strongly predicted by the affective quality of the parent-child relationship (Kochanska et al., 2005). Parent-child relationships that are defined by secure attachment (loving, trusting relationship) provide a more effective guide towards moral development in fearless children than relationships characterized by harsh parental discipline (Kochanska et al., 2005). Warm (described as displaying love and affection, positive involvement, expressions of enthusiasm and praise) (Suchman, Rounsaville, DeCoste, & Luthar, 2007) and nurturing parent-child relationships have been shown to be effective at protecting high risk children from later developing CU traits (Pardini, Lockman & Powell, 2007) and improving problematic behavior and emotional states in children with CU traits (Hawes & Dadds, 2007).

A number of studies have supported Kochanska's (2005) theory regarding the effect of parental affection on children with CU traits and antisocial behavior. Results from these studies have shown hopeful results indicating that high levels of parental warmth are negatively associated with antisocial behavior among children high on CU (Kroneman et al., 2011) and predict decreasing levels of CU traits during preschool years (Waller et al 2014; Pardini et al., 2007; Pasalich et al, 2016; Pardini, Lochman & Powells 2007; Somech & Elizur, 2012). Pasalich et al (2011) examined the moderating role of CU traits on associations between parental warmth and coercion relating to CP's in clinic referred boys (n = 95, age 4 – 12 years). Observation measures were used to code coercive parenting in family interactions, while parental warmth was coded through 5-minute narratives. Results from this study showed that coercive parenting was more strongly associated with CP's in boys with low levels of CU traits while parental warmth was negatively associated with CP's in boys with high levels of CU. This finding supports the notion that warm and positive parent-child interactions can lead to decreases in

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CP's in children with CU traits. These studies suggest that there is a need for treatment components aimed at enhancing parental warmth for more effective outcomes.

Close and warm relationships with caregivers are vital for the adoption of values and development of prosocial behavior and empathy for this subgroup of children. The family environment plays a significant role in changing CU traits, as increased levels of CU traits are predicted by harsh and inconsistent parenting (Willoughby et al., 2013), whereas high levels of positive parenting and warmth predict lower levels of CU traits (Pardini et al., 2007). Therefore, parent child relationships have an especially salient effect on the improvement of empathy and CU traits in young children. Existing research suggests that by emphasizing components of traditional interventions which focus on social learning-based parent training (i.e. positive reinforcement) and enhancing warm parenting and positive parent-child interactions, behavioral and emotional improvements can be achieved in children with CU traits (O'Connor et al., 2013). This study advances this line of work by incorporating treatments aimed at increasing parental warmth and positive parenting with the intention of reducing CU traits and CP's after treatment completion.

Emotional processing and responding deficits

A salient characteristic feature of children with CU traits is the difficulty in recognizing and responding to distress cues of others. Children with CU traits have difficulty recognizing sad and fearful facial expressions, sad vocal tones and fearful body postures (Blair, Colledge, Murray & Mitchell, 2001) and show weak orientation of attention to images of others distress (Kimonis et al., 2006). Recently studies suggested that early childhood CU traits were related to poorer recognition of others emotion. Kimonis et al, (2014) recently demonstrated that children (age 3 – 5) that scored high on the 12 and 24 item ICU questionnaire rating CU traits, showed deficits in recognizing facial expressions and showed less attentional orientation to distress cues. Similar conclusions were established by Viding and Kimonis (2015) that suggested children with CU traits as being less likely to recognize affective stimuli and react to distress cues in others, especially regarding fear and sadness. This leads to the assumption that since these children cannot comprehend others emotional states, they cannot feel empathetic towards them in situations of distress and may increase the risk for CU behaviors. Blair (2005) suggested that low affective arousal and deficits in recognizing other emotions were directly linked to a key characteristic marked by children with CU traits, namely impaired empathy.

Empathy is defined as the awareness and responding to others' emotions. It is comprised of two components, affective and cognitive; affective empathy is defined by emotionally identifying with another person's feelings (Blair, 2005), and cognitive empathy refers to the understanding of the other persons emotions, thoughts and intentions (Decety, 2010). Affective empathy deficits have been shown to be a salient characteristic among children with CU traits (Waller et al., 2015), however research linking CU traits and cognitive empathy has not been conclusive. Research suggests that pre-adolescent children with CU traits show deficits in both affective and cognitive empathy, however other research shows that deficits in cognitive empathy are only linked to females (Dadds et al., 2009). Dadd's et al (2009) suggested that the discrepancy is age related whereby boys below the age of 9 years showed parent reported lower cognitive empathy scores, while this deficit did not persist after this age. No discrepancy was associated with affective empathy as this persisted throughout the childhood years. Recent research has confirmed these results, demonstrating that children with CU traits as being associated with both cognitive and affective empathy deficits (Pasalich et al., 2014). Waller & Hyde (2018) suggest that low interpersonal emotional sensitivity can lead to deficits in affective empathy consequently resulting in less prosocial behaviour in the future, however interventions have not taken into regard these dimensions of CU temperamental deficits and their implication of empathy outcomes.

Emotional training programs have primarily been used with children with Autism Spectrum Disorders (ASD) that show similar deficits as children with CU traits in empathy, emotion recognition and difficulty in recognizing and responding to others emotional states (Blair, 2008). This component of treatment has proven to be especially important as results have indicated an effect on empathy levels after treatment. For example, a study by Dadds, Cauchi, Wimalaweera, Hawes and Brennan (2012), tested a computerized Emotional Training Program and showed increases in empathy and lowered CP's in children ($M = 10.52$) who were referred for behavioral/emotional problems. Mixed diagnostic children (n = 195) were assigned to either an emotional recognition-training (ERT) or a treatment-as-usual (TAU) group. The ERT involved a MindReading Program which helps children perceive and interpret emotions while using parent-child interactional exercises (Baron-Cohen et al., 2004). The TAU program consisted of a manualized Parent training program described as Integrative Family Intervention for Child Conduct Problems (Hawes & Dadds, 2006). Results showed that children with CU traits demonstrated poorer response to the TAU group while those who

received the adjunctive ERT showed improvements in affective empathy and conduct problems. These results indicate that ERT has the potential to intervene in clinically referred adolescents with CU traits. The authors referred to the importance of further examination of the emotional training component in younger samples. Given the importance of emotional recognition training on children with CU traits, the present study has incorporated and examined such a component in treatment in order to evaluate its role in effectiveness of outcomes. Characteristics such as emotional deficits in terms of recognizing and attending to emotions of others are being targeted in one treatment program (CARES) with the aim of improving on Affective Empathy and Cognitive Empathy after treatment.

Reduced Eye Contact.

Attention to the eye region is crucial in retrieving information about the emotional state of others, for more responsive prosocial interactions and adaptive behaviour (Dadds et al., 2011). One important characteristic of children with CU traits is the attention deficit to eye region of the face (Dadds, El Masry, Wimalaweera, & Guastella, 2008) as well as reduced eye contact with others (Dadds, Jambrak et al., 2011). Reduced attention to the eye region of caregivers from an early age can compromise effective attachment processes and the development of social competencies such as empathic concern and theory of mind (Skuse, 2003). From the earliest stages of life, eye to eye contact between an infant and its mother is the foundation of healthy attachment and emotional connection (Klaus et al., 1970). Children with CU traits that cannot attend to their parent's eyes during emotional expressions of love and warmth may not be able to understand or respond appropriately in adverse situations.

Studies examining eye contact during parent-child interactions demonstrated that children with high CU traits presented reduced eye-contact to both caregivers compared to control groups (Dadds et al. 2011; Dadds et al., 2012). The child's lack of attention to the eyes may have triggered deficits in the quality of attachment with primary caregivers, resulting in children feeling less emotionally connected to their parents and consequently less likely to seek approval by conforming to parental requests. This impairment in early relationships may form the basis of subsequent emotional problems comprising of the ability to empathise with others and conscience formation (Dadds, Allen et al., 2012). By tackling this risk factor, treatments can focus on improvements in eye gaze using various exercises and activities with parents, therefore enhancing parent-child relationships and eye gaze. This study has examined an

intervention specifically designed for improving eye contact between parent and child, namely the Emotion Engagement Intervention, which will be discussed in more detail further on.

Interventions for children with CU traits.

        The distinct temperamental and contextual risk factors associated with children with CU traits, characterized by fearlessness and insensitivity to punishment, low attention to others' distress cues, deficits in eye gaze and emotion recognition, and lack of warm nurturing parental attachments, may be viable intervention components when designing and implementing effective treatment programs. Recent research suggests that treatments targeting the unique characteristics of children with CU traits may show increased effectiveness, thus challenging assumptions about their "untreatability" (Kimonis & Armstrong, 2012). This study aims to examine three theoretically based interventions, namely, Child Directed Interaction for CU traits (CDI- CU), Coaching and Rewarding Emotional Skills (CARES), and Emotional Engagement Intervention (EEI) which incorporate all previously mentioned risk factors for the improvement of CP and CU traits in this unique subgroup.

Child Directed Interaction – for CU traits (CDI-CU).

        Parent Child Interaction Therapy (PCIT) is a PMT program that places heavy emphasis on the parent child dyad. The manualized PMT is aimed at treating pre-schoolers with CP's (Eyberg, Nelson & Boggs, 2008) and has been widely used in clinical settings around the world. Research has demonstrated its efficacy and maintenance of positive treatment outcomes with several at-risk populations (e.g. abuse histories, developmental delays) (Bagner, Sheinkopfm Vohr & Lester, 2010; Kimonis et al., 2014). Meta-analytic results showing the program's effectiveness point to medium to large effect size for families receiving standard PCIT in comparison to waitlist controls in reducing problematic behaviour (d = 0.61 – 1.45) while improving parenting behaviours for children with CP's (d = 0.76 – 5.67) (Thomas & Zimmer-Gembeck, 2007).

        PCIT progresses in two phases; Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI). Child Directed Interaction (CDI) aims at improving parental warmth and affection through a process of positive parenting interactions and parental responsivity within highly rewarding and low demand child-led play. Specifically, parents learn to follow the child's lead while using various positive skills (i.e. labelled praise) to develop and improve attachment between parent and child. The second phase of PCIT, namely Parent Directed

Interaction (PDI) teaches parents effective use of commands and discipline strategies (for example the time-out technique) for inappropriate behaviours. Since children with CU traits are characterized by a fearless temperament, (i.e. punishment insensitivity, or a lack of anxiety when faced with stressful stimuli) interventions focusing on punishment related arousal for internalization of parental norms are not expected to be effective (Kimonis et al., 2012). In a recent study, standard PCIT was tested with preschool children (n = 63 *M* age = 3.87) with or at risk for developmental delay and with parent reported elevated CU traits (Kimonis et al., 2014). Overall results indicated that treated children with CU traits had a significant improvement in CP's following treatment. However, developmentally delayed children with CU showed significantly higher CP results post treatment compared to children with CP-only. This study was the first to examine the efficacy of the CDI - CU phase of PCIT-CU for CP scores post treatment with children in the CU group. Contrary to previous literature, results testing the first phase of treatment indicated that CU traits did not predict CP scores post CDI treatment (Kimonis et al., 2014). The study provides support for the use of attachment building components for treatment interventions targeting children with CU traits. However, the relatively small sample size may have led to the lack of power for a significant main effect, pointing to the need of additional work with larger treatment groups.

PCIT has recently been adapted to address risk factors associated with children with CU traits. The adapted version shifts its focus towards increasing parental warmth as parents are coached to focus on engaging in warm and emotionally responsive interactions with their children. Kimonis et al (in press) have recently tested the adapted version of PCIT (namely, PCIT- CU) specifically for children with CP + CU traits for the first time in an open trial pilot study. Participants consisted 23 children with CP + CU traits between the ages of 3 – 6 (*M* age = 4.5). The families participated in a 21-week PCIT – CU and CARES module interventions. Results demonstrated decreases in children CP's, CU traits and increases in empathy (*Ds* = .70 – 2.0) which were maintained at 3-month follow up assessment. These results showed excellent effectiveness as all primary processes show great improvements. Based on results from previous studies, the CDI-CU may be ideal for the delivery of individualized treatment due to its emphasis on attachment and relationship building between parent and child.

The relationship between attachment style and disruptive behaviour has been well documented, as children that experience insecure attachment style also exhibit problematic behaviour compared to children expressing secure parental attachment (*d* = .31 & *d* =.

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34)(Fearon et al., 2010). This result assumes that mechanisms that play a great role in the alleviation of disruptive behaviours is the incorporation of warm parent child interactions, which in turn affect child acceptance and compliance to parental requests (Guttman-Steinmertz & Crowell, 2006). One of the first studies to examine the change in observed parenting behaviours during the CDI phase of PCIT, focused on behaviour changes in children with developmental delay (Bagner & Eyberg, 2007). Specifically, the RCT included children between the ages of 3 – 6 with mental retardation and examined the efficacy of PCIT for disruptive behaviours in this group. The researchers explicitly studied parent categories recoded using the DPICS coding manual (DPICS-IV; Eyberg et al., 2013), these depicted the "DO skills" and "Don't Skills" parents had learnt over the course of the program and created composite categories of "Do Skills" (behaviour descriptions, reflections and praises) and "Don't Skills" (questions commands and criticisms). Mediational analyses showed that increases in positive and decreases in negative parental behaviours lead to changes in child behaviours. A recent study examined the impact PCIT had on attachment-based caregiving behaviours (sensitivity, warmth and intrusiveness) during infant-led play compared to standard care. Attachment based caregiving behaviours and behaviourally based parenting do and don't skills were examined. Results showed that the behaviourally based do and don't skills moderately correlated with attachment-based caregiving behaviours. Increases were seen through the mediation of increased do skills post intervention with warmth and sensitivity during follow up assessments. The study suggests that behaviourally based parenting skills such as the ones taught during PCIT have a broad impact in attachment- based caregiving behaviours during very early ages (Blizzard, Barroso, Ramos, Graziano, & Bagner, 2017). To date the CDI-CU has not been compared to any other treatment or control group in terms of its treatment efficacy. This study has incorporated CDI- CU as a standalone short -term treatment with the aim of improving parent-child interaction through increased warmth, increased positive parenting skills. The aim of the inclusion of this intervention is the examination of treatment efficacy in terms of improvement in primary outcomes and treatment compatibility in comparison to two other intervention groups and a control group.

Coaching and Rewarding Emotional Skills (CARES).

The Coaching and Rewarding Emotional Skills (CARES) module is a brief emotional training program for children between the ages of 3.5 – 8 years with non-normative levels of CU traits (Datyner et al., 2016). The program was designed as a standalone intervention, as

well as an adjunctive module to complement PMT interventions such as PCIT. Emotional training aims to ameliorate empathy related deficits in processing negative emotions by emphasizing emotional development in children with CU traits. Treatment objectives involve: a) the improvement of attention to facial cues through micro-expression training whereby the child learns to recognize and label various emotions through activities with their parent; b) the improvement of emotional understanding by linking context to emotion, for example identifying contexts that elicit child anger and better prepare for those situations; c) the teaching of prosocial empathic behavior through social stories, parent modeling and through positive reinforcement; d) increasing the child's prosocial behavior through positive reinforcement; e) improve the child's frustration tolerance through modeling, role-playing and reinforcing the child's use of learned cognitive behavioral strategies to minimize aggressive behaviors (Datyner et al., 2016).

The CARES module has not been used in a RCT comparing participants or groups of interventions however initial support is provided by a case study describing the treatment of a 7-year-old boy with pronounced CU traits and low empathy scores (Datyner et al., 2016). Across the course of treatment, the child showed substantial improvements in affective empathy, improvements in emotion recognition performance and in CU levels. This case study serves as a basis for future research as there are no published reports examining the effectiveness of the CARES module with larger sample of children with CU traits. The CARES module has been examined for treatment effectiveness in this study in comparison to two interventions and one control group.

Emotional Engagement Intervention.

The Emotion Engagement Intervention was designed with the aim of reducing CU traits and CP's in children with CU traits by improving parental warmth and eye gaze between parent and child. The treatment includes several in vivo parent child interactions, namely parents are directed to use "Emotion Engagement Activities" and "Do" and "Don't" skills which focus on the promotion of shared eye contact and have as a main goal the increase of warm and positive interactions between parents and children (Hawes & Dadds, 2006). The intervention is based on Video Interactive Guidance (VIG; Fukkink 2008), whereby the therapist provides feedback in terms of the positive and negative aspects of the parent-child interaction. A fun and enjoyable context is set so that the parent and the child share positive interactions while playing.

EEI has been tested in a recent study by Dadds et al (in press) and has demonstrated large improvements in CP's; however, the treatment was unsuccessful in impacting CU traits. The study targeted children with CU traits with the aim of conducting the first stage 2 efficacy trial of the EEI. The children were randomized into two conditions which served as added components to an evidence-based parenting intervention, namely the Emotional Engagement (EE) or the Child Centered Play (CCP). Results showed that there were no overall differences between groups in the child's levels of CP's, however overall reductions in CP's were significant. The study did not use a control group so any changes in CP's cannot be assumed were the result of the added intervention components or the core parent management program itself (Dadds et al., in press). The results of the study show that the treatment did not have any impact on children's levels of CU traits, a finding which is consistent with previous literature which demonstrate that findings between primary processes are usually independent of each other (McDonald et al., 2011). Dadd's et al (in press) suggests that important treatment components involve mechanisms whereby the change in emotional attention or eye contact can translate into behaviour change. Thus, in the specific study, mechanisms of change were operationalized in terms of eye contact and since the specific treatment used the "I – Love – You task" for the practice of mutual eye contact between parent and child, it was also used as a measure of eye contact before after and at 3-month follow-up assessment. Observation data of children in the EEI group showed significant increases in reciprocated eye gaze, an improvement in initiated eye contact and a reduction in child rejection of parental eye gaze at post assessment. All changes were not maintained at follow-up assessment and returned to baseline levels. The study showed improvements in both parental warmth and CP's however not for CU traits, which the author explained was due to instable levels of CU traits pre-intervention. Mechanisms of change are shown to have an effect on behaviour change however the enrichment of intervention studies with empirically based treatments can lead to optimal program designs for improved results in children with CU traits. The present study has used the EEI intervention with the aim of improving parental warmth and parental eye gaze which could therefore lead to improvements in CP, CU and improve empathy scores for children with CU traits.

