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Parent-Child Interaction Therapy as a Treatment for ADHD in Early Childhood: A Multiple Baseline Single-Case Design

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by

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Abstract

The purpose of this study was to examine the effectiveness of PCIT as an alternative to medication in managing symptoms and behavior problems of preschool-aged children with ADHD. Using a multiple baseline single-case design, the study measured the impact of PCIT on four preschool-aged children's problem behaviors and ADHD symptoms, parenting practices, and mothers' attitudes towards therapy. Outcome measures included the Child Behavior Checklist, Eyberg Child Behavior Inventory, Behavior Assessment System for Children, ADHD Symptom Observation form, Dyadic Parent-Child Interaction Coding System, Parenting Practices Interview, and Therapy Attitude Inventory. Results from visual analyses, a visual permutation test, and hierarchical linear modeling showed partial treatment effects for mothers' use of labeled praises ($b = 10.67$, $p < 0.0001$), commands ($b = -26.84$, $p = 0.000$), behavior management skills ($b = 91.21$, $p < 0.0001$), children's behavior problems ($b = -20.29$, $p = 0.000$), and parent-reported ADHD symptoms ($b = -25.76$, $p = 0.000$). Mothers expressed high satisfaction with PCIT and reported their relationships with their children and their children's compliance and behavior problems had improved post-intervention. The consistency with which other caretaking partners (e.g., fathers) practiced the same discipline procedures as the mothers in the study played a significant role in the changes observed in mothers' use of effective discipline practices and children's behavior problems. Findings of this study indicate PCIT may partially be an effective intervention in improving children's behavior problems and ADHD symptoms.

Chapter One: Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) affects up to 12% of preschool-aged children (Suvarna, 2009) and is associated with adverse outcomes in several domains, including young children's cognitive, academic, social, and physical well-being (Bagwell, Molina, Pelham, & Hoza, 2001; Barkley, 2003; Centers for Disease Control and Prevention, 2010; Frazier, Youngstrom, Glutting, & Watkins, 2007; Halperin, Trampush, Miller, Marks, & Newcorn, 2008; Molina & Pelham, 2003). For instance, preschoolers with ADHD demonstrate weaker verbal, perceptual, and quantitative skills, fewer friendships, and more physical injuries than children without the disorder (Frazier et al., 2007; Leibson, Katusic, Barbaresi, Ransom, & O'Brien, 2001; Loe et al., 2008; Strine et al., 2006). These adverse outcomes often continue and worsen as children enter adulthood (Barkley, 2002; Flory, Molina, Pelham, Gnagy, & Smith, 2006). Furthermore, the impairment of young children's ADHD symptoms has been shown to predict the pervasiveness of symptoms in adolescence and adulthood (Sonuga-Barke, Thompson, Abikoff, Klein, & Brotman, 2006). Preschool children whose ADHD symptoms and associated problems are unaddressed may experience more functional impairment in later years than preschoolers whose symptoms are treated early (Lahey et al., 2004). The preschool years are therefore crucial to preventing the exacerbation of ADHD symptoms and their associated short-term and long-term negative outcomes (Sonuga-Barke et al., 2006).

Although the treatment of ADHD among school-aged children is well established, less is known about the efficacy and safety of treatments for preschool-aged children with the disorder (Price et al., 2005). In response to this paucity of research and the adverse outcomes of preschool-onset ADHD listed above, several organizations have funded and encouraged research in the identification and treatment of young children with this disorder. For instance, the American Academy of Child and Adolescent Psychiatry (AACAP) and the National Institute of Mental Health (NIMH) have supported studies designed to improve the functional outcomes of young children with ADHD (Gleason et al., 2007). Two primary evidence-based approaches have been the focus of these studies, including medication (i.e., psychostimulants) and behavioral modification.

Compared to their use with school-aged children, psychostimulant treatments among preschool populations have been associated with weaker effect sizes and more adverse side effects (Greenhill et al., 2006; Kollins et al., 2006; Swanson et al., 2006). Additionally, medication provides limited functional improvement for children, as psychostimulants do not alleviate problems that exacerbate ADHD symptoms, such as parent stress and depression, ineffective parenting skills, and children's lack of social skills (Pelham & Gnagy, 1999). Furthermore, stimulant medications are not recommended for children under the age of six (U.S. Food and Drug Administration, 2005). In contrast, behavior modification in the form of parent training has emerged as a safe and effective intervention in improving the functional outcomes of young children with ADHD (Fabiano et al., 2009). Parent training has also received the highest consumer satisfaction among caregivers (MTA Cooperative Group, 1999). These findings prompted organizations like the American Academy of Pediatrics (AAP, 2011),

the American Psychological Association (APA, 2006), and the National Institute for Health and Clinical Excellence (NICE, 2008) to endorse the use of parent-based behavior modification interventions before considering stimulant medications in the treatment of preschool-onset ADHD. To date, there is limited research on the effects of parent behavior modification training on the problem behaviors and symptoms of preschool children with ADHD in both home and school settings. The purpose of this study is to contribute to the literature investigating the efficacy of such training in lieu of medication for children aged three to five years old diagnosed with ADHD.

Conceptual Framework

One such parent-based behavior modification intervention is in the form of interaction therapy (Gallagher, 2003). Interaction therapy targets family interaction patterns and contingencies, which have been shown to maintain, exacerbate, and contribute to the variance in ADHD symptom expression among young children (DuPaul, McGoey, EcKert, & VanBrackle, 2001; Keown, 2012). For instance, parents of young children with ADHD engage in more controlling and less positive interactions with their children than parents of children without ADHD (DuPaul et al., 2001). The modification of parent-child interactions in reducing ADHD symptoms derives from the theory that genetic contributions and environmental factors interact and cause variations in symptom manifestation (Keown, 2012). Over time, negative interactions between children and their parents are believed to shape disruptive behaviors and worsen ADHD symptoms (Sonuga-Barke, Auerbach, Campbell, Daley, & Thompson, 2005). An example of this cycle occurs when preschool-aged children with ADHD exhibit challenging behaviors

that evoke negative responses from their parents. Parents' negative responses in turn continue to provoke children's challenging behaviors (Sonuga-Barke et al., 2006).