Taking age into account

   The unique developmental needs of young children with CU traits can guide specially designed interventions towards more effective future impact. The three interventions used in this study targeted the unique characteristics that have been previously overlooked by empirically-based interventions for children with CU traits. Greater parental warmth, positive parenting enhancement strategies, emotion-recognition training and eye gaze improvements are components which aim towards the alleviation of common risk factors identifying this heterogenous group of children with CU traits. Early intervention for children exhibiting CU trait behaviors is imperative for the inhibition of a problematic trajectory that these high-risk children are set to follow.

Importance of Early Intervention

  Childhood-onset CP's include non-normative levels of CU traits and account for 10 – 46% of children diagnosed with CD's (Rowe et al., 2010). The variability in the emotionality and behavior of children with CU compared to children with CP in general has led to diagnostic alterations, whereby the specifier "with Limited Prosocial Emotions" has been added to the DSM – 5 (*DSM-5*; American Psychiatric Association [APA], 2013) to better identify children with CU traits. Early identification of CU traits include difficulty exhibiting empathy and prosocial caring behaviors (Dunn, Brown & Maguire, 1995; Decety & Sveltova, 2012), deceitfulness and lying, lack of guilt and conscience development (Fowles & Kochanska, 2000) and shallow affect and connection with others (Lockwood et al., 2013). Children as young as 4 years old with CU traits have shown less eye contact, less affection to parents (Dadds et al., 2012) and poor recognition of emotion compared to children with CP's (Kimonis, Fanti, Anastasiou-Charalambous, 2016). The problematic characteristics in the early years can lead the child to antisocial and aggressive behaviors in the future.

  CU traits during these early years constitute a risk factor for the development of future problematic behaviors. Longitudinal studies have demonstrated that CU traits assessed at the age of 3 predicted later school aggression at the age of 10 (Waller et al., 2015), lower empathy and guilt and CU behaviors at age 9.5, demonstrating the continuity of these characteristics across childhood (Waller et al., 2016; Wright, Sharp, Pickles & Hill, 2017). The diagnosis of CU traits during these early childhood years can predict serious antisocial behavior in the

future, thus it is imperative that interventions target this early age whereby behaviors attitudes and characteristics can be shaped.

From a developmental perspective, the early childhood years are a promising window for early intervention. Early prevention and intervention that teaches parents to help their at-risk children achieve missed developmental milestones (i.e., moral development) has the potential to ameliorate the deteriorating trajectory the children otherwise have ahead of them. These preventative measures may prove to be more effective than interventions targeting older age groups (Dishion et al., 2008) as treatments targeting adult populations have not been effective in reducing crime and violence (Harris & Rice, 2006), making early intervention with at-risk youth vital.

The Current Study

A number of studies have suggested that the family environment is one of the most significant factors which can influence the behavioral problems of children high on CU traits (Waller et al., 2014). Enhancing warm and loving relationships between parents and their children is especially important in the behavioral and emotional adjustment of children with CU traits (O' Connor et al., 2013). Since CU traits can be detected as early as the age of 3 (Kimonis et al., 2006) it is vital that interventions are delivered as early as possible to alleviate the environmental risk factors which can place a child in a developmental pathway of CU traits and aggressive CP's. While the field has developed a better understanding of the unique deficits and needs of children characterized by CU traits (Viding, et. al., 2007), interventions designed around these distinct characteristics have not been compared to one another to examine the efficacy of specific treatment targets identified as relevant to this group of children.

The current study serves to fill the gap in the literature by comparing the treatment efficacy of three empirically based treatments with a control group among children with CU traits and low empathy between the ages of 4 – 8 years. The purpose of this a quasi-experimental design (N = 72) was to examine and compare three interventions that target deficits unique to children with CU traits, namely the Child Directed Interaction for Callous-Unemotional traits (CDI-CU), the Coaching and Rewarding Emotional Skills (CARES) module and the Emotion Engagement Intervention (EEI) against a Wait-List control group (WL). A main strength of the study is the multi-method assessment of primary and secondary

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outcomes using questionnaires, observation tasks and structured professional judgment measures.

The proposed intervention study will accomplish the following Specific Aims:

The first aim was to test whether each intervention produced improvement in its specified treatment target, and whether this change in targeted outcome was greater for its respective target intervention condition than for other conditions. The CDI-CU targets parental warmth and positive parenting, CARES targets empathy, and EEI targets parental warmth and parent eye gaze. Primary outcomes involved positive parenting (measured by the DPICS, APQ Involvement and Positive Parenting), parental warmth (measured by DPICS and PBI Care) and cognitive/affective empathy (measured by the GEM and distress task coding), and eye gaze (measured by the I-love-you coding scheme). It was hypothesized that CDI-CU intervention would lead to improvements in parent-child warmth and positive parenting. The CARES module would lead to greater empathy and the EEI would lead to greater improvements parental eye gaze and parental warmth.

Second aim was to test whether improvements in secondary outcomes (CP, CU, empathy) was greater for intervention conditions compared to the control condition and between intervention groups. Secondary processes consisted of parent reported child CP's and CU traits. It was hypothesized that children participating in treatment groups will show improvements in secondary outcomes at post and 3 months follow – up assessments. Specifically, the CDI- CU and EEI interventions were expected to demonstrate significant reductions in CP's and CU traits while the CARES module was hypothesized to show greater improvements in CU traits.

Method

Participants

Participants consisted of a community sample of 72 children (*M* age 7.5 years, *SD* = 1.49) with high CU and low empathy. The percentage of boys 54.2% (n = 39) and girls 45.8% (n = 33) was relatively equal. Most of the families were cohabiting 86.1%, (n = 62), 5.6% were children of divorced parents and 5.6% were living with their mothers and her partner. The majority of parents were in full-time occupation (75%), while the rest were either in part time work (9.7%), unemployed (13.9%) or training (1.4%) (see Table 1).

Families were sent a questionnaire package through the school which assessed the parents' ratings on child behavioural and emotional measures. The questionnaire package

assessed for children's scores on CU traits and low empathy as well as a multitude of other measures. Families were regarded as eligible if they met a number of requirements (a) the child must have been between the age of 4 – 8 and (b) showed CU traits (*above +1 SD*) on the *Preschool Inventory of Callous-Unemotional Traits* (ICU; Essau, Sasagawa, & Frick, 2006) and the *Child Problematic Traits Inventory* (CPTI; Collins et al., 2014), and low empathy (*below -1 SD*) on the *Griffith Empathy Measure* (GEM; Dadds, Hunter, et al., 2008), by at least two respondents (mother/father and/or teacher). Therefore, we followed a multi measure approach for assessing characteristics related to CU traits due to the importance of these traits for the study design. These questionnaires are described in detail in the measures section. There were no significant differences in age, sex or other demographics between groups (see Table 1).

Families were deemed ineligible if the primary caregiver and child did not speak Greek as the assessments and treatment were based on the Greek language. The families were also considered ineligible if the child had been receiving treatment for autism or other behavioral problems as specified by the parents at the same time, or if the child was deaf. Children with CU traits and comorbid diagnosis of ADHD could take part in the study as previous intervention studies have included this diagnosis (Hawes & Dadds ,2005), however no instances of diagnosed children occurred in the study's eligible sample.

Figure 1 presents the participant flow throughout the study. Out of the 178 eligible families 96 (58%) provided consent for participation while 82 families were excluded from participation. The primary reason for exclusion was due to the participants declining to take part in the study because of time constraints (n = 58), while the rest of the group was deemed ineligible due to simultaneous commitment to other treatment programs (n = 3), loss of contact (did not answer the phone) (n = 8), autism diagnosis (n = 2) and not providing a reason (n = 11). The study consisted of 72 participants at the time of post assessment and results were based on this number. Data of participants that dropped out before post assessment were not regarded in the results of this study.

Procedure

Screening procedure. All study procedures were approved by the Ministry of Health, the Ministry of Education and the National Bioethics Committee prior to contacting families through the school system. After securing consent from the boards of each participating school, consent was sent to the parents of children fulfilling the age requirements (first and

second class of elementary schools and nursery schools) for participation in the study. Parents that signed consent received an envelope that included two questionnaire packets (mother/father) that was given to their child at school. The questionnaires were marked with a specific ID number for each family separately to keep in accordance with ethical regulations of anonymity. The parents were instructed to return the completed questionnaire packets in the sealed envelope to the school and a researcher would then collect the packets from each school in every district. The teacher of each child was also provided with a questionnaire packet marked with the specific child's ID to secure anonymity. During the screening process, 1545 questionnaire packets were sent to 137 nurseries and elementary schools across the Nicosia, Limassol and Larnaca districts. Questionnaire packs consisted of several questionnaires, which focused on child behaviour, temperamental characteristics, child CU traits and empathy, parental stress, and parental bonding. A community sample of 1,315 (85%) packets were returned and were screened for eligibility, out of which 178 children with CU traits and low empathy scores (13.5%) were determined eligible (see Figure 1).

   In depth assessment. Researchers contacted eligible families by telephone and briefed them about the aims and procedure of the study and the selection criteria. Eligibility criteria was also assessed during this mini interview with the parent so that any children undergoing other types of treatment at the same time would not be eligible to participate. Other reasons for ineligibility were also evaluated during the phone conversation (language barriers, deafness, autism diagnosis). Once parental consent was obtained parents and their children were invited to the Developmental Psychopathology Lab (DPL) at the University of Cyprus to take part in an in-depth assessment. An email was sent to each family prior to their assessment which included the contact details of the main researcher in case they needed any further assistance, the University map, directions, a reminder of their scheduled assessment and questionnaires for assessment purposes (see Table 5). Upon their arrival at the University families were greeted by a researcher who thanked them for deciding to participate and explained the assessment procedure to them. The researcher answered any questions that came up and explained the consent form in detail. Once informed consent was provided by parents the researcher interviewed the parent about the child behaviour and assessed whether the child fulfilled LPE specifier criteria with the use of the Clinical Assessment of Prosocial Emotions (CAPE; Frick, 2013). The parent was then debriefed about the observation tasks while the child played in the pre-set play room next door. The parent and child then participated in a

video recorded observation assessment which involved 5 tasks, 1) the DPICS child-led play, 2) a distress task whereby the parent hurts his/her finger, 3) the DPICS clean-up task, 4) another distress task whereby the researcher hurts their finger and 5) the "I Love you" task (see Appendix). The parent joined the child and carried observation tasks by following the researchers' directions. Finally, parents and children were thanked for their participation and they were informed that they would be contacted by telephone in order to schedule their first meeting with their program trainer.

     Allocation, Training, Supervision and Treatment Integrity. Allocation of families took place by the main researcher who matched availability of therapist to family availability based on the time and area that the intervention would take place. The main researcher was blind as to any scores, name and school of the child. Each family was assigned a designated "trainer" and together they scheduled their six weekly program sessions. All trainers were educational and clinical psychologists that had completed their clinical training at the university and had undergone specific training for the treatment they were allocated to. They were provided with all the translated materials including manuals, handouts for families, homework sheets, educational material and props such as stories and printed activities for the intervention they were involved with. All CDI- CU trainers (n = 5) received intensive in-vivo training from the PCIT – CU developer and training sessions with the main researcher to practice the DPICS coding manual. Trainers in the CARES program (n = 10) and EEI (n = 5) underwent intensive training for their specified intervention which included educational training sessions about the aims of treatment, detailed group study of the treatment manual and role play between therapists for better familiarity with the session content. The main researcher oversaw video editing for the purposes of EEI sessions whereby trainers sent the session video, and after editing for treatment discussion purposes she sent it back. The trainers in all treatment programs participated in group supervision for each separate treatment with the main researcher to ensure program adherence and fidelity. Specific problems were discussed such as lateness, parental problematic behaviours, while group discussions lead to constructive solutions to treatment issues. The trainers completed integrity checks after each of their sessions, and the lead researcher reviewed random sessions for each therapist independently after the completion of the session. Sixty percent of the sessions were checked by the lead researcher and accuracy with treatment protocol ranged between 85% - 95%.

Coding training. Graduate psychology students were extensively trained in all observation coding procedures. The coders were blind to the scores, treatment condition, and the time of assessment for each video they had received comprising of all 5 tasks. The main researcher coded 50% of the videos for inter-rater reliability (results for each observation task are included in the measures section).

Post- assessment. Within a week of treatment completion, the families were contacted and scheduled an appointment for post-assessment at the DPL. The family was informed that the procedure followed the same protocol as the first assessment (an email with a link to questionnaires was sent prior to assessment date and observation tasks followed) and were informed that they would expect a call for the follow-up assessment after three months.

Follow-up Assessment. The family was greeted at the DPL and assessment followed the same protocol as pre and post assessments. Professional reports were provided to each family which consisted of the pre and post treatment questionnaire results involving problematic behaviour, emotional difficulties, empathy, parental characteristics while guidance was provided depending on the severity of the problem. The researcher explained the report results to the parent, answered questions, and provided suggestions. The child was offered a certificate for program completion and the family members were thanked for their participation in the study. Reimbursement to cover travelling expenses was provided to all the families at post-assessments (€10).

Description of the Targeted Intervention.

Child Directed Interaction for CU traits (CDI-CU) (sessions 1-6). The program began with a Teach session (parents only) during which parents were provided with an overview of the program aims and rational as well as the way the sessions were coached. CDI-CU teaches the importance of learning the focused parenting-skills which aim to build positive parent-child interactions. The skills are consisted of five CDI -CU "Do" skills, namely **P**raise, **R**eflections, **I**mitation, **D**escription and **E**motional Expression (or expressions of warmth), also known as the PRIDE skills. The fifth CDI-CU "Do" skill has been adapted in the CDI-CU and involves training and coaching parents to express greater warmth/affection, increase eye contact and label emotions in interactions with the child to improve the child's recognition and response to distress cues (i.e., emotional expression and identification skill). These skills were practiced for the remaining five sessions through in-vivo coaching while the parent played

with the child in a play room fitting DPICS requirements. While the treatment is usually applied with the use of a wireless headset whereby the trainer coaches the parent through a two-way mirror, due to technical difficulties, this study used in-vivo training whereby the trainer sat in the corner of the room and whispered to the parent. Progress of the 5 'Do' skills was monitored through weekly behavioral coding using the adapted Dyadic Parent-Child Interaction Coding System (DPICS). Coding took place during the first 5 minutes of each coaching session to identify session goals with the target of achieving mastery of CDI-CU skills. The last session involved graduation from the program whereby the parents, child and trainer discussed progress throughout the program (see Table 2).

Coping and Rewarding Emotional Skills (CARES) (sessions 1 - 6). This 6-session novel adjunctive module is designed to (a) teach parents to better identify and describe their child's distress-related emotions, (b) teach children to recognize distress cues and engage in empathic and prosocial behavior using several parent-implemented strategies including modeling, role-playing and social scripts, and refocusing attention to the eye region of the face (Dadds, et. al., 2008), (c) encourage prosocial behavior and motivate compliance with activities using positive reinforcement (praise, token system), and (d) teach developmentally appropriate cognitive-behavioral strategies to the child to cope with frustration-based anger that arises when reward driven behaviors are thwarted and that might lead to reactive aggression. The first session began with an overview of the CARES program, whereby the parent and trainer discussed the importance of emotion labelling and modeling during everyday interactions and the importance of emotional literacy in everyday language. The remaining four sessions were centered around activities (e.g. stories, games, role-play) that are aimed at developing, 1) emotion recognition in others, 2) practice of emotion recognition between parent-child dyads, 3) link between emotion and context and 4) learning to cope with emotions like anger and frustration. The last session progressed into graduation whereby a review of learned skills was discussed and the child was provided with a program completion diploma (see Table 3).

Emotional Engagement Intervention (EEI) (sessions 1 - 6). The treatment aims to increase the two factors that are most important in the development of CU traits, namely, parental warmth and eye contact. An initial pre-intervention video-recording in which the parent and child engaged in Free Play was interpreted by the trainer and was presented at the first session of the program. Therapists looked at the interactions between parents and children

and the parent's ability to let the child lead play, comment on the child's play, let the child take the lead and refrain from giving instructions; while the child's reactions were also taken into account. The pre-intervention session also involved the 'I Love You' task whereby the parent was asked to express affection in a natural manner, make eye contact and engage with the child. The therapist selected positive moments from both activities to show and discuss with parents during the first treatment session whereby the parents were introduced to the rational and content of the program. During the video review parents were informed about a technique called the 'Video Based Guidance' which aids the parents in increasing the frequency of their positive interactions with their children as they reviewed their positive and successful interactions only. The program consisted of two more videotaped sessions (sessions 2 and 4) as well as two review sessions whereby parents viewed the positive interactions and discussed with the therapist strengths and positive aspects of their communication (Sessions 3 and 5). The final session consisted of a review session whereby the family discussed their progress throughout the intervention process. The treatment process was supported by daily homework exercises involving positive parenting and eye gaze (see Table 4).

Wait List Control Group (WL). The participants assigned to the Wait List Control Group were assessed at pre (baseline) and post assessment (6 weeks after baseline assessment) and at follow-up assessment (3 months after post-assessment). After all assessments were completed this group was offered the choice of participating in a treatment program for ethical reasons.

Measures

Primary Outcome Measures.