Interaction therapy is based upon attachment theory (Ainsworth, 1989) and social learning theory (Patterson, 1982). Attachment theory emphasizes the importance of sensitive and responsive parenting, which fosters children's understanding that their parents will respond to their needs (Ainsworth, 1989). Stable attachments between parents and their children help to promote children's social, behavioral, and emotional development and allow children to feel secure in their relationships (Thompson, 2008). In this way, parents' learning and application of positive interaction strategies work to provide children with a secure attachment. Patterson's (1982) coercion theory maintains that disruptive behaviors are developed through maladaptive parent-child interactions. These interactions are interrupted when parents begin delivering clear and consistent limit setting. Social learning theory emphasizes that parents must learn to establish consistent contingencies for their children's behaviors while also maintaining a positive and secure relationship with their children.

Finally, an important supporting theory underlying interaction therapy is the Biopsychosocial Model (Engel, 1980), in which biological, psychological, and social factors are all believed to contribute to an individual's health. For instance, psychosocial factors may influence biological processes through exposing individuals to risk factors. Thus, an individual's health status is viewed in a much broader context (i.e., interactions among several individual risk factors) than merely a focus on the biological etiology of health conditions. The Biopsychosocial Model is applied in practice through the

selection of treatments and health services that consider individuals' relationships with others and address multiple psychosocial dimensions (i.e., family relationships).

In the context of the proposed study, the Biopsychosocial Model provides a developmental perspective of the psychosocial factors that contribute to the variance in ADHD symptom expression. In this way, interaction therapy has the potential to alter children's developmental trajectories by targeting maladaptive relational and social factors that influence the biological processes of ADHD. The model also underlines the need for early intervention to improve child outcomes, instead of intervening later when symptoms become more frequent and severe. Early intervention is hypothesized to alleviate ADHD symptoms through four primary venues (Sonuga-Barke & Halperin, 2010). First, preschool-aged children have more brain plasticity than school-aged children, allowing for more environmental influence (Vuksic, Rados, & Kostovic, 2008). Early intervention may also prevent persistent behavioral habits from forming over time, which may further impair children's outcomes. Similarly, parents may be more receptive to early intervention, as they may be less likely to have developed negative attitudes related to their children's symptoms and behaviors. Finally, early intervention has the potential to alleviate ADHD symptoms and behaviors among preschool-aged children before they experience negative outcomes later in life, such as low academic achievement and self-esteem (Sonuga-Barke & Halperin, 2010).

Purpose and Research Questions

Currently, the most empirically supported interaction therapy treatment is Parent-Child Interaction Therapy (PCIT; Eyberg, 1988). PCIT is an evidence-based intervention for children in preschool with behavior problems (Brinkmeyer & Eyberg, 2003;

Herschell, Calzada, Eyberg, & McNeil, 2002). This therapy utilizes live coaching, parent modeling, ignoring of inappropriate behaviors, and praise of appropriate behaviors to improve children's behavioral health and quality of life. PCIT has recently been viewed as a promising nonpharmacological intervention for young children with ADHD given its strong evidence base and direct relation to ADHD symptom manifestation (Matos, Bauermeister, & Bernal, 2009). However, only two recent studies have investigated this particular use of PCIT. These two studies utilized a culturally adapted form of the intervention and found significantly improved ADHD symptoms and problem behaviors among preschool children (Matos et al., 2006; 2009).

The purpose of the present research proposal was to examine the effectiveness of PCIT in improving the functional outcomes of preschool-aged children with ADHD. Thus, the study adhered to national recommendations to provide behavioral services as a first line of treatment for preschool children with ADHD (AAP; 2011; APA, 2006; NICE, 2008). The study measured the impact of PCIT on the frequency and severity of preschool-aged children's problem behaviors and ADHD symptoms as rated by children's mothers. The study also measured changes in the parenting practices of young children's mothers as a result of PCIT, as well as the mothers' attitudes towards the therapy. The dependent variables of the study (i.e., children's behavior problems and ADHD symptoms, mothers' parenting practices, mothers' satisfaction with intervention) were measured via questionnaires and live observations during play interactions. As such, the study utilized a single-case design in an attempt to answer the following research questions:

1. Will mother-child dyads' participation in PCIT produce positive changes in mothers' parenting practices, children's problem behaviors, and children's ADHD symptoms from baseline to intervention and three-month follow-up?
    a. Will mothers report less significant child behavior problems from baseline to intervention and three-month follow-up, as measured by mothers' completion of the Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999)?
    b. Will mothers report less significant child ADHD symptoms from baseline to intervention and three-month follow-up, as measured by mothers' completion of the Behavior Assessment System for Children, Second Edition – Parent Monitor Ratings (BASC-2 PMR); Reynolds & Kamphaus, 2009), an ADHD Symptom Observation Form, and the Child Behavior Checklist (Achenbach, 1991)?
    c. Will mothers report more positive parenting practices from baseline to intervention and three-month follow-up, as measured by the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg & Robinson, 1983) and Parenting Practices Interview (PPI; Webster-Stratton, Reid, & Hammond, 2001)?
2. Will parents report a positive attitude towards PCIT upon completion of the therapy?
3. What is the relationship between PCIT, changes in the dependent variables over time, and the consistency with which mothers and other caregivers use evidence-based parenting practices?

4. What is the relationship between PCIT, changes in the dependent variables over time, and mothers' consistent practice of PCIT skills within the home setting?

Significance of the Study

Preschool-aged students with ADHD whose symptoms are not preemptively addressed may be placed at increased risk of later functional impairment compared to children whose symptoms are treated early (Lahey et al., 2004). Early intervention practices are greatly needed to reduce developmental risk, prevent further impairment, and improve the school readiness of preschool-aged children with ADHD (Sonuga-Barke et al., 2013). Interaction therapy, particularly PCIT, may improve child outcomes by targeting environmental factors that contribute to the etiology of ADHD. This study examined the use of PCIT to improve parenting practices, assess parents' satisfaction with treatment progress, and reduce problem behaviors and ADHD symptoms among preschool-aged children as young as three. As such, the results of this study will add to the extant literature investigating the efficacy of PCIT as an alternative to pharmacological treatment for this population.

Chapter Two: Review of the Literature

Introduction

An increased public awareness of medication use among preschool-aged children to address Attention-Deficit/Hyperactivity Disorder (ADHD) has resulted in a significant emphasis on the detection and treatment of the disorder among this population (Greenhill, Posner, Vaughan, & Kratochvil, 2008). Underlying this emphasis is research that suggests ADHD diagnosed in early childhood is indicative of the chronicity of the disorder later in childhood and adolescence (Sonuga-Barke, Thompson, Abikoff, Klein, & Brotman, 2006). Little research has examined the efficacy and safety of treatments (e.g., medication, behavioral modification) for preschool-aged children with the disorder (Price et al., 2005). The literature available suggests that, compared to school-aged children, psychostimulant treatments among preschool populations are linked with weaker effect sizes and more adverse side effects (Greenhill et al., 2006; Kollins et al., 2006; Swanson et al., 2006). Meanwhile, parents' use of behavior modification skills is considered a safe and proficient way to improve the functional well-being of preschool-aged children with ADHD (Fabiano et al., 2009). Parent-Child Interaction Therapy (PCIT), the intervention under study, is an evidence-based parent training program that targets parent-child interactions and behavior contingencies (Gallagher, 2003).

The literature review that follows will explore behaviors and symptoms experienced by young children with ADHD, as well as the treatments available to them and their families. The review will begin with the definition, prevalence, etiology, and

diagnostic procedures associated with ADHD. The cognitive, academic, social/behavioral, and physical health outcomes of early onset ADHD will be presented next. Subsequent sections of the review will illustrate the risks and benefits of psychopharmacological and psychotherapeutic approaches currently available for preschool-aged children with ADHD. The chapter concludes with a thorough description of PCIT and the purpose of the present study.

Attention-Deficit/Hyperactivity Disorder (ADHD)

Definition. Attention-Deficit/Hyperactivity Disorder (ADHD) is an externalizing neurological disorder characterized by abnormal levels of inattention and/or hyperactivity. The disorder can lead to problems in several areas of functioning, including academics, emotion regulation, and self-esteem (Centers for Disease Control and Prevention, 2010). ADHD is associated with three primary symptoms, including inattention, hyperactivity, and impulsivity (American Psychiatric Association, 2013). As such, three presentations of ADHD have been established to aid diagnosis and intervention: Inattentive, Hyperactive-Impulsive, and Combined Inattentive and Hyperactive-Impulsive. The Inattentive presentation is linked to difficulties with organizing or finishing tasks, attending to details, following instructions, becoming easily distracted, and forgetting daily routines. Behaviors and events such as fidgeting, reoccurring verbalizations, difficulty sitting for long periods, constant activity (e.g., running), impulsivity (e.g., interrupting, grabbing items from others), difficulty waiting, and frequent accidents and injuries are associated with the Hyperactive-Impulsive presentation of ADHD (Centers for Disease Control and Prevention, 2010; Leibson et al., 2001). The symptoms associated with both Inattentive and Hyperactive-Impulsive

presentations may be present in the Combined Inattentive and Hyperactive-Impulsive presentation of ADHD.

Prevalence. Most recent estimates indicate ADHD affects 9.5% of children aged four to 17 (Centers for Disease Control and Prevention, 2010). Among preschool populations, ADHD has a prevalence rate of up to 12% (Suvarna, 2009). The Hyperactive-Impulsive and Inattentive presentations affect 10% and 30% of children and adolescents, respectively (Wilens et al., 2009). Symptoms associated with the Combined presentation are the most prevalent and affect 50% to 75% of children and adolescents with ADHD (Packer & Pruitt, 2010). Overall, male children are more likely to be diagnosed (13.2%) than females (5.6%) (Centers for Disease Control and Prevention, 2010). However, females are more likely to be diagnosed with the Inattentive presentation (Spencer et al., 2007). ADHD diagnoses are most frequent among children who have access to Medicaid, as well as among multiracial children (Centers for Disease Control and Prevention, 2010). Across the lifespan, ADHD symptoms tend to decline, with inattention symptoms remaining more stable than those associated with hyperactivity or impulsivity (Spencer, Biederman, & Mick, 2007). However, 66% of children with ADHD experience significant ADHD symptoms as adults (Barkley, Fischer, Smallish, & Fletcher, 2002).

An increase in diagnoses of ADHD has been observed throughout the past decade, as an average of 5.5% more children were diagnosed with ADHD from 2003 to 2007 (Centers for Disease Control and Prevention, 2010). Though the exact cause for this increase is unknown, researchers speculate it may be linked to gradual changes over time in diagnostic criteria and children's social environments and life experiences (Perrin,

Bloom, & Gortmaker, 2007). For instance, compared to one to two decades ago, more parents are working away from home, suffering from increased stress and less energy, and receiving little social and family support related to parenting. In turn, children over time have begun viewing more electronic media (i.e., television, phones, Internet), spending more time indoors, engaging in less physical activity, and are exposed to more unsafe neighborhoods. These familial and societal changes are hypothesized to negatively impact children's cognitive and social development due to parents' reduced availability to nurture their children (Armstrong, 2003; Perrin et al., 2007).

Etiology. Though both genetic and environmental factors contribute to neurological disorders such as ADHD, genetics have been shown to contribute most (60% - 77%) to the variance in the etiology of this disorder (Faraone, Perlis, & Doyle, 2005; Faraone, Spencer, Aleardi, Pagano, & Biederman, 2004; Wood et al., 2010). For instance, Hudziak and Faraone in 2010 found concordance rates of ADHD to be significantly higher among monozygotic twins than dizygotic twins. However, many studies have been unable to identify a particular gene directly related to the onset of ADHD. Bobb, Castellanos, Addington, and Rapoport (2006) conducted a meta-analysis of 113 twin and adoption studies across 14 years to determine specific genes that were most studied in their relation to ADHD. Though no conclusive evidence was found for any particular gene, the genes most reported among studies to have positive associations with ADHD were related to the dopamine and serotonin systems (Bobb et al., 2006). Moreover, all estimates of heritability among the 114 studies indicated the strong contribution of genetic factors to the variance in ADHD. In a more recent meta-analysis, several genes in the dopamine (i.e., genes *DAT1*, *DRD4*, *DRD5*), serotonin (i.e., genes

5HTT, *HTR1B*), and nervous systems (i.e., gene *SNAP-25*) were consistently associated with ADHD (Gizer, Ficks, & Waldman, 2009). These associations increase the risk for ADHD by less than 50% (Faraone et al., 2005).