Parental Warmth

The Parental Bonding Instrument (PBI; Parker et al. 1979) measures parent – child bonding. Specifically, it assesses maternal (n=25 items) and paternal (n=25 items) parenting styles on the factors of care and overprotection. The present study used the maternal care scale (n = 12 items) to assess parenting behaviors by the primary caregiver. The parent rated questionnaire is scored on a 5-point likert scale from 0 never – 5 always and involves items such as 'I speak to my child in a warm and friendly voice'. Previous research has shown good reliability and validity (Parker, 1989) satisfactory construct and convergent validity independent of mood effects (Parker, 1983). The present study shows similar levels of internal consistency (α = .85) that previous research has found (α = .82) (Bisby et al., 2017).

The Dyadic Parent-Child Interaction Coding System IV (DPICS-IV; Eyberg, Nelson, Ginn, Bhuiyan, & Boggs, 2013) is a behavioral coding system assessing the quality of parent-child interactions during a specified coding period. Parental Warmth skills were coded during two specific tasks, a child – directed play scenario and a clean-up scenario. Interrater reliability ranged from 60 - 70%.

The "I love you" Task was used as part of the observation measures to examine the extent of eye contact between parent and child during a directed exercise. Cameras were placed to directly follow the face of the mother and child during the observation task. The parent was directed to look into the child's eyes and to show him/her in a natural way that they love the child. Recordings of this two-minute exercise were coded in terms of eye contact and physical expression of affection on a scale of 1 (not at all) to 5 (very much) (Dadds et al., 2012). Interrater reliability has shown good to perfect results, while intraclass correlations ranged from .65 to 1.

Positive Parenting

The Alabama Parenting Questionnaire (APQ; Frick, 1991) is a 42-item questionnaire which has been validated and is a widely used instruments for assessing parenting practices associated with Conduct Problems in children. Subscales that have been included in this study are parental involvement (10 items), positive parenting (6 items) which have previously been shown to be negatively associated with CP's (Shelton et al, 1996). These subscales have previously shown good internal consistency (α = .76 to .86). This study showed good internal validity for subscales – parental involvement α = .70 and positive parenting α = .80.

The Dyadic Parent-Child Interaction Coding System IV - Parenting 'Do Skills' (DPICS-IV; Eyberg, Nelson, Ginn, Bhuiyan, & Boggs, 2013). Positive parenting was assessed by the frequency of 'Do Skills' that the parents exhibited during Child-led play and clean-up observation tasks. The 'Do' Skills incorporate key skills learned during CDI-CU intervention, namely, praise, reflections and descriptions toward child. Inter-rated reliability ranged from 78% to .86%.

Empathy

The Griffith Empathy Measure (GEM; Dadds, et al., 2008) is a 23-item questionnaire that measures total score of empathy as well as both cognitive and affective indicators of parent reported empathy. Cognitive empathy involves the ability of taking another perspective to understand how they might feel in a certain situation, it is measured by 6 items (e.g. 'It's hard

for my child to understand why someone else gets upset'). Affective empathy refers to the ability to share another's emotional state, measured by 9 items (e.g. Seeing another child sad makes my child feel sad'). Parents rate their agreements of behavior descriptions on a 9-point likert scale ranging from (-4) strongly disagree to (4) strongly agree. GEM scores have shown good correlations with behavioral measures for empathy in children as well as good internal consistency (Dadds et al., 2008). The GEM scale has demonstrated good test-retest reliability of scores (r >.89), good internal consistency, and a stable factor structure across age and sex groups (Dadds, El Masry, Wimalaweera, & Guastella, 2008). In the present study, total GEM (α = .83) showed very good reliability.

The Malts – Fetzer empathy coding for children (Robinson & Zahn – Waxler, 2016) observation task which pertains the reaction of children to the distress of others as coded for *total empathy* and for *concern for victim* items. Empathy simulation involves the examination of children's responses to another's distress (parent and researcher). This observation scale has not been extensively used in previous research. Interrater reliability for this study ranged between 77 – 82% for total empathy codes and 78 – 80% for concern for victim codes.

Parental Eye Gaze

The 'I-Love-You' Coding Scheme (Moul et al., in press) observation task assessed a number of interactions between the parent and the child. The parent is instructed to express affection while looking into the child's eyes in the most natural way possible. Parents were coded on how long the parent made eye contact with the child during this observation task.

Treatment Acceptability

Therapy Attitude Inventory (TAI; Brestan, Jacobs, Rayfield & Eyberg, 1999). Parents level of satisfaction is measured using a 10-item rating scale from 1 (dissatisfaction with treatment or worsening of problems) to 5 (maximum satisfaction with treatment or improvement with problems). Internal consistency for TAI scores is excellent (α = .91) and test-rested reliability (r = .85) across post and follow – up assessments (Brenstan et al., 1999). Treatment acceptability was also assessed using rates of treatment attrition from treatment and was measured by recording the number of familied that dropped out of treatment before completion of the program, either by stating reasons for dropping out or by not responding to therapist attempts to contact for rescheduling purposes. Cronbach's Alpha for this study was α = .90.

Conduct Problems

      The Eyberg Child Behavior Inventory (ECBI, Eyberg & Pincus, 1999) is a 36-item questionnaire, which assesses child behavior problems in children between the ages of 2 – 16 years. The scale assesses two factors, namely, the perceived intensity by a parent rating of 1 ('Never') to 7 ("Always"), and the degree to which the behavior is a problem for the parents/caregiver, specified through parent "Yes" or "No" answers. This scale shows excellent internal consistency coefficient (α =.95 and .93; Eyberg & Pincus, 1999), inter-parent reliability (α = .69 for Intensity Scale; Eisenstadt, McElreath, Eyberg, & McNeil, 1994), and test-retest reliability across 12 weeks and 10 months (α = .80 and .75 for Intensity Scale; Funderburk, Eyberg, Rich, & Behar, 2003). This study demonstrated very good reliability for ECBI Intensity (α = .96) and for the ECBI Problem Scale (α = .90).

Callous Unemotional Traits

The Child Problematic Traits Inventory (CPTI; Colins et al, 2014) is a 28 – item questionnaire which assesses psychopathic traits across different developmental phases, ages 3 – 12. More specifically, it assesses Grandiose – Deceitful (GD) factor (n = 8 items), Callous-Unemotional (CU) factor (n = 10 items) and the Impulsive – Need for Stimulation (INS) factor (n = 10 items). The questionnaire has shown good internal consistency (α = .95), good model fit for its three-factor structure and good criterion validity (Klingzell et al., 2016). This questionnaire was used during screening only.

The Inventory for Callous – Unemotional Traits - Preschool version (ICU; Essau, Sasagawa, & Frick, 2006) assessed the level of callous – unemotional traits in children. The 24-item inventory consists of items such as "Shows no remorse when he/she has done something wrong" and is measured on a 4-point likert scale ('not at all true' to 'definitely true'). The ICU is described by a bifactor model which includes a general factor on which all items loaded including three separate subfactors, namely callous, unconcerned and unemotional. Previous research has measured reliability and validity of the ICU in children and adolescents in Cyprus and the USA through parent-reports (Frick et al., 2003; Kimonis et al., 2014). There has been preliminary support for the construct validity and internal consistency (α = .77 to .89) in samples as young as preschool age (Fanti, Frick, & Georgiou, 2009). This study showed very good reliability α = .87.

Clinical Assessment of Prosocial Emotions (CAPE; Frick, 2013) is a clinical guide used to identify the specifier "with Limited Prosocial Emotions" in the assessment of CU traits which is used by the DSM-V in the criteria for CD. The CAPE utilizes a structured professional judgement method offering descriptions which guide the clinician in making a decision as to how much the person assessed matches the symptom on a scale of $0 - 2$ (0 = Not descriptive or mildly descriptive, 1 = moderately descriptive, 2 = highly descriptive). The clinician uses the semi-structured interview to collect multiple sources of information by the parent of the assessed child. The structured interview is consisted of 'Yes' or 'No' stem questions followed by requests for examples and follow-up questions allowing for gathering of relevant information. For example, "Does _____ seem to feel bad or guilty if he/she does something wrong or if he/she hurts someone?", comprises of the stem question during the assessment of lack of remorse of guilt.

Plan of Analysis

Initially, acceptability of the selected interventions was tested using descriptive analysis whereby mean scores on the Therapy Attitude Inventory (TAI; Brestan, Jacobs, Rayfield & Eyberg, 1999) were measured at follow-up. The frequency of participants that dropped out of treatment before post assessment and follow-up assessment were also examined.

Repeated Measures General Linear Model (SPSS 24.0) analyses was used to examine longitudinal effects of three levels of outcomes (pre, post, follow-up) for primary and secondary outcomes. Primary outcomes are defined as increases in parental warmth, positive parenting, parental eye gaze and an increase in child empathy scores. Secondary outcomes are defined as a significant reduction in child problem behaviour (CP) and CU traits. Further, repeated measures ANOVA was used to examine whether group (CDI-CU vs. EEI vs. CARES vs. WL control group) moderates treatment outcome for each primary and secondary outcome. Firstly, a two-way interaction for each repeated measure outcome by group was analysed. Thereafter a three-way interaction with the addition of gender was analysed to test possible gender differences, and lastly a three-way interaction with repeated measures outcome by group by LPE Specifier was tested to identify differences among children with versus without the LPE specifier. Due to relatively small size of the sample, exploratory analysis in terms of effect sizes were used to draw conclusions of treatment implications (Cohen's d) (see Tables

6,7,8). Effect size ranged from negligible effect (>=-0.15 and <.15), small effect (>=.15 and <.40), medium effect (> = .40 and <.75), large effect (> = .75 and <1.10), very large effect (>=1.10 and <1.45) and huge effect (> 1.15).

Results

Baseline Measures

No significant results were shown for differences between groups at baseline in terms of Conduct Problems in a one-way ANOVA for the groups, F (3, 71) = .26, p = .85, or ECBI problem score F (3, 71) = 1.19, p = .31. Baseline results for CU traits between groups also showed non-significant results, F (3, 71) = .59, p = .61. Results for baseline sex differences between groups were also not significant, F (3, 71) = .36, p = .78 as were results for LPE specifier criteria at baseline, F (3, 70) = 1.07, p = .36. Based on the identified non significant differences at baseline, these variables were not included as covariates.

Results for Primary Outcomes

Parental Warmth.

      Parental Warmth. The Repeated Measures ANOVA with Parental Bonding as the outcome did not show significant results either for assessment time, F (2, 104) = .64, p = .52, or by groups, F (6, 104) = .35, p = .90. The two-way interaction between treatment groups and WL control groups did not show significant results F (6, 108) = .105, p = .90, suggesting that the differences are evident between treatment groups. The addition of gender, F (6, 96) = 1.07, p = .41, and LPE specifier, F (6, 96) = .62, p = .70, by independent three-way interactions did not show any significant results in changes of parental warmth shown by the PBI Care scale between intervention groups.

      Parental Warmth – Observation Measures. The repeated measures ANOVA for DPICS parental warmth scale summed for Child Directed Play and Clean-up tasks, as the dependent variable did not show significant results by assessment time, F (2, 104) = 2.04, p = .13. No significant results were shown between treatment groups and WL control groups, F (6, 108) = .14, p = .86. However, significant results were indicated for assessment time by group, F (6, 104) = 4.38, p <.05. Figure 2 indicates the trends shown by each group based on levels of parental warmth. The CDI- CU group showed large effect increases from pre to post assessment (d = .85) and between pre and follow-up assessment (d = .16). On the other hand, CARES showed opposite trends, and a decrease (d = 1.07) in parental warmth at post assessment which remained stable at follow – up (d = 1.07). Parental warmth scores for the

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EEI showed decreasing trends ($d = .38$) at post assessment while levels went back to baseline at follow-up assessment ($d = .14$). The three-way interactions with gender, $F (6, 96) = .72$, p = .63 and the LPE Specifier, $F (6, 96) = .86$, p = .52, did not show any significant results for DPICS parental warmth.

The 'I love you task' coded for parental physical affection showed no significant results regarding assessment time, $F (2, 90) = 1.33$, p = .26, or by group interaction, $F (6, 90) = 1.58$, p = .16. The two-way interaction between treatment groups and WL control groups did not show significant results $F (6, 94) = .81$, p = .44, indicating that differences were distinguished among treatment groups. The addition of gender to the three-way interaction did not show significant results, $F (6, 82) = 1.20$, p = .31. The three-way interaction for parental physical affection, assessment time by group by LPE Specifier did show significant effects for assessment time by LPE Specifier, $F (6, 82) = 1.19$, p = .31. The 'I love you' observation task coding scale for parental physical affection and changes in scores depending on child fulfilment of LPE Specifier criteria are shown in Figure 3. Effect sizes indicated that the parents of children that did not fulfil LPE Specifier criteria increased their warmth towards their children at post assessment ($d = .47$) and from pre to follow-up ($d = .31$). In contrast, parents of children fulfilling LPE Specifier criteria showed reduced parental warmth at post assessment ($d = .57$) and slight decreases were indicated between pre and follow-up assessment ($d = .13$).

Although group effects were not shown as being significant, a large effect size for the EEI was indicated involving increased parental physical affection coded with the 'I love you' observation task ($d = .94$). Post assessment scores for the EEI remained high at follow-up assessment ($d = .73$) also. The CDI – CU and CARES groups both showed stable levels of parental physical affection while the WL control group showed ($d = .21$) increases at post assessment and medium at follow-up ($d = .45$).

Positive Parenting

Parental Involvement. The Repeated measures ANOVA with APQ Involvement scale as the outcome did not show any significant results by assessment time, $F (2, 136) = 1.24$, p = .29, and by group, $F (6, 136) = 1.27$, p = .27. No significant results were demonstrated between intervention groups and WL control group, $F (6, 140) = .36$, p = .69. Interactions by group by gender also did not show significant results, $F (6, 128) = 1.67$, p = .13, or by specifier, $F (6, 126) = 1.04$, p = .41.

Positive Parenting. The APQ positive parenting scale did not show significant results either by assessment time, $F (2, 136) = .58$, p = .55, or by group, $F (6, 136) = .97$, p = .44. The two-way interaction between treatment groups and WL control groups did not show significant results $F (6, 140) = .66$, p = .51. The results were not significant in the three-way interaction by gender, $F (6, 128) = .90$, p = .49, and by LPE specifier, $F (6, 126) = 1.54$, p = .33.

Positive Parenting 'Do Skills' – Observation Measures. No significant results were shown between intervention groups and control group, $F (6, 140) = 1.12$, p = .32. The repeated measures ANOVA for DPICS behaviourally based parenting 'Do Skills' (descriptions, praise and reflections) signifying positive parenting skills showed significant results for assessment time and group, $F (6, 136) = 4.68$, p <.05. The changes in group scores of positive parenting 'Do Skills" are indicated in Figure 4. Specifically, the CDI – CU group showed a large increasing trend in the use of positive parenting 'Do Skills' ($d = .98$) at post assessment and slightly decreased these skills at follow-up, showing a medium effect for changes in scores at pre to follow-up assessment ($d = .58$). On the other hand, the CARES group showed a decrease in 'Do Skills' at post assessment ($d = .42$) and increased back to baseline levels at follow-up ($d = .02$). The EEI and WL groups both showed stable scores throughout assessments with no changes (post $d = .03$, $d = .17$, follow-up $d = .01$, $d = .14$ respectively). Significant results were not shown in the three-way interaction by gender, $F (6, 128) = .66$, p = .68, or by LPE specifier, $F (6, 126) = .50$, p = .80.

Parental Eye Gaze

Parental eye gaze – Observation Measures. The Repeated Measures ANOVA showed no significant results for the 'I love you' task -parental eye contact score by assessment time, $F (2, 90) = .39$, p = .67, or by group, $F (6, 90) = .81$, p = .55. Variations in scores between treatment groups and WL control groups were not significant, $F (6, 94) = .17$, p = .83. The three-way interaction by gender, $F (6, 82) = 1.11$, p = .36, and LPE Specifier, $F (6, 82) = .51$, p = .79, also did not show significant results for parental eye contact.

Empathy

General Empathy. Total empathy parent rated scores showed no significant results for assessment time, $F (2, 136) = .29$, p = .74, or for assessment time by group, $F (6, 136) = .38$, p = .58. The two-way interaction between treatment groups and WL control groups did not show significant results, $F (6, 96) = .56$, p = .56. The Repeated Measures ANOVA also did not

show any significant results involving gender differences, F (6, 128) = .56, p = .75, or for participants fulfilling LPE Specifier criteria, F (6, 126) = 1.67, p = .13.

      Affective empathy. The Repeated Measures two-way interaction between Affective Empathy subscale of the GEM empathy measure did not show significant results for assessment time, F (2, 136) = 1.58, p = .20, and between groups, F (6, 136) = 1.01, p = .42. No significant results were shown between treatment groups and WL control group, F (6, 96) = 1.41, p = .24. The three-way Repeated Measures ANOVA by assessment time, group and gender also did not show any significant results indicating no differences between gender regarding Affective Empathy, F (6, 128) = .29, p = .93.