Differences in brain development have additionally been noticed in structural studies. For instance, abnormal symmetry has been detected between the left and right frontal lobes in the brains of children with ADHD (Castellanos et al., 1996; Filipek et al., 1997; Hynd, Semrud-Clikeman, Lorys, Novey, & Eliopulos, 1990). The globus pallidus, a part of the basal ganglia that controls voluntary movement, also tends to be significantly smaller among individuals diagnosed with ADHD (Aylward et al., 1996; Castellanos et al., 1996; Singer et al., 1993). Physiological risk factors for the etiology of ADHD may include mothers' difficulties during pregnancy, prenatal exposure to tobacco and alcohol, prematurity, low birth weight, high body lead levels, and postnatal injuries to the brain (CHADD, 2013).

Environmental risk factors also have been connected to the etiology of ADHD. A combination of several adverse factors, such as marital discord, large family size, low socio-economic status, and maternal mental disorder may place young children at risk of developing ADHD (Biederman et al., 1995a; Biederman et al., 1995b). Maternal depression and coping skills have additionally been identified as potential predictors of increased hyperactivity and ADHD symptoms among preschool-aged children (Keown & Woodward, 2002; Lee et al., 2013). Family interaction patterns have especially been shown to maintain ADHD symptoms among this population (Keown, 2012). For instance, parents of preschool-aged children with ADHD report more dysfunction in their families than parents of children without ADHD and tend to engage in more controlling

and less positive interactions with their children (DuPaul, McGoey, EcKert, & VanBrackle, 2001). Genetic contributions and environmental factors are theorized to interact and cause variations in the frequency and severity of symptoms and the age in which ADHD onset occurs (Keown, 2012). Through these interactions, parents and children shape the behaviors of one another over time (Sonuga-Barke et al., 2005). For example, young children who exhibit poor self-regulation and challenging behaviors often provoke negative responses from their parents, which in turn serve to prompt children's defiant and impulsive behaviors (Sonuga-Barke et al., 2006).

Over the years studies have identified several maternal interaction patterns that may exacerbate ADHD symptoms from early to middle childhood. Goodman and Stevenson (1989) reported that mothers' levels of criticism and stress represented a proportion of the variance in young children's ADHD symptoms. Barkley (1990) found that mothers of young children with ADHD were more likely to demonstrate a negative and controlling parenting style than parents of children without ADHD. Meanwhile, other researchers proposed a reciprocal pathway between parents' over-control and children's challenging behaviors, in which punitive parenting may exacerbate children's current ADHD symptoms (Campbell, March, Pierce, Ewing, & Szumowski, 1991; Coon, Carey, Corley, & Fulker, 1992). Similarly, Anderson, Hinshaw, and Simmel (1994) investigated whether difficult behaviors of young school-aged boys with ADHD (i.e., aggression, stealing, noncompliance) could be predicted by their mothers' negativity during play interactions. Forty-nine boys with ADHD were compared with 37 comparison children. Mothers' levels of criticism and stress were measured via the Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1983), and specific play

interactions observed included maternal commands, approval, and negative statements or actions. Children were observed for their compliant behaviors and demonstrations of anger or discouragement during play. Using hierarchical linear modeling, the researchers found significant group differences in mothers' negativity and children's compliance and negativity (Anderson et al., 1994). Mothers' negativity predicted boys' noncompliant behaviors, which were positively correlated with boys' levels of externalizing behavior. The study complemented Goodman and Stevenson's (1989) discovery that mothers' negative and hostile behaviors accounted for a significant proportion of variance in boys' noncompliant and stealing behaviors.

In 2000, Peris and Baker demonstrated the importance of the emotional climate within the home environment, called emotional expression, and its effects on problem behavior and ADHD symptoms. Emotional expression was measured through mothers' five-minute descriptions of their children. Mothers were identified as having high emotional expression when they verbalized negative aspects about their children or their relationships with their children. Mothers' high levels of emotional expression towards their children during preschool predicted ADHD diagnosis and symptoms in the third grade (Peris & Baker, 2000). Cunningham and Boyle (2002) found that mothers of preschool-aged children with ADHD, when asked how they would solve child management problems, suggested more controlling and negative parenting methods than positive or preventive methods. Keown and Woodward (2002) also found that mothers of hyperactive preschool boys believed they were more likely to give in to their children's difficult behaviors than comparison families. These mothers also exhibited fewer responsive, reciprocal, and harmonious behaviors during play with their children.

Later in 2004, Gadeyne, Ghesquiere, and Onghena identified young children's problematic externalizing and attention behaviors as predictors of mothers' high levels of control.

Continuing this line of research, Jester et al. (2005) examined the trajectories of inattention and hyperactivity problems in the context of family interaction patterns across nine years. The sample consisted of 335 young children aged three to five years whose parents maintained high levels of alcohol abuse, as well as comparison parents with no history of alcoholism. The researchers targeted parents with alcoholism in order to examine the effects of family environments that are typically characterized by increased parent-child conflicts. The families were assessed every three years for substance abuse, mental health, parenting styles, and children's behavior problems. Children's behaviors were rated by both parents and teachers using the Child Behavior Checklist (CBCL; Achenbach, 1991). The Home Observation for Measurement of the Environment (HOME; Bradley, Caldwell, Rock, Hamrick, & Harris, 1988) was utilized to assess parents' emotional and social support and intellectual stimulation provided to their children. In addition, the Family Environment Scale (FES; Moos & Moos, 1994) measured relationship, conflict, personal growth, and family organization factors. Parents' increased intellectual stimulation, emotional support, and cohesiveness were associated with children's decreased levels of inattention, hyperactivity, and aggression (Jensen et al., 2005). However, lower levels of emotional support and stimulation predicted an increase in inattention and hyperactivity over time. The researchers concluded that non-genetic factors that maintain inattention and hyperactivity behaviors occur in the home environment (Jester et al., 2005). One year later, Sonuga-Barke,

Thompson, Abikoff, Klein, and Brotman (2006) disseminated a theory reflecting this research, in which sensitive parenting was thought to mediate children's development of attention and self-organization abilities. This theory encourages parents to engage in activities, games, and exercises in the home setting to enhance children's attention, concentration, turn-taking skills, and memory (Sonuga-Barke et al., 2006). Parents then require their children to practice and generalize these acquired skills in real-life situations. Parents thus become facilitators of their children's cognitive skills and abilities (Sonuga-Barke et al., 2006).

More recently, Keown (2012) conducted a three-year longitudinal study to determine whether mothers' parenting in early childhood could predict 110 boys' ADHD symptoms in later childhood years. During play sessions, three responsive parenting behaviors were examined, including sensitivity (i.e., responsiveness to child's behaviors and interests), positive regard (i.e., displays of affection and affirmation towards child), and intrusiveness (i.e., controlling play instead of following child's preferences). Interactions were measured using 7-point Likert scales (i.e., 1 = very low; 7 = very high) adapted from the Early Head Start Research and Evaluation Project (Brady-Smith, O'Brien, Berline, Ware, & Fauth, 2000). Greater scores indicated higher levels of sensitivity, positive regard, or intrusiveness. The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was completed by the children's mothers, fathers, and teachers to assess ADHD symptoms and child impairment, such as the frequency of peer problems. The questionnaire was completed by all stakeholders at the beginning of the study and three years later. Higher levels of maternal sensitivity when boys were four or five years old were correlated with fewer inattention problems three years later. In

addition, a positive correlation was identified between levels of maternal positive regard and children's later increased attentiveness at home. In contrast, less maternal positive regard and sensitivity predicted continued ADHD status later in childhood. Mothers' levels of intrusiveness were positively linked to later levels of children's inattentiveness when rated by children's fathers and teachers. Keown (2012) thus recommended targeted interventions should help parents of children with ADHD use effective behavior management strategies that ultimately improve parent child interactions.

To conclude, the etiology of ADHD is comprised of interactions between genetic and environmental factors. Genetic variables contribute up to 78% of the divergence in the disorder's etiology (Faraone et al., 2005; Hudziak, Derks, Althoff, Rettew, & Boomsma, 2005), in which connections have primarily been made with the dopamine and seratonin systems (Bobb et al., 2006). Environmental variables, such as prenatal complications and family factors, have been shown to contribute approximately 22% to the variance in ADHD symptoms (Hudziak et al., 2005). In particular, low levels of quality parent-child interaction patterns, such as little maternal warmth and responsiveness, are shown to contribute to and maintain ADHD symptoms among young children (DuPaul et al., 2001; Jensen et al., 2005; Keown, 2012; Peris & Baker, 2000; Sonuga-Barke et al., 2005). These findings have prompted researchers to theorize that positive parenting may potentially alleviate ADHD symptoms and prevent negative outcomes among young children with ADHD (Sonuga-Barke et al., 2006; Smith, Calkins, Keane, Anastopoulos, & Shelton, 2004).

Diagnosis. Though onset of ADHD typically occurs during the preschool years, diagnoses are most commonly made during middle childhood (Sonuga-Barke et al.,

2006). However, there has been an increase in diagnosis and prescriptions for pharmacological treatment among preschool children (Zito et al., 2000). This increase has caused the validity of ADHD diagnosis to be questioned due to arguments that primary symptoms of ADHD are commonly exhibited by very young children (Pelham et al., 2004). For instance, skills related to attention and self-control are not as developed in preschool children as they are in school-aged children. The overlap between ADHD symptoms and common behaviors in early childhood has caused the public and mass media to believe ADHD is over-diagnosed, although a review of prevalence studies has not shown this belief to be true (Sciutto & Eisenburg, 2007). Changes to diagnostic criteria have also prompted concerns regarding the validity of ADHD diagnoses during early childhood (Pelham et al., 2004). For example, the American Academy of Pediatrics (2011) recently modified the age limit to the diagnosis of ADHD from the age of six to the age of four.

To address these concerns, Lahey et al. (2004) conducted a longitudinal study to examine the persistence and reliability of diagnostic criteria and impairment among young children with ADHD over time. Ninety-six children who met full criteria for ADHD in multiple settings (e.g., home and school) and 29 children who met situational criteria in only one setting were compared to 126 children without ADHD over the course of three years. Children with full and situational ADHD first diagnosed between the ages of four and six were more likely than children without ADHD to meet diagnostic criteria for the disorder in multiple settings after three years (Lahey et al., 2004). In particular, 79% of the children with full ADHD and 34.5% of children with situational ADHD continued to meet diagnostic criteria compared to 3% of children without ADHD (Lahey

et al., 2004). These results remained constant after demographic, intellectual, conduct, and internalizing factors were controlled. Similar results were found by the Preschool ADHD Treatment Study (PATS) funded by the National Institute of Mental Health (NIMH). After six years, 89% of 180 children first diagnosed with ADHD during preschool still met diagnostic criteria for symptoms and impairment (Riddle et al., 2013). These studies suggest the stability of symptoms over time, as well as the accuracy of ADHD diagnosis during early childhood.

More recent changes to diagnostic procedures stem from the newest edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013). The fifth edition of the DSM was recently published in May of 2013 and is used to classify and diagnose the symptoms associated with ADHD. To meet DSM-5 criteria for diagnosis, children must exhibit six or more of nine behaviors and symptoms related to inattention (e.g., "often does not seem to listen when spoken to directly") and/or six of nine behaviors and symptoms related to hyperactivity and impulsivity for at least six months. These behaviors must be deemed disruptive and inappropriate for children's respective developmental levels. In addition, diagnoses are only given when some symptoms causing impairment are evident before the age of 12, and when the impairment is demonstrated in two or more settings. For instance, symptoms of ADHD that may have been noticed in infancy include high activity, less sleep, recurrent crying, and difficulty being soothed (Pennington, 2009). As a toddler, a child with ADHD may exhibit less fear of danger, a significant amount of energy, and frequent transitions between different activities (Pennington, 2009). Furthermore, if ADHD symptoms are only exhibited in

one setting, the child's environment may be reinforcing the problem behaviors thought to reflect ADHD (Roberts & Steele, 2009).