      The addition of the LPE Specifier to initial analyses for Affective Empathy showed a significant effect for assessment time by LPE Specifier, F (2, 126) = 3.46, p <.05. Figure 5 demonstrates the varying trends shown by children fulfilling LPE Specifier criteria and those that did not. Specifically, children fulfilling the specifier showed increases in affective empathy at post assessment (d = .69) while a slight decrease by follow-up assessment indicated that scores on affective empathy remained higher than baseline levels (d = .29). The children that did not fulfil LPE Specifier criteria at pre-assessment showed negligible changes in affective empathy at post-assessment (d = .03) and slight decreases in affective empathy scores at follow-up (d = .21). The three-way interaction with the inclusion of the LPE Specifier also indicated significant results regarding group differences by assessment time by LPE Specifier, F (6, 126) = 2.24, p <.05. Figure 6a shows the differences between intervention group scores for children fulfilling the LPE Specifier criteria. Negligible changes were shown in changes of affective empathy scores for children participating in the CDI-CU group at post assessment (d = .04) and a small increase was indicated between pre and follow-up assessments (d = .20). The CARES group showed a large effect size increase in the affective empathy scores of those fulfilling LPE Specifier criteria at post assessment (d = 3.88) and a decreasing trend in affective empathy scores by follow-up assessment. However higher scores were indicated at follow-up assessment compared to pre-assessment (d = 1.29) for children in the CARES group that fulfilled LPE specifier criteria. Similar results were shown in the EEI group whereby children fulfilling LPE specifier criteria showed an increase in affective empathy scores at post-assessment however to a smaller extent compared to the CARES group (d = .35). Affective empathy scores indicated reductions between pre and follow-up assessments (d = .21) for children in the EEI group. Results for WL group showed negligible

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changes in affective empathy scores for children fulfilling LPE Specifier criteria at post-assessment (d = .05) and slight increases by follow-up assessment (d = .42). Figure 6b demonstrates the trends for scores of children not fulfilling LPE specifier criteria. Specifically, the CDI-CU intervention group show increased affective empathy at post assessment (d = .27) and decreased affective empathy between pre and follow-up assessment (d = .20). Children not fulfilling LPE criteria within the CARES group showed negligible changes in affective empathy at pre to post and pre to follow-up (d = .02, d = .04). Decreases in affective empathy scores of children participating in the EEI were shown across assessments (pre – post d = .39, pre – follow-up d = .72). Negligible changes in affective scores for children not fulfilling LPE Specifier criteria were shown at post and follow-up assessments (d = .03, d = .01) in the WL control group. In conclusion, children fulfilling LPE criteria and participating in the CARES group showed the biggest improvements in affective empathy after treatment, while reductions in affective empathy were shown by the EEI intervention group at follow-up assessment. The lack of change for the WL group enhances the value of the changes shown by groups in affective empathy.

　　　　Cognitive Empathy. The Repeated Measures ANOVA for Cognitive Empathy by assessment and intervention group showed no significant results for assessment time, F (2, 136) = .30, p = .74, or by group, F (6, 128) = .78, p = .58. Results of the two-way interaction between treatment groups and WL control groups did not show significant results F (6, 96) = .37, p = .69. The addition of gender in the three-way interaction indicated a significant interaction between assessment time and gender, F (2, 128) = 3.34, p <.05. The varying trends in Cognitive Empathy for boys and girls throughout assessments are demonstrated in Figure 7. Results demonstrated that boys increased Cognitive Empathy scores at post assessment (d = .29) and decreased at follow-up at slightly higher levels than baseline (pre to follow-up d = .10). An opposite trend was shown by girls, as Cognitive Empathy scores reduced at post assessment (d = .24) and increased slightly between pre and follow-up assessment (d = .09). The addition of the LPE Specifier showed no significant results for cognitive empathy scores, F (6, 128) = .77, p = .59.

　　　　Empathy- Observation measures. The findings with total empathy scores on the Distress observation task involving parental distress as the outcome showed no significant results for assessment time, F (2, 92) = .48, p = .61, or assessment time by group, F (6, 92) = .67, p = .66, by gender, F (6, 84) = 1.40, p = .22, or by Specifier, F (6, 84) = 1.36, p = .24. No

significant results were also shown between intervention groups and control group, F (6, 96) = 1.59, p = .20. The same results were indicated for total empathy scores on the Distress observation task for researcher distress by assessment time, F (2, 92) = .27, p = .76, or by group, F (6, 92) = 1.29, p = .26. The inclusion of gender, F (6, 84) = .45, p = .84, and LPE Specifier to both analyses did not result in significant results either.

The repeated Measures ANOVA between the Distress task score for - concern for victim (parental distress) and assessment time showed no significant results, F (2, 92) = .30, p = .73 or by group F (6, 92) = .44, p = .44. The three-way interaction also did not show significant results by gender F (6, 84) = .38, p = .88, or by Specifier F (6, 84) = 1.15, p = .34. Similar results were shown by scores for - concern for victim (researcher distress) during the observation distress task. The two-way Repeated Measures ANOVA showed that concern for researcher distress did not change by assessment time, F (2, 92) = .48, p = .48, or by group, F (6, 92) = .55, p = .76.

Results for Secondary Outcomes

Conduct Problems

Conduct Problems – ECBI Intensity Score. The Repeated Measures ANOVA with ECBI Intensity as the dependent variable suggested a significant effect of assessment time, F (1.81, 123.56) = 3.58, p <.05, demonstrated through a decrease from pre to post assessment (*d* = .29) and from pre to follow-up assessment (*d* = .21) (see Figure 8). The differences between intervention group scores and WL control group were non-significant, F (2, 140) = .04, p = .95. The two-way interaction for assessment time and group was not significant, F (5.45, 123.56) = 1.44, p = .20. The addition of gender to the analysis resulted in a significant interaction between assessment time and gender, F (2, 128) = 3.43, p <.05. As illustrated in Figure 8, boys showed reduction in CP's at both pre to post (*d* = .58) and pre to follow-up assessments (*d* = .25). This reduction was not evident in girls scores of CP's as they showed stable levels throughout assessment times (pre-post *d* = .03, pre to follow-up *d* = .13).

In addition, a significant three-way interaction between assessment time, groups and gender was identified, F (6, 128) = 3.24, p <.05. The interaction between groups by gender interaction showed significant scores, F (3, 64) = 2.93, p <.05. Figure 9a demonstrates group trends in ECBI intensity scores for boys across assessment points. Specifically, boys in the CDI-CU group showed large reductions in CP's from pre- post assessment (*d* = 1.43), and a slight increase from pre to follow-up assessment (*d* = .05). The CP trends for boys in the

CARES group were similar to those of boys in the CDI-CU group as they showed large decreases in CP's at post assessment (d = .83) and moderate from pre to follow up (d = .38). The EEI group indicated negligible change for boys CP's *(d = 0.04)* at post assessment and decreased CP's pre to follow-up (d = .43), indicating that the effects of these programs were evident at a later stage. CP's assessed at post and at follow-up for the WL control group showed slight decreases for boys at post assessment (d = .30) and further reductions in boys CP's at follow-up (pre to follow-up d= .43).

Figure 9b presents the identified groups by assessment points by gender interaction for girls. The girls in the CDI-CU groups showed decreases in CP's (d = .34) pre to post and further decreases between pre to follow-up assessments (d = .84). The changes in CP's for girls in the CARES group indicated opposite trends to those of girls in the CDI-CU group as they demonstrated increases in CP's (d = .39) pre to post and a small increase (d = .17) at pre to follow-up assessment, suggesting that emotion recognition training may not generalize well to girls. The EEI and WL groups showed slight decreases in CP's for girls (d = .07, d = .12 respectively) at post assessment, while girls in the EEI group continued to show decreases at follow-up (d = .33), although girls in the WL group showed increasing trends in CP at follow-up assessment (d = .40).

In conclusion, the CDI-CU and CARES group demonstrated reductions in CP's for boys immediately after treatment which returned to baseline levels at the 3-month follow-up assessment. The CP levels for girls showed different trends as parental scores indicated reductions for the CDI-CU, EEI and WL groups at post assessment and further decreases in CP's at follow-up for the girls participating in the CDI-CU and EEI groups. The CARES group showed slight increases in CP's for girls at post and at follow-up assessments, while the WL control group showed increases in CP scores for girls at follow- up only. The addition of the LPE Specifier did not influence the findings, F (2, 126) =.34, p = .70.

ECBI Problem Score. The ECBI Problem score shows the degree to which the parent believes that the child's behaviour is problematic. The Repeated Measures ANOVA did not demonstrate significant results for ECBI Problem score by assessment time, F (2, 136) = 2.51, p = .84, and by group, F (6, 136) = 1.41, p = 1.48. The two-way interaction examining differences between treatments and WL control group did not show significant results F (2, 140) = 1.26 p = .28. The three-way interaction between assessment time, group and gender was not significant, F (6, 128) = 1.91, p = .08, as was the three-way interaction with addition

of the LPE Specifier, $F(6, 126) = 1.16$, p = .33. These results show that there were no significant changes in the degree to which parents perceived their child's behaviours as being problematic either between assessments or between groups.

Parent rated ECBI Problem score showed distinctions between children that fulfilled LPE Specifier and those that did not, $F(3, 63) = 3.82$, p <.05. Figure 10a demonstrated the group changes in ECBI Problem score across assessment times for children fulfilling LPE specifier criteria. The CDI- CU parent scores for whether problematic behaviour deemed a problem for the parent lowered at post assessment ($d = .51$) by a medium effect size and was also lower between pre and follow-up assessment ($d = .39$). A huge effect size in improved ECBI problem scores was indicated by parents of children fulfilling LPE specifier criteria in the CARES group at post assessment ($d = 2.06$) however this increased from pre to follow-up ($d = .94$). This indicated that treatment had an effect on parental views of whether they rated particular behaviour as problematic or not. The EEI also showed large effect sizes in improvements on parental scores of perceived problematic behaviours ($d = .75$) at post assessment and a decrease between pre to follow-up ($d = .32$). Parents of children fulfilling LPE specifier requirements participating in the WL control group showed a very large effect increase in perceived problematic behaviour at post assessment ($d = 1.24$) and at follow-up ($d = .54$). Results of the WL group indicated increases in rated of how much parents believe that their child's behaviour is problematic while the treatment groups all showed decreases at post assessment. This verified the treatment effects and improvements in parental attitudes.

Figure 10b demonstrates the group changes in parental ratings of perceived problematic behaviour for children not fulfilling LPE specifier criteria. Improvements of small effect size were indicated by parents participating in the CDI-CU group ($d = .23$) at post assessment which improved further at follow-up assessment ($d = .53$). The CARES group showed a different trend whereby improvements at post assessment ($d = .32$) did not last to follow-up and instead slightly increased from pre to follow-up ($d = .17$). Parents participating in the EEI and WL group both showed decreasing levels of perceived problematic behaviours, at post ($d = .36$, $d = .11$ respectively), and at follow-up ($d = 1.06$, $d = .27$). The EEI group showed particularly large effects by follow- up assessment while the WL group's decreases in scores lead to a small effect size by follow-up assessment. The scores of parents with children not fulfilling the LPE specifier show decreases in perceived problematic behaviour for all

groups by post assessment, however parents in the CARES group showed increases at follow-up, indicating that decreases were due to treatment effects.

Callous Unemotional Traits

Callous – Unemotional Traits – ICU Scale. The Repeated Measures ANOVA with Total CU scores as the within subject's measure showed no significant interactions by assessment time, F (2, 136) = .60, p = .55, or by groups, F (6, 136) = .17, p = .98. No significant results were shown by differences in treatment groups and the WL control group, F (2, 140) = .05, p = .94. The three-way interaction for ICU total score by time by gender, F (6, 128) = .57, p = .74 and by LPE specifier, F (6, 126) = .91, p = .48, also did not show significant results.

Similarly, the ICU - Callous sub-scale did not result in any significant results since both the two-way interactions by assessment time, F (2, 136) = .86, p = .86, or by groups, F (6, 136) = .15, p = .98 were not significant. The two-way interaction examining differences between treatments and WL control group did not show significant results, F (2, 140) = .37, p = .68. Callous subscale scores showed no significant results for gender, F (6, 128) = .85, p = .53, or by LPE specifier, F (6, 126) = 1.90, p = .08.

The ICU subscale for Unconcerned scores suggested no significant interaction in a two-way repeated measures ANOVA for assessment time, F (2, 136) = 2.92, p = .05, or by group, F (6, 136) = .206, p = .97. The interaction between intervention groups and control group also did not show significant results, F (2, 140) = .37, p = .96. The three-way interaction with the addition of gender showed a significant effect for assessment time by gender, F (2, 128) = 6.35 p <.05. The results seen in figure 11 indicate that at post assessment, boys showed reduced unconcerned scores (d = .20) which returned to baseline levels at follow-up assessment (d = .04). Unconcerned scores for girls demonstrated the opposite effect with an increase in parental ratings at post assessment (d = .28) and a decrease between pre and follow-up assessment (d = .47). The LPE Specifier also did not show any significant effects when added to the three-way interaction F (6, 126) = .18, p = .98.

The ICU subscale for Unemotional scores showed no significant effect for assessment time, F (2, 136) = .23, p = .79, or by group, F (6, 136) = 1.41, p = .21. The two-way interaction examining differences between treatments and WL control group did not show significant results F (2, 140) = .42, p = .65. The three-way interaction between assessment time, group and gender also did not indicate significant results F (6, 128) = .10, p = .99.

Similarly, the repeated measures ANOVA three-way interaction showed no significant effect for children fulfilling LPE specifier criteria, F (6, 126) = 1.64, p = .14.

Treatment retention

Retention rates were high for all the groups, as out of the 96 initial participants, 72 (78%) completed post assessment and 65 (67%) completed follow-up assessment. The main reason for dropout before post assessment was loss of contact (the parents stopped answering the phone) (n = 7), the parent or child not wanting to continue (n = 14), unforeseen life events (n = 1) and difficulties due to travel time as some families lived in other towns and could not travel to the university for assessments (n = 2). The reason for dropout before follow-up assessment was loss of contact (n = 7). Retention rates were high for CDI-CU as out of 20 families which were allocated to treatment, 5 (25%) dropped out during treatment due to the child and parent not wanting to continue and 75% of families completed the intervention and follow-up assessment. The CARES module also showed high retention rates as out of 21 allocated families, 16 (76%) were assessed after treatment, and 15 (71%) at follow-up assessment. In EEI group, 19 (73%) out of the allocated 26 families completed post assessment and 16 (61%) completed follow-up assessment. High retention was also demonstrated in the WL group, as 22 families (75%) completed post assessment out of 29 families, and 19 (65%) families completed follow-up assessment.

Parents perceived treatment acceptability as being good for all treatment programs, CDI-CU (*M* TAI = 3.68 out of 5, SD = .941, Range 3.1 – 4.2), CARES (*M* = 3.84, SD = .79, Range 3.4 – 4.28) and EEI (*M* = 3.63, SD = 1.08, Range 3.02 – 4.22) at follow- up assessment. The results of TAI scores showed that parents participating in the CARES intervention showed slightly higher rates of treatment satisfaction compared to the other groups, however no significant differences were demonstrated between groups, F (3, 58) = .71, p = .54.

Clinical Significance. Clinical significance was based on Jacobson, Roberts, Berns and McGlinchey (1999) criteria whereby parent reported scores were compared with measures' cut off scores. This criterion requires that a) the magnitude of change between the two-time points (pre to post, and post to follow-up) is statistically reliable, and b) that the child's score at time 2 falls within normal range. The Reliable Change Index (RCI; Jacobson, Follette & Revenstorf, 1984) was used to determine whether the magnitude of change pre to post intervention and between post to follow-up assessment exceeded the margin of measurement error. The magnitude of change was divided between pre and post and post and

follow-up scores by the standard error of the difference in scores. An RCI that exceeded 1.96 was considered sufficient in magnitude (Jacobson et al., 1999).

The clinical significance criterion required the child's score to be the same or above the published cut-off score for the measurement at pre-assessment and below the measurement cut off at post assessment (Bagner & Eyberg, 2007). The 72 children scores were evaluated for each secondary outcome, CP's measured by the ECBI intensity scores (see Table 9) and total CU traits (see Table 10) measured by the preschool ICU, and were reported in terms of reliable change, and clinically significant change. In terms of CP's, the cut off score of 131 or above on the ECBI Intensity scale is considered to indicate a potentially significant problem. A score of above 24 on maternal reports of CU traits on the Preschool – ICU indicated the cut off for clinical significant range (Kimonis, Fanti, & Singh, 2014).

The CDI-CU showed Reliable Change (RC) in improvements for CP's in 53.3% of children from pre to post and for 40% of participants from post to follow-up. The CARES group also showed very good improvements with 37.5% of the sample showing improvements from pre to post and post to follow-up. The EEI indicated few improvements from pre to post (15.7%) and clinically significant change for a participant from pre to post assessment. Improvements were especially evident in this group at post to follow-up assessment (43.7%). See Table 9.

The groups varied in terms of improvements in total CU scores, as the CDI-CU demonstrated 33.3% (n=5) of children had shown reliable change and had significantly improved CU total scores from pre to post and post to follow-up assessment. The CARES group showed 18.7% of children had improved CU scores by the RCI and one had shown clinically significant change from pre to post, while 13.3% showed reliable change in improvements and clinically significant change from post to follow-up. Improvements were also seen in the EEI group whereby 10.5% (n=2) of children improved both in terms of RCI and showed clinically significant change, and 12.5% of participants showed improvements in reliable change and clinically significant change.

In conclusion, the CDI-CU showed the biggest improvements in both CP and CU traits. The CARES group also showed very good improvements in CP's from pre to post and post to follow-up, and the EEI showed especially large improvements in CP's from post to follow-up. The CARES and EEI group showed similar levels of change in CU traits for all time points.

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Discussion

      This quasi-experimental design compared three empirically based short-term interventions with a waitlist control group with a particular focus on targeting distinct risk factors associated with the development and maintenance of CU traits. Interventions aimed at improving both primary, including parental warmth, positive parenting, parental eye gaze and empathy and secondary processes, including CP's and CU traits. Results from this study showed that interventions varied in the level of impact on certain processes.

      The CDI-CU intervention indicated increases in parental warmth and in behaviourally based parenting 'Do Skills' taught during treatment, indicating the effectiveness of this treatments' components. These increases may have led to improvements in CP's exhibited by this group both for boys at post-assessment and for girls across assessments. The distinction based on sex was prominent for CARES participants as boys had excellent improvements in CP's at post assessment however changes were not maintained to follow-up. Girls participating in the CARES group showed no changes across assessment in terms of CP's. Children fulfilling LPE specifier criteria and that participated in the CDI-CU and the CARES interventions showed prominent reductions in CU traits, while changes for those participating the EEI group were less pronounced. Similar trends were identified by the increase in affective empathy for children in the CARES and EEI group that fulfilled LPE specifier criteria. The WL control group did not show large changes in any primary or secondary processes, which suggests that intervention changes were due to treatment effects. All groups showed very good retention rates at post assessment as the CDI-CU had retained 75% at post and at follow-up as no participants dropped out after post assessment. The CARES, EEI and WL showed similar rates of retention at post assessment, 76%, 73% and 75% respectively. This indicated that participants committed to treatment and additionally showed good levels of parent reported treatment satisfaction levels.