Beyond use of the DSM-5, diagnosis is also based on data collected from interviews and observations regarding previous and current symptoms, as well as the severity of impairment (Pennington, 2009). Parents are typically asked about the history of ADHD in the family, as children are at greater risk for ADHD if their parents also experience symptoms of the disorder (Pennington, 2009). Parents also can provide information concerning children's early development and previous academic achievement, as well as significant stressors in the family context that can exacerbate symptoms of ADHD and interfere with management of symptoms (e.g., marital discord) (Roberts & Steele, 2009). Similarly, recently developed guidelines recommend examining family contextual patterns that may contribute to behaviors, as well as assessing symptoms in more than one setting (Gleason et al., 2007). As such, teachers may also be interviewed to gain insight into children's behaviors in school that reflect ADHD symptomatology, such as difficulties remaining seated, finishing work, and keeping hands to self (Pennington, 2009). Diagnosis of ADHD is less likely to be given to a child who has not exhibited behaviors such as these during their first school years (Pennington, 2009). It also is important to assess teachers' perceptions of whether a child's behaviors are similar or significantly different from their same-gender and age peers (Roberts & Steele, 2009).

Parents' and teachers' completion of behavior rating scales, such as the Child Behavior Checklist (CBCL; Achenbach, 1991) or the Conners Parent and Teacher Rating Scales (Conners, Sitarenios, Parker, & Epstein, 1998) provide useful quantitative data to

inform diagnosis, as well as serve as progress monitoring tools across intervention implementation (Roberts & Steele, 2009). When interacting or interviewing children, observations are made of any presenting behaviors that suggest symptoms of ADHD (e.g., fidgetiness, impulsive responses) in both clinical and natural settings (Pennington, 2009). In addition, children's executive functioning is assessed, including children's organizational and planning skills, and working memory (Roberts & Steele, 2009). In sum, a diagnosis of ADHD is established via multi-informant, multi-method, and multi-source assessment procedures incorporating diagnostic criteria, interviews, rating scales, and observations.

Comorbidity. Approximately 50% of children diagnosed with ADHD also have a behavioral disorder, the most common of which include Oppositional Defiant Disorder (ODD) and/or Conduct Disorder (CD) (Centers for Disease Control and Prevention, 2010; Kollins et al., 2006; Spencer et al., 2007). Surprising evidence suggests children with ADHD without co-occurring symptoms of ODD or CD may have more impaired skills related to attention, information processing, reaction time, and preparation than children diagnosed with both conditions (Banaschewski et al., 2003). Children with ADHD also may be identified as having mood disorders. In a four-year study, rates of comorbid depression among children with ADHD increased from baseline (29% at age 11) to age 15 (45%) (Biderman, Faraone, & Keenan, 1992). In the same study, 11% of children with ADHD at baseline experienced mania. Four years later, this comorbidity rate increased to 23%. Posner et al. (2007) also identified anxiety as another comorbid symptom (Posner et al., 2007). In a large study of 303 preschool-aged children diagnosed with ADHD, 14.5% of children had anxiety disorders. The two most prevalent anxiety

disorders experienced by children included specific phobias and separation anxiety disorder (Posner et al., 2007). Posner et al. (2007) found that the severity of ADHD symptoms was positively linked to higher anxiety levels among children.

Other studies examining comorbidity rates among this population suggest that 50% of children aged six to 11 with ADHD may have a Learning Disorder (LD) (Centers for Disease Control and Prevention, 2010). Approximately 25% of preschool-aged children with ADHD also may have communication disorders (Kollins et al., 2006), and girls with ADHD may be at higher risk of being diagnosed with a language disorder (Hinshaw, 2002). Comorbidity studies also have been conducted in regards to Autism Spectrum Disorder (ASD), in which 65% to 80% of children with ADHD were found to demonstrate symptoms reflecting the DSM-5 diagnosis of ASD (Clark, Feehan, Tinline, & Vostanis, 1999). Children with ADHD may additionally be more likely to develop tic disorders (Spencer, Biederman, & Coffey, 1999). Sleep disorders also are common comorbid disorders with ADHD, as up to one half of parents of children with ADHD indicate their children have difficulties falling and staying asleep (Centers for Disease Control and Prevention, 2010; Corkum, Tannock, & Moldofsy, 1998). Further, children with ADHD are two to three times more likely to have sleep problems than children without ADHD (Gruber et al., 2006).

Outcomes of ADHD in Early Childhood

The severity of ADHD in early childhood is a strong indicator of the chronicity of symptoms later in life (Sonuga-Barke et al., 2006). Furthermore, children diagnosed with ADHD as preschoolers are less likely to be well-adjusted in the domains of mental health, social skills, and peer relationships (Lee, Lahey, Owens, & Hinshaw, 2008). For

instance, only 12.5% of 96 children diagnosed with ADHD in early childhood were well-adjusted in these areas as adolescents, compared to 64% of 126 children without ADHD (Lee et al., 2008). The Total Problem scores on the CBCL (Achenbach, 1991) of preschool-aged children are also typically higher than scores of those without the disorder (Loe et al., 2008). The discrepancy in scores between children with and without ADHD has been shown to increase as children enter elementary school (Loe et al., 2008). Given these statistics, the negative outcomes of childhood ADHD will be examined in the following domains: cognitive/academic, social/behavioral, and physical health.

Cognitive/academic outcomes. Adolescents and young adults diagnosed with ADHD in childhood demonstrate more neuropsychological deficits compared to similar-age peers without ADHD (Halperin, Trampush, Miller, Marks, & Newcorn, 2008). In particular, those with ADHD have poorer working memory than those with no history of ADHD. Children with ADHD also tend to score lower on measures of cognitive ability than their counterparts without the disorder (Frazier, Demaree, & Youngstrom, 2004). For instance, preschool-aged boys with ADHD-Combined type tend to demonstrate weaker verbal and cognitive skills than boys without ADHD, particularly skills related to short-term memory, comprehension of long sentences, and visual construction (Iwanaga, Ozawa, Kawasaki, & Tsuchida, 2006). In another study by Loe et al. (2008), preschool-aged children with ADHD were found to have lower scores than children without ADHD on cognitive tests of verbal, perceptual, quantitative, and receptive vocabulary skills (i.e., McCarthy Scales of Children's Abilities General Cognitive Index [MSGCI; McCarthy, 1972]; Peabody Picture Vocabulary Test – Revised, Form M [PPVT-R; Dunn, 1981]).