Primary Processes.

      The interventions in this study were empirically based and components were designed to target specific risk factors leading to the development and maintenance of CU traits in children. Primary processes are targets of treatment components which are aimed at alleviating such risk factors, these processes included parental warmth, positive parenting, parental eye gaze and empathy. Changes after treatment indicated whether a specific intervention was

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effective at targeting specific processes. Thus, indicating the importance of including these primary processes as intervention components.

Parental Warmth.

The focus on parental behaviour change was confirmed by significant improvements found on levels of parental warmth exhibited and coded with the DPICS observation task. The CDI- CU showed improvements in parental warmth ($d = .85$) at post assessment. This increase was expected given that CDI- CU is based on the enhancement of positive interactions between parents and children during child directed play. The parents were coached to increase their expressions of warmth through verbal (i.e. tone of voice, verbal affection) and physical (i.e. touch, facial expression) expression. The sum of scores for total parental warmth during both the child-directed play task and the clean-up task, were incorporated in the total warmth outcome across assessments. Studies have started emphasizing the need to focus on mechanisms of change in treatment studies to better facilitate knowledge about effective intervention components. Recently Blizzard et al (2017), have examined an infant behaviour program (IBP) as a home-based adaptation of PCIT, which comprises of the CDI phase. The aim of the study was to examine changes in attachment-based caregiving behaviours after IBP treatment, compared to a control group. The study indicated that IBP treatments had a direct effect on warmth post intervention and during 3 and 6-month follow-ups. These conclusions support the results of this study whereby the CDI-CU phase showed increased levels of parental warmth at post assessment.

The CARES group showed decreasing scores in warmth on the DPICS which remained stable at follow up ($d = 1.07$) while the EEI group also showed minor decreases which returned to baseline levels at follow-up. The decreases in warmth shown by the CARES and EEI group were unexpected since both interventions involved parent-child empathic exercises, however parents were not coached to specifically display the behaviours coded for warmth using the DPICS. The CDI-CU which incorporated the specific skills for increasing parental warmth behaviours did show expected increases which can be attributed to familiarity with the setting and with the specific skills. The WL group showed no changes in warmth scores.

Significant results were not demonstrated for changes between groups for scores of physical affection with the use of the 'I love you' task observation measure. However exploratory analyses using Cohens'd effect sizes showed increases in parental affection that was of large effect size for the EEI group ($d = .94$). The CDI-CU and CARES groups did not

show changes and the WL group demonstrated small increasing trends. Recently, Dadd's et al, (in press) tested the EEI as an adjunctive treatment to PMT in comparison to a neutral condition and showed large increases in parental physical affection at post and follow-up, for both conditions. It is interesting to note that in terms of parental warmth and physical affection, the CDI-CU and the EEI module both showed increases on each treatments' distinct coding platform, DPICS and 'I love you task' respectively. No other treatments showed any positive changes on parental warmth of physical affection involving the distinct measures, and each treatment did not show increases in parental warmth or parental physical affection on both observation tasks. This might involve an effect regarding the familiarity of each group with its subsequent task. Since CDI-CU was coached using DPICS observation for Child directed play and Clean-up during each session while the EEI had been practicing the 'I love you task'.

Positive Parenting

As hypothesized the DPICS observation task showed significant results for behavioural based parenting 'Do Skills' (i.e. praises, behavioural descriptions and reflections) since they are used during CDI-CU treatment. As expected the CDI-CU showed great improvements in positive parenting 'Do skills' ($d = .98$) at post assessment. The CARES and EEI groups showed minor changes in 'Do Skills' since parents participating in these treatments were not coached to use the specific skills. Parents participating in the CDI-CU treatment group were coached to practice and master the specific 'Do Skills' as increases in these skills show treatment effectiveness for positive parenting components. Similar results were shown in previous RCT's examining PCIT vs a control group, as 'Do Skills' increased during time 2 assessment for PCIT and not for the control group (Comer & Furr, 2015; Bagner & Eyberg, 2007; Bagner et al., 2010). Previous studies enhance the idea that parenting dimensions act as intervening mechanisms aimed at reducing the risk of CP versus CU traits (Dadds et al., 2012). Developmental processes which focus on increasing positive affective parent-child relationships can increase the child's willingness to embrace parental values and exhibit prosocial behaviours (Kochanska, 2002).

Empathy

The results of this study showed that changes relating to empathy were distinguished among subtypes. Deficits in empathy for children with CU traits have been shown to be pronounced in terms of affective empathy (Waller et al, 2015), or the difficulty in emotionally

identifying with another person's feelings (Blair, 2005). It is important to distinguish between components of empathy since one is more salient that the other in this heterogenous group. In this study effects of treatment have demonstrated distinct changes in affective empathy more than cognitive empathy improvements.

The LPE Specifier distinction showed varying trends in affective empathy across assessments and between groups. Interestingly, children that were rated positively on the LPE Specifier also showed greater increases in affective empathy compared to those that did not fulfil LPE specifier criteria. This trend is also demonstrated between groups, as CARES participants that fulfilled LPE specifier criteria showed large improvements in affective empathy at post assessment. These results are consistent with previous findings whereby the Emotion Recognition Training (ERT) had produced significant improvements in affective empathy in children with elevated CU traits (Dadds et al., 2012). The ERT can be compared to the CARES module since treatment was composed of a computerized emotional recognition training, studying images of emotional expressions and discussing them with parents as well as homework activities involving the MindReading Program. The results for the CARES group in association with affective empathy for children fulfilling LPE specifier criteria were expected since these children showed initial lower baseline scores in affective empathy. The CARES module provided a theoretically and empirically based guideline which was comprised emotional training activities and matched the specific deficits exhibited by this group. Similar results were shown in a case study whereby a boy with high levels of CU participated in the CARES program. The child's affective empathy scores increased at post treatment suggesting that the CARES program can address the specific needs of this unique group in terms of empathic responding (Datyner et al., 2016).

In this study the EEI group was expected to show increases in affective empathy, as this treatment directly targets the importance of improved attention to the emotional signs of caregivers, a risk factor that past research has highlighted (Skuse, 2003; Dadds et al., 2006). Improvements in affective empathy were indicated by the children fulfilling LPE specifier criteria by a small effect size at post assessment and dropped to baseline levels at follow-up, thus demonstrating a treatment effect. The lack of large scale improvements in affective empathy with regard to the EEI could be due to the lack of paternal participants in the study. As research has indicated that reduced eye gaze for children with CU traits is associated with low reciprocated eye gaze with fathers than mother figures (Dadds et al., 2011). Since mothers

participated in treatment groups with their children this could be a reason for the lack of impact that the EEI has had in terms of affective empathy. The WL control group did not show changes in affective empathy at post assessment and small effect size increases at 3-month follow-up, which suggests that the changes seen with the intervention studies are due to treatment effects.

Cognitive empathy refers to the understanding of the other persons emotions (Decety, 2010) and was expected to show improvements especially regarding to the CARES module since microexpression training was a salient feature in treatment. Microexpression training enhances the child's understanding of emotions by guiding the child in paying attention to facial cues that indicate various emotions (Datyner et al., 2016). Unexpectedly scores were stable throughout assessments and between groups indicating that treatments did not have an effect on this dimension of empathy. Similar results were indicated by ERT intervention study using a computerized microexpression training whereby no significant results were indicated regarding cognitive empathy (Dadds et al., 2012). The aforementioned study hypothesized that training in emotion recognition would lead to improvements in children's ability to distinguish between emotions and improvements in empathy. However mediational analyses indicated that the sample was not influenced by improvements in emotion recognition signifying that other components of treatment may have had an effect on improvements in CU traits and CP's (Dadds et al., 2012). These conclusions cannot be suggested with regard to the present study, however they provide some insight into processes that might have led to the lack of change in cognitive empathy scores.

Significant results indicated an interaction between gender whereby boys ($d = .3$) showed slight increases in cognitive empathy at post assessment while girls had slight decreasing changes ($d = .25$) and both groups retained their initial scores at follow-up assessment. Literature pertaining to cognitive empathy suggests that both males and females with CU traits demonstrate deficits in cognitive empathy in childhood (Pardini et al., 2009), however no previous intervention literature has found significant interactions between gender and cognitive empathy (Dadds et al., 2012). This suggests that gender differences involving cognitive empathy need to be further studied in order to incorporate valid mechanisms of change that may be more effective for either gender.

Secondary Processes

Conduct Problems

Contrary to previous literature which demonstrated that children with CU show low response to treatment for CP outcomes (Frick et al, 2014; Hawes & Dadds, 2014), the present study showed decreases in overall group CP's at post assessment. Although group differences in changes of CP did not reach statistical significance, large effect size changes were demonstrated by treatment groups. The CDI-CU intervention resulted in large decreases in CP's ($d = 0.81$) after treatment while mean levels of ECBI Intensity scores increased by follow-up indicating that changes were due to treatment effects. The remaining two treatment groups and WL control group showed minor improvements for parent rated CP scores, further advancing the value of the improvements shown by the CDI-CU group. Similar results were demonstrated by standard CDI phase in previous studies, whereby CU traits were not associated with post-CDI CP's but were associated with CP's after the completion of the discipline component of treatment (Kimonis et al., 2015). These results are in line with the notion that children with CU traits are more responsive to positive 'reward' based treatments rather than punishment related strategies (Dadds & Salmon, 2003). In a more recent study, the adapted version of PCIT-CU has been implemented with young children with CU traits and showed large effect sizes in improvements for CP's (ds = 1.67 - 2.00), although these changes are not distinguished between CDI-CU and PDI-CU and were not compared to a control group (Kimonis et al., in press).

In this study sex also played a particularly interesting role in CP improvements indicating significant interactions between interventions and changes in levels of CP's. Specifically, boys in the CDI- CU group showed reduced CP's at post assessment with a large effect size ($d = 1.43$), however the improvements did not last, and assessment at 3-month follow-up indicated that CP scores reached initial pre-intervention levels. Girls in the CDI- CU group also showed decreases in CP's by a small effect size after treatment ($d = .34$) and even larger effect sizes at follow-up assessment ($d = .84$) indicating that treatment effects were maintained and were improved for girls. These distinctions may indicate that parental warmth and positive parenting may be especially relevant to girls.

In the present study, the change in CP's by the CARES group participants was demonstrated only by boys, with decreases in CP's indicated by large effect sizes immediately after intervention ($d = .83$) and decreased between pre and follow-up ($d = .38$). On the other

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hand, girls participating in the CARES program, showed minor changes. Previous research examining intervention effects by incorporating an Emotion Recognition Training (ERT) component as adjunctive to PMT, showed comparable results. Specifically, the computerized ERT had no treatment effect on CP's of female participants (Dadds et al, 2012). This indicates that emotion recognition or empathy deficits may not be consistent across sex. Very few studies have focused on emotion recognition among girls with CU traits, thus findings may not generalize well to females. Further research needs to take into account these characteristics when designing more effective components of treatment.

The remaining two groups demonstrated negligible results in terms of CP's. Recently the EEI has been tested as an adjunctive module to a PMT (Dadds & Hawes, 2006) and was compared to the same PMT with the added Child Centered Play (CCP) module. Both treatments improved child CP's and showed no overall differences between groups, however the study did not include a control group (PMT without adjunctive module) therefore results cannot conclude that the EEI produced any changes in levels of CP's (Dadds et al., 2012). These results provide further support for the lack of improvement in CP's of children participating in the EEI. Overall, the group differences showed that the CDI- CU had the biggest impact on parent reported intensity of problematic behaviour. Sex differences were prominent for improvements in CP's for the CARES participants, thus further study is needed to distinguish sex specific effects for varying treatment components.

Parent Perceived Problematic Behaviour.

The ECBI Problem scale measures how problematic the child's behaviour is for the parent. Group differences showed an effect on maternal distress about their child's behaviour only when the distinction of whether the child fulfilled LPE specifier criteria was taken into consideration. The CARES group showed huge improvements in maternal attitudes of their child's behaviour at post assessment. Results showed that mothers of children that fulfilled LPE specifier criteria rated their child's behaviour as being less problematic at post assessment. This indicated that treatment had an effect on maternal attitude.

The CARES group also showed improvements in maternal ratings of problematic behaviour for the children that did not fulfil LPE specifier criteria. Similar results were indicated by the CDI-CU and EEI group by a smaller effect, however improvements in maternal attitudes were indicated in both children fulfilling LPE specifier criteria and those that did not. These results demonstrate an interesting effect since ECBI intensity scores for

EEI group did not show changes in child problematic behaviour and yet their mothers perceived their child's behaviour as less problematic for them. A contrast that may be linked to other factors such as the increases in parental warmth which will be discussed further below. All treatment groups showed improvements in mothers' distress relating to their child's problematic behaviours, while the WL group showed opposite effects whereby mothers showed large effect increases in maternal distress at post assessment. This indicates that maternal distress about problematic behaviour decreased for the children that participated in treatment and further strengthens the value of treatment effects (Bagner & Eyberg, 2007).

Callous-Unemotional Traits.

The study showed mild decreasing effects in CU scores for children participating in the study (pre to post $d = .20$; pre to follow-up $d = .29$). These results are inconsistent with previous studies that indicated moderate to large reductions in CU traits when implementing similar interventions (Hawes & Dadds, 2007; McDonald et al., 2011). The improvements in CP's demonstrated by the CDI-CU group are not consistent with the lack of improvement shown for CU traits. Previous studies have also shown that the distinction between changes in CU traits demonstrating that decreases in CP's are independent of changes in CU traits (McDonald et al., 2011; Dadds et al., in press). Specifically, in Dadd's most recent RCT study (in press), the author states that reductions of CU traits in previous studies were attributed to the characteristics of the sample.

Interestingly these general effects changed when the LPE Specifier was added to the repeated measures design by group and CU traits. Varying levels of CU traits across assessments were demonstrated in terms of whether a child fulfilled LPE Specifier criteria before intervention. Children rated as demonstrating LPE Specifier diagnostic criteria showed decreases in CU traits, (medium effect size $d = .61$) while children not fulfilling diagnostic criteria showed minor changes in effect sizes ($d = .01$). In terms of initial CU ratings, a high score for CU traits was indicated for participants that fulfilled the LPE Specifier ($M = 31.1$ SE $= 6.51$) while a low CU score was indicated for those described as not fulfilling LPE Specifier criteria ($M = 23.45$ $SE = 9.95$). In the present study, CDI-CU participants that were rated as fulfilling the LPE specifier criteria had the greatest reductions in CU traits ($d = 1.55$), however these changes did not last at follow-up. The distinctions between participants that fulfilled LPE specifier criteria and those that did not was demonstrated across treatment groups regarding the improvements of CU traits. The same trend was demonstrated by the CARES

group, whereby CU scores dropped at post assessment (d = 1.23) for those fulfilling LPE Specifier criteria. The EEI intervention also showed reductions in CU traits for children meeting LPE Specifier criteria with medium effect sizes (d = .56) at post assessment. Given the importance of the LPE Specifier, we can conclude that since these interventions were theoretically based and designed to target the developmental needs of children with high CU traits, the specified treatments did have ameliorating effects on this high-risk group particularly. The results add to the literature on interventions whereby treatments had an effect on reductions of CU traits, however in this study reductions were discriminant upon high levels of CU traits (Kimonis et al., in press; McDonald et al., 2011; Hawes et al., 2014).

   The study shows that the ICU subscale for Callousness indicated changes across groups and with the LPE specifier distinction although significance was not indicated. Children across all groups that fulfilled LPE specifier criteria showed reductions in ICU-Callous scores (medium effect size d = .71) at post assessment and at follow-up (d = .41), while children that did not fulfil LPE Specifier criteria showed negligible effect (d = .11). This group showed improved levels of callous behaviour at post assessment and parental scores reached baseline levels at follow-up assessment, indicating that treatment effects may have created this improvement. It is important to notice the distinction between ICU subscale that are being affected. In terms of the callous subscale research has indicated that this subscale has been positively associated with most problematic behaviour (Fanti et al., 2009). Thus, an improvement in the Callous subscale for children meeting LPE specifier is encouraging. In terms of group differences, the CDI-CU scale showed important decreases at post assessment (d = 2.28) while the remaining three groups showed no differences at post intervention. The changes in parent rated total CU scores and Callous subscales for children with high CU traits participating in the CDI-CU intervention may be due to improvements in parenting which have been shown to have had an impact on CU traits (Waller et al., 2018; McDonald et al., 2011). This conclusion may also be due to the reductions in CP's since the callous have been associated with increased aggressiveness and problematic behaviour (Fanti et al., 2009).

   Results regarding the unconcerned subscale scores indicated slight changes in gender effects across assessments. Specifically, boys reduced their unconcerned scores at post assessment while girls increased unconcerned scores at post assessment and decreased at follow-up. The changes in terms of effect sizes were small (d = .20 decreasing trend for boys,

$d = .28$ increasing trend for girls at post assessment) between assessments. Similar results have not been demonstrated in the intervention literature.

Clinical Significance.

Improvements in terms of Reliable change were shown by CDI-CU participants for both CP's from pre to post and post to follow-up assessment. In terms of CU traits, the CDI-CU showed improvements in reliable change and clinically significant change (33.3%) at pre to post and post to follow-up assessment. The CARES group showed 37.5% improvements in participants CP's from pre to post and post to follow-up assessment based on reliable change. In terms of CU improvements, the CARES group showed improvements in CU traits based on reliable change (18.7%) and showed clinical significant change 6.25% from pre to post assessment, while improvements in terms of reliable change and clinical significant change increased to 13.3% from pre to follow-up. The EEI showed few improvements in terms of reliable change between pre and post assessment for CP's 15.7% and between post and follow-up assessment 43.7%. Few improvements were also indicated in terms of CU traits with 10.5% reaching clinical significant change from pre to post assessment, and 12.5% reaching clinical significant change from post to follow-up. Overall, the CDI-CU intervention showed the largest improvements based on the RCI for CP's and CU traits compared to the CARES and EEI.

Strengths and Limitations

The study has several limitations that need to be considered. Firstly, a key limitation of the study is the allocation of participants to treatment groups. Due to scheduling issues participants were allocated based on availability of trainers, however the main researcher was blind to all measurement scores before allocation. Secondly, even though the study aimed at targeting a larger number of families in each intervention group, many families decided not to participate during the recruitment stage due to lack of time. The small number of participants for each intervention group creates a sense of caution in inferring that the results of this study fully address the efficacy of the intervention. Employing alternative analyses, such as multilevel modelling, could provide additional information to the results as dropouts would better be accounted for. In addition, subtyping the sample based on CP's and psychopathic dimensions could inform future research. Treatment sessions took place at the university as well as private offices for all three interventions as travel time deemed a deterrent and led to families dropping out. Therefore, there was no uniform condition for intervention

implementation for which the study can account for. Another limitation is that due to participants' time constraints, only mothers could participate in the interventions which led to a lack of paternal involvement in treatment. This is consistent with previous literature which states that mothers' involvement in treatment is more common that fathers (Phares et al., 2010). It is also unfortunate due to recent literature stating the importance of paternal involvement in outcomes of treatment and maintenance of treatment gains (Sawrikar & Dadds, 2018). Another limitation in terms of treatment fidelity was that due to lack of resources the main researcher was also responsible for checking integrity scores of trainers after session completion.

The main strength of this study is the multi-method approach towards assessing primary and secondary factors. The use of questionnaires, observation measures and a structured interview strengthened the value of the information that was gathered. Previous research has stated that the use of observation measures is crucial in the assessment of characteristics in this group of children as such information will provide guidance into innovative techniques for the design and implementation of treatments (Hawes, Pasalich & Dadds, 2013). The study screened a large community sample of children across the country to identify those fulfilling study profile characteristics, CU traits and low empathy. The study was able to examine interventions with children that are very young, as research has shown this early stage to be particularly important in alleviating risk factors and changing the way future problematic behaviour may develop (Kochanska et al., 2013). Another important strength of this study is that all three interventions examined were based on established theoretical underpinnings regarding risk factors for child CU traits. The interventions were designed to target specific processes that research has shown underlie the manifestation of CU traits in children. In addition, the inclusion of a control group strengthened the results shown by the intervention groups as the WL group acted as a point of reference for the changes indicated by the intervention groups. Lastly, the examination of three treatments demonstrates the measurable comparable effect on treatment outcomes. Intervention studies informing of these effects add to the literature and guide future studies aimed at designing and implementing interventions that are optimal for children with CU traits.

Conclusions

The study shows encouraging results which contradict previous research about the 'untreatability' of CP's in children with CU traits (Hawes & Dadds., 2014). Significant

improvements in parental warmth and positive parenting skills (Do Skills) were demonstrated by parents participating in the CDI-CU intervention. This increase in parental warmth and positive parenting skills may have led to the improvements in CP's which were exhibited by this group as several studies have shown that increased parental warmth is negatively associated with CP's in children with CU traits (Kroneman et al, 2011; Pasalich et al., 2011). In terms of sex differences, warm parenting may be particularly relevant for girls as scores were improved across assessments, while improvements for boys CP's did not last to follow-up assessment. This may indicate that more intense treatment is needed with regard to increases in parental warmth and positive parenting especially for boys. It is possible that the improvement in maternal distress may have been due to the decrease shown in their child's CP's and supported by the increase in positive parent child interactions and warmth shown by this group at post assessment. The results indicate the effectiveness of treatment components with regard to increases in parental warmth and positive parenting skills, showing that this treatment resonated to a great extent.

The CARES intervention resulted in distinct decreases in boys CP's at post assessment, however girls did not show changes in CP's across assessments. This result may indicate that emotion recognition deficits may not be consistent across sex since few studies have examined emotion recognition among girls (Schwenck et al., 2014). Mothers rated their perceived child's behaviour as less problematic at post assessment for children that met LPE specifier criteria. This result comes in accordance to the significant reductions in CU traits and improvements in affective empathy that were demonstrated by the children fulfilling LPE specifier criteria and that participated in the CARES intervention. Affective empathy has been indicated as being a distinct characteristic for children with CU traits since they lack in the ability to emotionally identify the feelings of others (Blair, 2005). The participants in the EEI group also showed this distinction whereby children fulfilling LPE specifier criteria demonstrated improvements in affective empathy and CU traits though not to the extent shown by the CARES group. The EEI had a big impact of parental physical affection and this may have led to treatment effects in increasing affective empathy and decreasing CU traits in children meeting LPE specifier criteria. The inclusion of the WL control group enhanced the value for the indicated changes brought by the treatment groups as participants in this group showed minor changes throughout assessments.

The findings of this study can be regarded as preliminary given the small sample in each group, however each intervention group has indicated distinct patterns of change in terms of primary and secondary processes. A combination of the CDI-CU and CARES treatments could lead to optimal results with improvements in CP's and empathy. Treatment effects were not sustained at post assessment for most improved outcomes and this may be due to the short-term treatments involved for this hard to treat group of children with high CU and low empathy. Thus, treatment with longer lasting sessions including booster sessions could lead to maintained treatment effects. In this study sex distinctions have been indicated for various components of treatment effectiveness. Research on the distinct characteristics of this heterogenous group needs to inform future intervention studies into further testing and tailoring treatment components for optimal results. These results add to the growing body of intervention studies whereby new empirically based treatments can lead to behavioural and emotional improvements in children with CU traits. By continuing this line of research, and building on this knowledge, studies can aim to provide insight into the effective treatments for this unique group of children.

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Tables

Table 1.1.

Demographic data split by condition.

	CDI-CU (n = 15)		CARES (n = 16)		EEI (n=19)		WAITLIST (n=22)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (years)	7.13	1.506	7.19	1.471	7.11	1.487	8.32	1.249
Maternal Education*	6.40	.737	6.13	.806	5.89	1.197	5.91	.921
	n	%	n	%	n	%	n	%
Gender								
Male	8	53.3%	7	43.8%	9	47.4%	15	68.2%
Female	7	46.7%	9	56.3%	10	52.6%	7	31.8%
LPE Specifier								
YES	3	20%	2	13.3%	7	36.8%	4	18.2%
NO	12	80%	13	86.7%	12	63.2%	18	81.8%
Family Status								
Parents live together	13	86.7%	14	87.5%	17	89.5%	18	81.8%
Parents divorced	1	6.7%	0	0.0%	2	10.5%	1	4.5%
Parents separated	0	0.0%	0	0.0%	0	0.0%	0	0.0%
One parent is deceased	0	0.0%	1	6.3%	0	0.0%	0	0.0%
Child lives with one parent	0	0.0%	1	6.3%	0	0.0%	0	0.0%
Child lives with mother and partner	1	6.7%	0	0.0%	0	0.0%	3	13.6%
Child lives with father and partner	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Does not live with biological parents	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Occupation Status								
Full Time work	10	66%	15	93%	14	73.6%	15	68%
Part Time work	2	13.3%	0	0	1	7.3%	4	18.1%
In Training	0	0	0	0	0	0	1	4.5%%
Unemployed	3	20%	1	6.25%	4	21%	2	9%

Table 2. 1.

Outline of Child Directed Interaction for Callous-Unemotional Traits (CDI- CU).

Session	Goal	Content	Activity
1	Provide an overview of CDI- CU intervention program	Teach parent the CDI PRIDE skills and provide rationale for each skill	Psycho-education of parent in the absence of the child
2	CDI Coaching Session 1	Code and coach parent and child interaction in CDI activities	Orient child to CDI practices Review summary sheet data
3	CDI Coaching Session 2	Code and coach parent and child interaction in CDI-CU activities Explain Social Story Activity.	Review Homework Showing you care – social story
4	CDI Coaching Session 3	Code and coach parent and child interaction in CDI activities Educate Parents of importance of relieving stress and suggested activities.	Review homework Proven stress relief strategies for parents.
5	CDI Coaching Session 4	Code and coach parent and child interaction in CDI activities Discuss stress relief activities. Increase parent motivation if not meeting mastery criteria.	Review homework Review summary sheet data and ECBI graph
6	Graduation session	Review new skills learned, progress/success Planning for future maintenance of treatment gains	Review all the activities used

Note. CDI = Child Directed Interaction.

Table 3. 1.

Outline of Coaching and Rewarding Emotional Skills (CARES) module.

Session	Goal	Content	Activity
1	Provide an overview of CARES intervention program	How to use emotion recognition and labeling in everyday to increase emotion recognition skills	Psycho-education of parent in the absence of the child
2	Teach how to identify and understand others' emotions	How to look for signs that indicate different emotions (i.e., eye and mouth region)	Images with different facial expressions to guess the emotion shown
			Discuss the salient facial cues (e.g., smile)
			Identify relevant micro-expressions
3	Teach how to recognize each other emotions	How to look for signs that indicate different emotions like muscle change	Facial expression configurations (e.g., happy face) by fill in blank faces
			Flash cards game with parents and children taking turns and making emotional expressions for the other to guess
4	Teach how to link each emotion with context	Teach the child how others feel in different occasions	Discuss about different emotions in different situations
			Social stories about prosocial behavior and making amends following transgressions
5	Teach how to cope with frustration	Teach child coping skills for negative emotions (e.g., anger, distress)	Social story – "Stop, Breathe, Think" (SBT)
			Scenarios with SBT and role-playing in order to practice these skills
6	Graduation session	Review new skills learned, progress/success	Review all the activities used
		Planning for future maintenance of treatment gains	

Note. CARES = Coaching and Rewarding Emotional Skills.

Table 4. 1.

Outline of Emotional Engagement Intervention.

Session	Goal	Content	Activity
1	Provide an overview of EE intervention program	Presentation of rationale and intervention content	Psycho-education of parents in the absence of children Video Based Guidance (VBG): Watching positive moments of Pre-assessment free play session
2	Practice session 1	Combine parental warmth and eye contact	Emotional Engagement exercises
3	Review video session 1	Video Based Guidance (VBG)	Parent and therapist discussion on positive moments of practice sessions and identify of the progress made
4	Practice session 2	Combine parental warmth and eye contact	Emotional Engagement exercises
5	Review video session 2	Video Based Guidance (VBG)	Parent and therapist discussion on positive moments of practice sessions and identify of the progress made
6	Graduation	Review new skills learned, progress/success Planning for future maintenance of treatment gains	Review all the activities used

Note. EE = Emotional Engagement Intervention.

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Table 5. 1.

Pre/Post Assessment Measures.

Number	Measure	Construct	Items	Reporter
1	Demographics	Age, gender, income etc.		Parent
2	Eyberg Child Behavior Inventory (ECBI)	Child behavioral problems	36	Parent
3	Inventory of Callous-Unemotional Traits (ICU)	CU Traits	24	Parent
4	Clinical Assessment of Prosocial Emotions (CAPE)	CU traits "low prosocial emotions" specifier	Interview	Parent
5	Griffith Empathy Measure (GEM)	Empathy- Affective & Cognitive	23	Parent
6	Distress Task	Response to Distress of Others (Parent and Researcher)	Clinical Observation	Parent & Researcher with child
7	Parental Bonding Instrument (PBI)	Parental Care	12	Parent
8	"I Love You" Task	Parent-Child Affection	Clinical Observation	Parent with child
9	Dyadic Parent-Child Interaction Coding System (DPICS)	Parent-Child Warmth/Affection	Clinical Observation	Parent with child
10	Alabama Parenting Questionnaire (APQ)	Parenting: Involvement, Positive Parenting	33	Parent
11	Dyadic Parent-Child Interaction Coding System (DPICS)	'Do Skills' (praise, descriptions, reflections)	Clinical Observation	Parent with child

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Table 6. 1.

CDI-CU Effect Sizes by Construct.

	Pre-treatment vs Post-treatment	Pre-treatment vs 3-month follow-up
Positive Parenting		
DPICS 'Do Skills'	.98	.58
APQ Involvement	.08	.21
APQ Positive Parenting	.04	.21
Parental Warmth		
DPICS Warmth	.85	.16
'I love you' Task	0	.09
PBI Care	.04	.08
Eye Gaze		
I love you' task Parental Eye gaze	0	.07
Empathy		
GEM Total Empathy	.15	.12
GEM Affective	.21	.12
GEM Cognitive	.17	.1
Conduct Problems		
ECBI Intensity	.81	.33
ECBI Problem	.26	.49
Callous-Unemotional		
ICU Total	.03	.04
ICU Unconcerned	.13	.31
ICU Callous	.2	.57
ICU Unemotional	.2	.57

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Table 7. 1.

CARES Effect Sizes by Construct.

	Pre-treatment vs Post-treatment	Pre-treatment vs 3-month follow-up
Positive Parenting		
DPICS 'Do Skills'	.42	.02
APQ Involvement	.03	0
APQ Positive Parenting	.04	.33
Parental Warmth		
DPICS Warmth	1.07	1.07
'I love you' Task	.09	.35
PBI Care	.07	.30
Eye Gaze		
'I love you' task	.34	.29
Parental Eye gaze		
Empathy		
GEM Total Empathy	.05	.04
GEM Affective	.38	.09
GEM Cognitive	.25	.22
Conduct Problems		
ECBI Intensity Raw	.16	.04
ECBI Problem Raw	.40	.14
Callous-Unemotional		
ICU Total	.11	.17
ICU Unconcerned	.20	.07
ICU Callous	.50	.53
ICU Unemotional	.50	.50

Table 8. 1.

EEI Effect Sizes by Construct.

	Pre-treatment vs Post-treatment	Pre-treatment vs 3-month follow-up
Positive Parenting		
DPICS 'Do Skills'	.03	.17
APQ Involvement	.41	.72
APQ Positive Parenting	.35	.50
Parental Warmth		
DPICS Warmth	.38	.14
'I love you' Task	.94	.73
PBI Care	.25	.29
Eye Gaze		
'I love you' task Parental Eye gaze	.01	.15
Empathy		
GEM Total Empathy	.06	.25
GEM Affective	.12	.51
GEM Cognitive	.06	.17
Conduct Problems		
ECBI Intensity	.01	.32
ECBI Problem	.48	.76
Callous-Unemotional		
ICU Total	.07	.41
ICU Unconcerned	.10	.34
ICU Callous	.17	.08
ICU Unemotional	.17	.08

Table 9. 1.

Number of Families Showing Reliable Change and Clinical Significant Change in terms of Conduct Problems

Group	n	Reliable Change[α] No	%	Clinically Significant Change[b] No	%	Reliable Change[α] No	%	Clinically Significant Change[b] No	%
		Pre to Post Assessment				Post to Follow-up Assessment			
CDI - CU	15					15			
Improvement		8	53.3%	0	-	6	40%	0	-
No change		3	20%	-	-	2	13.3	-	-
Deteriorate		4	26%	-	-	7	46.6%	-	-
CARES	16					15			
Improvement		6	37.5%	0	-	4	37.5%	0	-
No change		7	43.7%	-	-	9	60%	-	-
Deteriorate		3	18.7%	-	-	3	20%	-	-
EEI	19					16			
Improvement		3	15.7%	1	5.2%	7	43.7%	0	-
No change		13	68.4%	-	-	9	56.25%	-	-
Deteriorate		3	15.7%	-	-	0	-	-	-

[α] The reliable change index (RCI) determined by whether the magnitude of change exceeds the margin of measurement error. It is calculated by dividing the magnitude of change between pre and post assessment scores of each participant by the standard error of the difference in scores of the sample. RCI scores above 1.96 are considered adequate in magnitude.
[b] Clinically Significant Change of a child score is determined if the child's score at pre-assessment is in the clinically significant range, and the score changes to normal range at post-assessment.

Table 10. 1.

Number of Families Showing Reliable Change and Clinical Significant Change in terms of Callous Unemotional Traits

Group		*n*	Pre to Post Assessment				Post to Follow-up Assessment			
			Reliable Change[α]		Clinically Significant Change		Reliable Change[α]		Clinically Significant Change	
			No.	%	No.	%	No.	%	No	%
CDI - CU		15					15			
	Improvement		5	33.3%	5	33.3%	5	33.3%	5	33.3%
	No change		4	26.6%	-		6	40%	-	
	Deteriorate		6	40%	-		4	26.6%	-	
CARES		16					15			
	Improvement		3	18.7%	1	6.25%	2	13.3%	2	13.3%
	No change		11	68.7%	-		11	73.3%	-	
	Deteriorate		2	12.5%	-		2	13.3%	-	
EEI		19					16			
	Improvement		2	10.5%	2	10.5%	2	12.5%	2	12.5%
	No change		15	78.9%	-		12	75%	-	
	Deteriorate		2	10.5%	-		2	12.5%	-	

[α] The reliable change index (RCI) determined by whether the magnitude of change exceeds the margin of measurement error. It is calculated by dividing the magnitude of change between pre and post assessment scores of each participant by the standard error of the difference in scores of the sample. RCI scores above 1.96 are considered adequate in magnitude.

[b] Clinically Significant Change of a child score is determined if the child's score at pre-assessment is in the clinically significant range, and the score changes to normal range at post-assessment.

Figures

Figure 1.1. Consort diagram showing flow of participants through the study.