Many children with ADHD also experience academic problems. Fifty percent of children with ADHD in elementary school need tutoring or extra assistance in academics, and up to 50% are placed in special education classrooms (Barkley, 2003). In one study, preschool-aged children exhibiting ADHD symptoms in multiple settings were three times more likely than comparison children to be placed in a special education classroom three years later (Pelham et al., 2004). In a meta-analysis of 72 studies examining academic performance among children with ADHD, Frazier, Youngstrom, Glutting, and Watkins (2007) found children with ADHD experienced lower academic achievement than children without ADHD. Academic performance was measured through standardized achievement tests, rating scales completed by parents and teachers, and other indicators such as grade point averages. In a more recent study, ADHD had a significant negative effect on the performance of 101 children on standardized tests of reading, mathematics, and written language compared to 67 children without ADHD (McConaughy, Volpe, Antshel, Gordon, & Eiraldi, 2011).

ADHD also is associated with in-school suspensions and expulsions. Forty percent of young children aged two to six with ADHD are suspended from school or day care, and nearly 16% are expelled (Egger et al., 2006). In a study of preschool children with and without ADHD, 15% of students with ADHD were suspended from day care compared to 0.4% of control participants (Angold et al., submitted). In the same study, approximately 7.8% of children ADHD had been expelled compared to 0.8% of children without ADHD (Angold et al., submitted).

Social/behavioral outcomes. Young children with ADHD are reported by their parents to have three times more social problems with peers as children without ADHD

(Centers for Disease Control and Prevention, 2010). Moreover, parents report their children with ADHD are ten times as likely to have behavioral difficulties that hinder their ability to form friendships with others (Centers for Disease Control and Prevention, 2010). Adolescents diagnosed with ADHD as children tend to report having fewer close friendships and being rejected more by peers than adolescents without ADHD (Bagwell, Molina, Pelham, & Hoza, 2001). These reported social problems may be due to specific symptoms such as frequent changes in conversation, talking at inappropriate times, and interrupting or intruding (DSM). Social difficulties are still apparent as children enter adolescence (Bagwell et al., 2001).

Beyond relationships with others, childhood ADHD is associated with later risky and antisocial behaviors in adolescence and adulthood. No identified studies have examined this connection in regards to preschool-onset ADHD; however, the results of studies examining children diagnosed during the early elementary school years may potentially generalize to the preschool population. For instance, when compared to a control group, young adults who were diagnosed with ADHD as early elementary school students were more likely to have casual sex with infrequent condom use and sexual relations that resulted in pregnancy (Flory, Molina, Pelham, Gnagy, & Smith, 2006). A comparable study found adolescents diagnosed with ADHD during childhood tended to have more sexual partners and be less likely than peers without ADHD to use contraception, causing higher incidences of teen pregnancy and sexually transmitted diseases (Barkley, 2002). Researchers have hypothesized that increased risky sexual behaviors among adolescents with ADHD may be in part due to peer relationship

problems, low levels of parental monitoring and trust, and high familial conflict (Flory et al., 2006).

The type and severity of ADHD in childhood is also associated with an increased risk of drug and alcohol use during adolescence (Molina & Pelham, 2003). Children with ADHD-Inattentive Type are more likely to later exhibit substance abuse than children with other types of ADHD (Molina & Pelham, 2003). Researchers speculate an increase in drug use among adolescents with ADHD may be related to deficits in executive functioning and lower academic achievement, which may cause adolescents to gravitate from peer groups that value academic success to groups that encourage and model substance abuse (Kaplan & Johnson, 1992; Molina & Pelham, 2003).

Studies have also found that children with ADHD who exhibit consistent physical fighting during childhood are at greatest risk of engaging in antisocial behaviors as adults (McKay & Halperin, 2006). In a study of 288 males with ADHD who were diagnosed in childhood, individuals with ADHD committed more, and a greater variety of, severe crimes (e.g., breaking and entering, attacking another person with a weapon with the intent to hurt) and were at risk for earlier delinquency than a comparison group by age 18 (Sibley et al., 2011). Another study compared the driving patterns of 355 adults who were diagnosed with ADHD in childhood with those of a control group (Thompson, Molina, Pelham, & Gnagy, 2007). Results found small to medium positive correlations between adults with ADHD and the number of car accidents and tickets received within the last six months (Thompson et al., 2007).

Physical health outcomes. Children with ADHD are more likely to experience accidental physical accidents and injuries than children without ADHD (Centers for

Disease Control and Prevention, 2010; Lahey et al., 1998). For instance, they are more likely to be injured while riding a bike, experience head injuries, have injuries to more than one part of their body, be hospitalized for accidental poisoning, and be admitted to intensive care units (Centers for Disease Control and Prevention, 2010). These adverse events tend to occur due to children's inattentiveness to surroundings and impulsive behaviors (Byrne, Bawden, Beattie, & DeWolfe, 2003). Similarly, health care costs tend to be twice the amount for children and adolescents with ADHD as for those without ADHD (Kelleher, Childs, & Harman, 2001).

In review, ADHD in early childhood is associated with several alarming outcomes in a variety of domains. Students diagnosed with ADHD as young children may experience more cognitive and neuropsychological deficits than children without the disorder (Frazier et al., 2004; Halperin et al., 2008; Iwanaga et al., 2006). These difficulties may lead to academic challenges and underachievement (Egger et al., 2006; Frazier et al., 2007). Childhood ADHD is also linked to more problems with peers, risky and/or antisocial behaviors later in life, and life-changing injuries and accidents (Bagwell et al., 2001; Kelleher et al., 2001; Molina & Pelham, 2003). These outcomes indicate the need for early intervention in order to optimize children's learning experiences, health, and psychosocial well-being.