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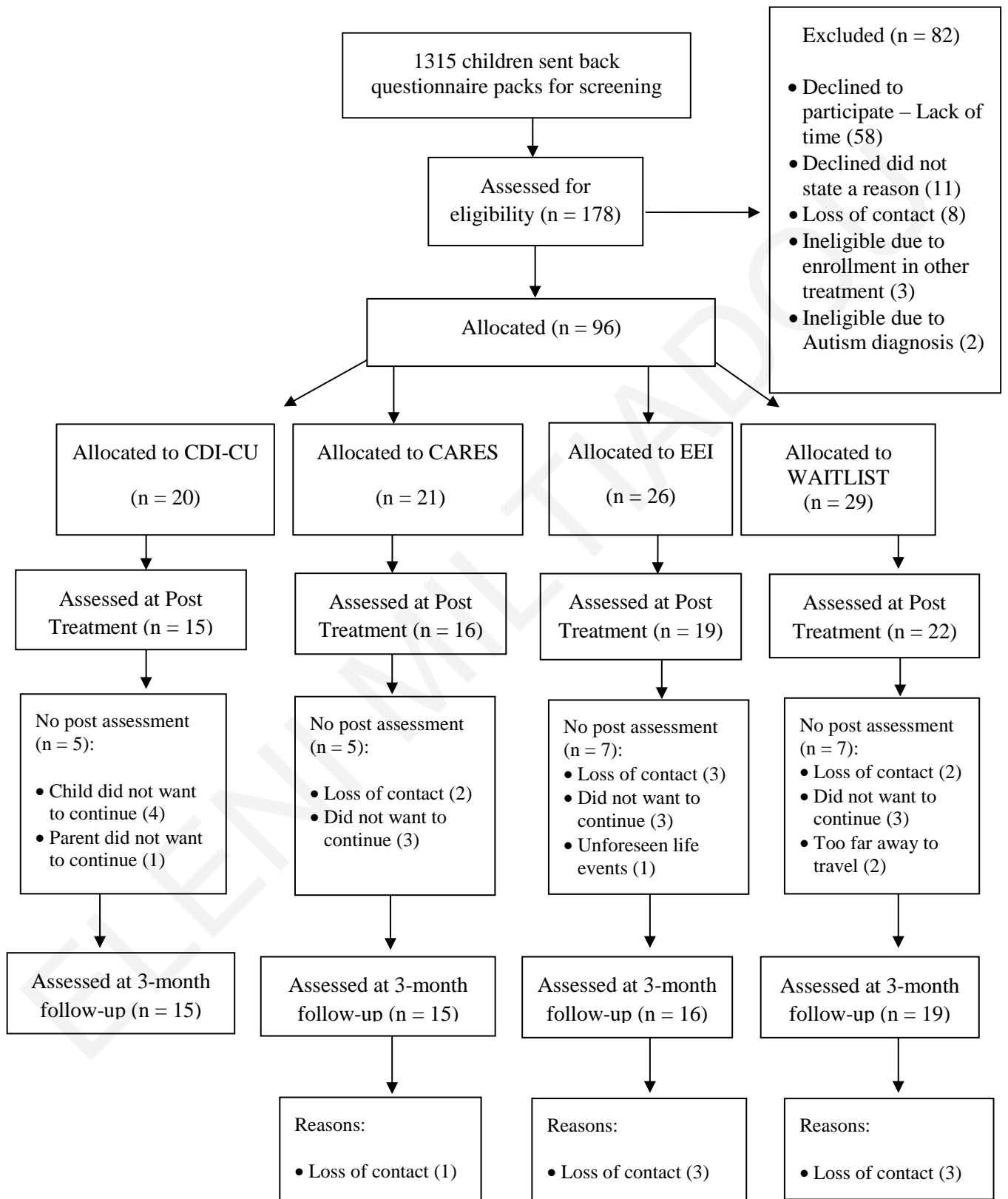
Figure 2. 1.Assessment time by group predicting DPICS Parental Warmth.
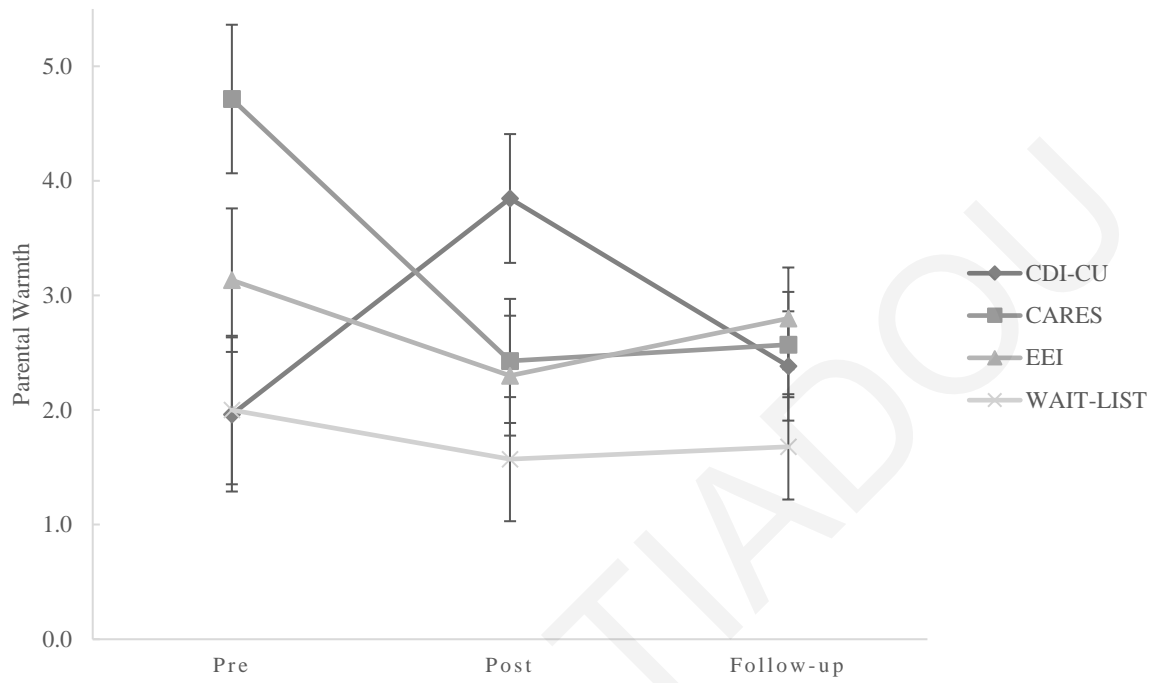
Figure 3. 1. Assessment time by group for parental physical affection by LPE Specifier.
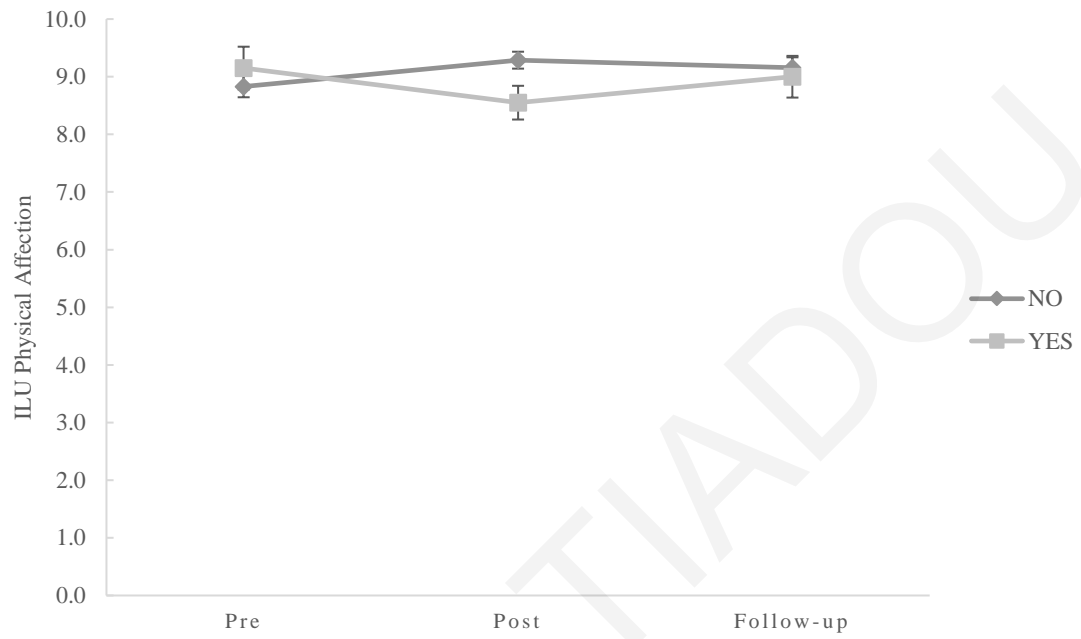
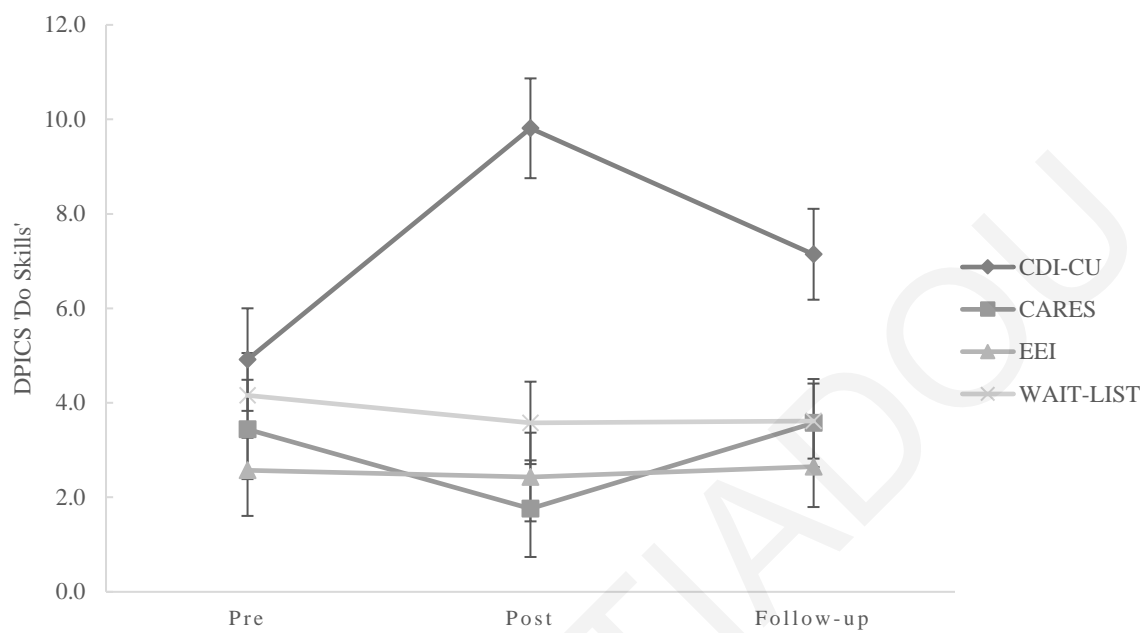Figure 4. 1.Positive behavioural based parenting 'DO Skills' by group.

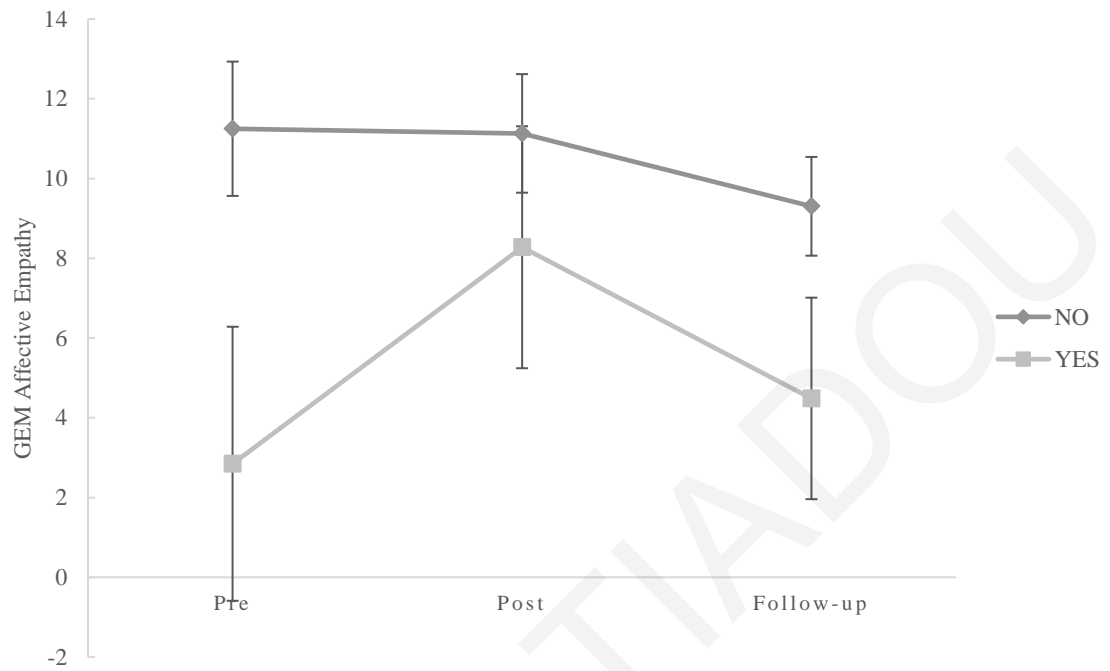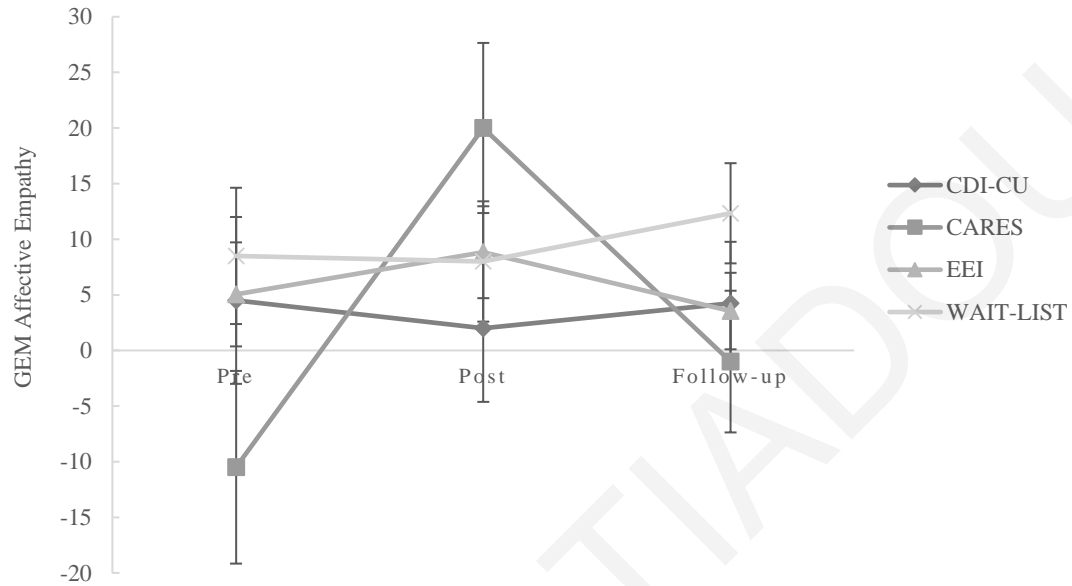Figure 5. 1. Assessment Time by LPE Specifier predicting Affective Empathy.
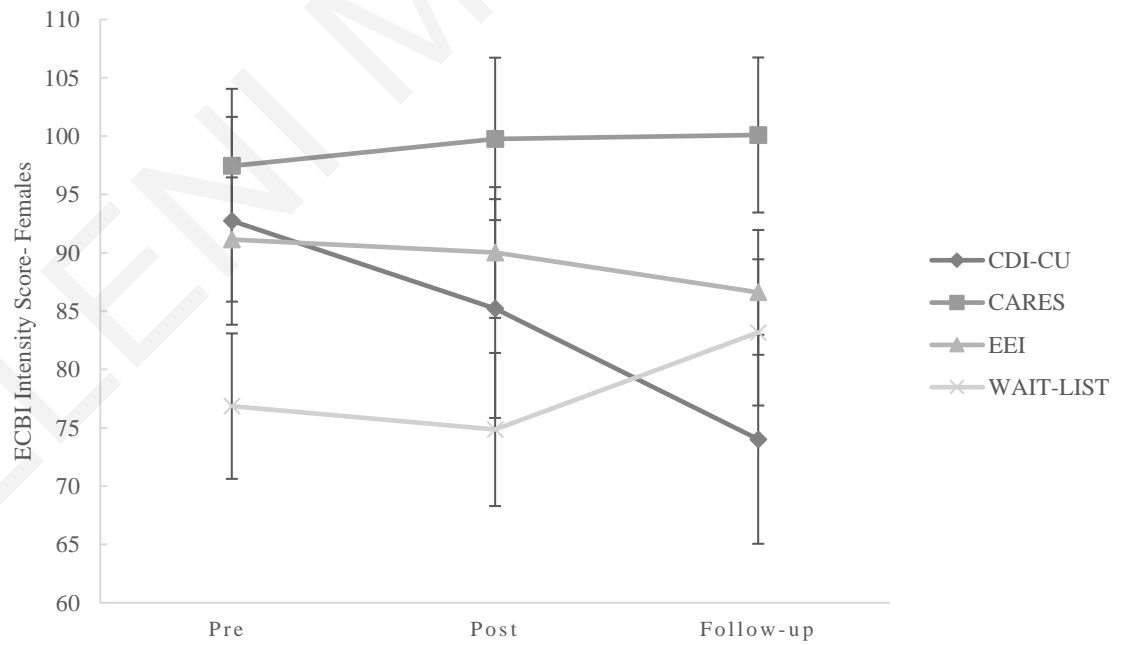
Figure 6. 1. Assessment Time by group by LPE Specifier predicting Affective Empathy.

a) Children fulfilling LPE Specifier criteria.

b) Children not fulfilling LPE Specifier criteria.
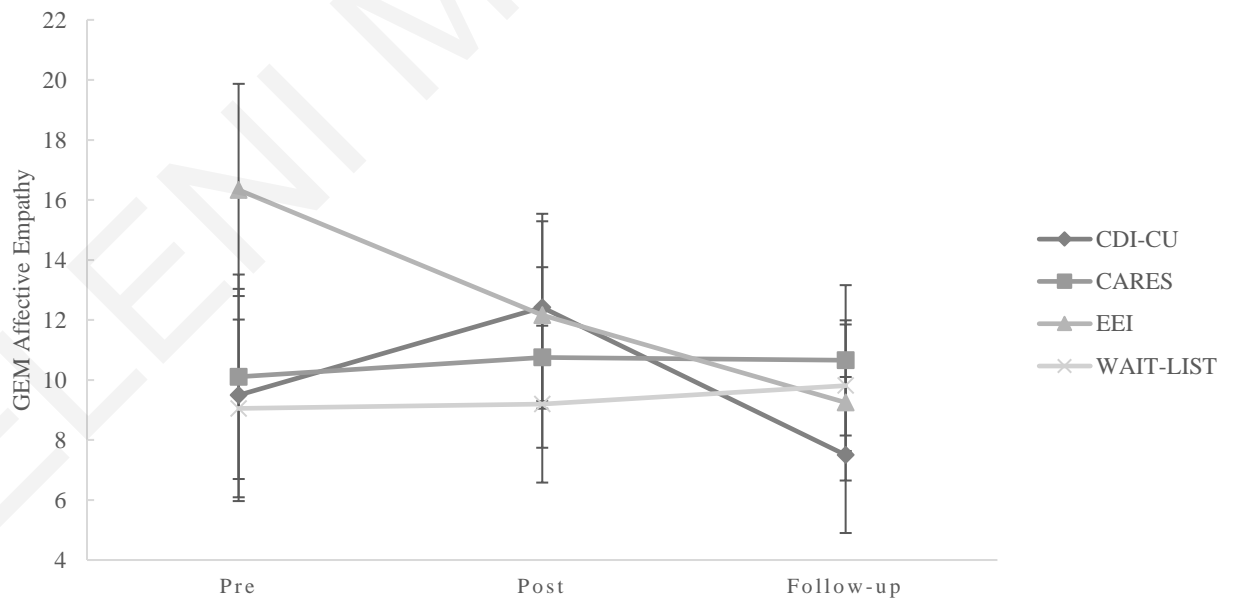
Figure 7. 1. Assessment Time by gender predicting Cognitive Empathy.
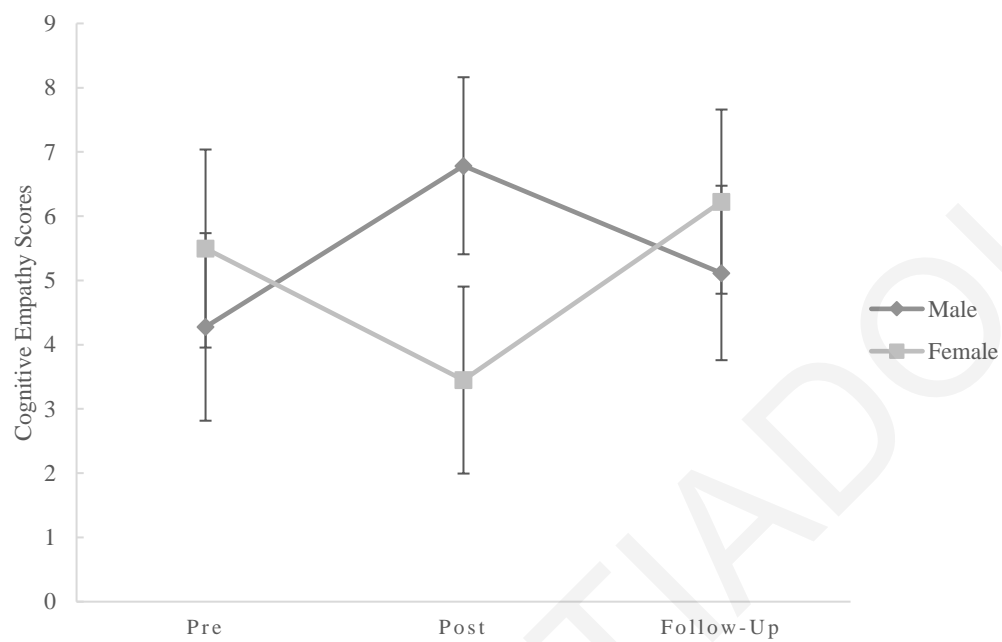
Figure 8. 1.Assessment time with ECBI Intensity score as the dependent variable.
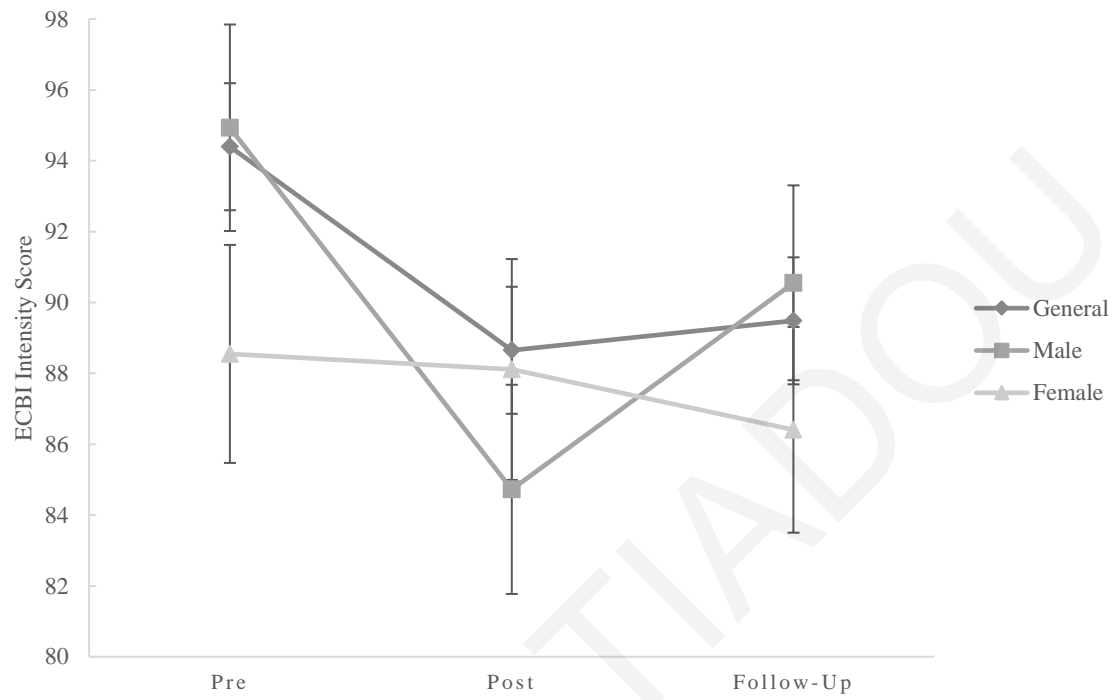
Figure 9. 1. Assessment Time by group by gender with ECBI Intensity as the dependent variable.
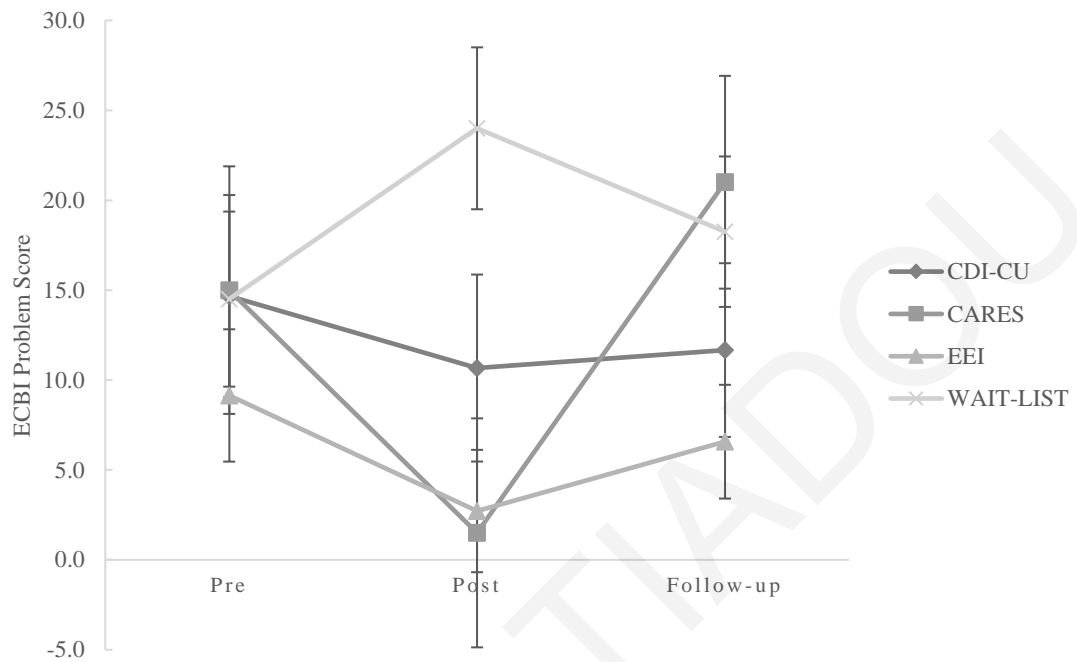
a)
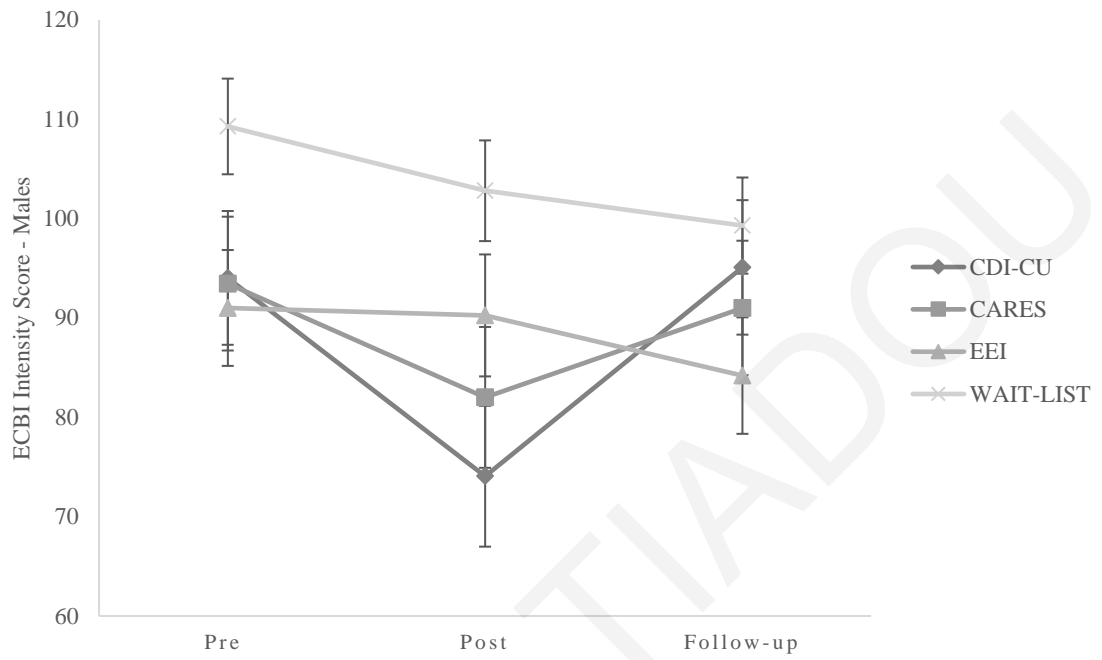
b)

Figure 10. 1. Assessment time by group by LPE Specifier with ECBI Problem score.

a) Children fulfilling LPE specifier criteria.
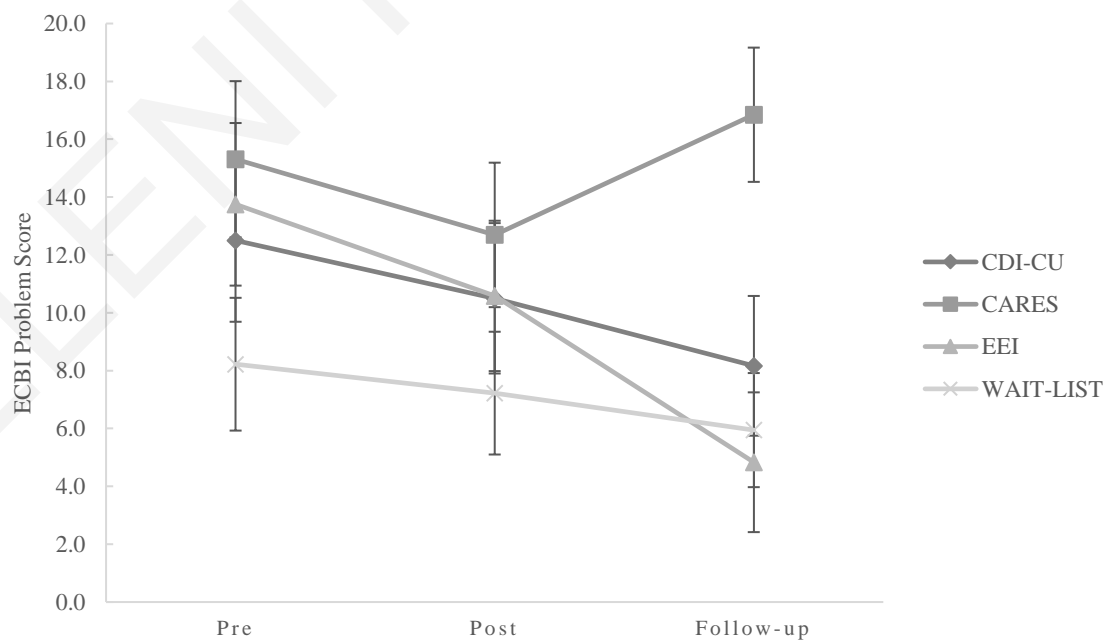

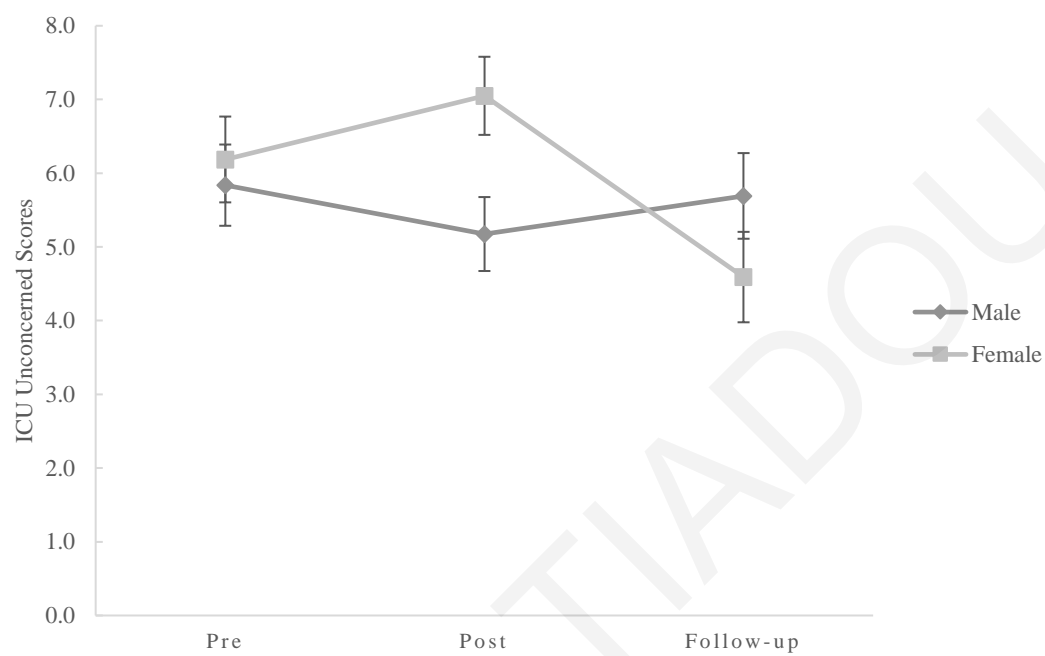b) Children not fulfilling LPE Specifier criteria

Figure 11. 1. Assessment Time by gender for the ICU subtype - Unconcerned as a dependent variable.

Observation tasks instructions for parents.

Let's play!

Instructions for Five Situations:

1. **Child Free Play** (6 minutes)
   - "In this situation tell _____ that he/she may play with whatever he/she chooses. Let him/her choose any activity he/she wishes. You just follow his/her lead and play along with him/her."

2. **Parent Distress** (2.5 minutes)
   - Pretend that you have hurt your finger while playing and say "Ouch, that hurt! "with a sad look for about 30 seconds.
   - During this time, focus your attention on your hurt finger.
   - After 30 seconds say that you are okay, and you can continue playing.

3. **Clean-up** (2.5 minutes):
   - "Now please tell _____ that it is time to leave the playroom and the toys must be put away. Make sure to have him/her put the toys away. "

4. **Researcher Distress** (2.5 minutes):
   - The researcher will also pretend that she has hurt her hand while picking up the box. Do not respond to the researcher and do not communicate with your child during this time.

5. **"I – Love – You" task** (1.5 minutes)
   - The researcher will leave the room with the box of toys and will tell you that they will come back in 2 minutes.
   - "I'd like you to look into _____ eyes and show him/her, in a way that feels most natural for you that you love him/her. Does this sound ok?"