Treatment Options for Preschool-Aged Children with ADHD

The treatment of ADHD and other neurodevelopmental and behavior disorders among preschool-aged students has become a topic of great scrutiny over the years. As a result, several organizations have recognized the paucity of research and the developmental and ethical challenges associated with treatment for this age group

(Gleason et al., 2007). Guidelines have consequently been created to facilitate the selection of evidence-based treatments. For instance, in 2000 the American Academy of Child and Adolescent Psychiatry emphasized the need for further research and standards in balancing the risks and benefits associated with psychopharmacological and nonpharmacological interventions (Gleason et al., 2007). The Preschool Psychopharmacology Working Group (PPWG) was subsequently formed to create guidelines in determining when these two forms of treatment are appropriate based on the literature, clinical experience, and expert consensus (Gleason et al., 2007). The clinical consensus of this group recommended that if medication is necessary, methylphenidate (MPH) (i.e., Ritalin) is the psychopharmacological treatment with the most evidence compared to other medication options, followed by amphetamine (i.e., Adderall) and atomoxetine (i.e., Strattera) (Gleason et al., 2007). However, the working group strongly recommended that behavior management, and especially parent training, be the first-line treatment for preschool students with ADHD (Gleason et al., 2007; Kollins et al., 2006; Kratochvil et al., 2004). This recommendation was made given the substantial evidence for psychotherapeutic interventions and lack of evidence for medication use among very young children (Gleason et al., 2007). For instance, an effect size of .74 was found for 23 between-group studies on behavioral interventions implemented in home, school, and peer settings (Fabiano et al., 2009). The following literature review will examine the existing research on both psychopharmacological and psychotherapeutic treatment options for ADHD among preschool populations.

Psychopharmacological treatment. Medications are the first line of treatment for school-aged children diagnosed with ADHD. According to most recent reports from

the Center for Disease Control and Prevention (2007), 2.7 million children between the ages of four and 17 are medicated for ADHD. Older children (i.e., between the ages of 11 and 17) are more likely than younger children to take medications for ADHD, and male children are 2.8 times more likely to receive medication than females (Centers for Disease Control and Prevention, 2007). Approximately 75% to 80% of school-aged children with ADHD who receive medication will respond positively and exhibit fewer ADHD symptoms (Daley, 2004). For children under the age of five with ADHD, prescriptions for pharmacological treatment have increased over the years (Zito et al., 2000). The types of pharmacological treatments prescribed for young children vary, but typically consist of methylphenidate hydrochloride (i.e., Ritalin), clonidine hydrochloride (e.g., Catapres), and dextroamphetamine sulfate (i.e., Dexedrine) (Rappley et al., 1999). These prescriptions occur despite recommendations by the Food and Drug Administration to avoid giving MPH, as well as several other psychopharmacological treatments, to children under the age of six (AAP Committee on Drugs, 2002; Gleason et al., 2007).

Several studies have indicated successful treatment of ADHD with medication among this age group. For instance, Monteiro-Musten, Firestone, Pisterman, Bennett, and Mercer (1997) found stimulants were effective in improving preschool children's attention and decreasing impulsiveness. However, much of the current knowledge base regarding the effectiveness of stimulants in managing young children's ADHD symptoms derives from the Preschoolers with ADHD Treatment Study (PATS; Greenhill et al., 2004). This comprehensive longitudinal study was conducted to determine whether short-term and long-term MPH could be used safely and efficaciously to treat young

children with ADHD. The 70-week study entailed two double-blind phases, in which 165 of 303 children were randomly assigned to receive varying amounts of MPH per day. The remaining preschoolers engaged in a placebo-controlled parallel trial. MPH significantly reduced ADHD symptoms when given in smaller doses (e.g., 14 milligrams per day) than typically received by older students (Kollins et al., 2006). MPH also was found to improve the global severity, functioning, and social skills among children with ADHD who received long-term treatment (Vitiello et al., 2007). Despite these positive effects, 45 of 95 participants discontinued the medication due to reasons such as adverse side effects (i.e., irritability, weight loss, emotionality, motor tics) and the exacerbation of challenging behaviors (Vitiello et al., 2007).

Amphetamine and atomoxetine have less empirical support than MPH. No data are available to guide the dosing considerations of amphetamine among preschool students (Gleason et al., 2007). Furthermore, amphetamine was temporarily suspended in Canada due to adverse cardiovascular effects among very young children (FDA, 2005). One recent study examined the effectiveness of atomoxetine in young children ages five and six. In an eight-week double-blind study, 101 children were randomly assigned to receive 0.8, 1.2, 1.4, or 1.8 milligrams per day of atomoxetine depending on tolerability and response (Kratochvil et al., 2011). Though treatment was associated with an effect size of 0.7 using the ADHD-RS, children who received atomoxetine were significantly more likely to have gastrointestinal discomfort, decreased appetite, and sedation compared to children in a placebo control group. Moreover, most of the children receiving treatment still exhibited significant ADHD symptoms by the end of the treatment phase (Kratochvil et al., 2011).

Despite these studies, there are still uncertainties regarding the efficacy and safety of pharmacological treatments in children under the age of five (Volkow & Insel, 2003). Furthermore, several studies have found medications are associated with weaker effect sizes among preschool-aged children than school-aged children. For instance, the PATS study found the effect sizes of medication (i.e., methylphenidates) on the functional outcomes of young children with ADHD (ranging from 0.4 to 0.8) do not parallel effects among school-aged children (Abikoff et al., 2007). The PATS study, as well as other studies, also revealed that preschool students' social skills and parents' stress levels do not improve with medication (Greenhill et al., 2004; Monteiro-Musten et al., 1997). In contrast, parents' ratings of their young children's symptoms became worse as children received continued medication (Abikoff et al., 2007).

Beyond the weak effect sizes associated with MPH, several adverse side effects of the medication were identified through the PATS study. One physical side effect was reduced growth rates among child participants. The annual growth rates of 95 medicated preschool-aged children in the PATS study were 20.3% less than what was expected for height (Swanson et al., 2006). These changes in growth rates were more pronounced than in studies of school-aged children receiving MPH. Moreover, 30% of 183 children receiving medication were reported by their parents to experience moderate or severe adverse side effects (Wigal et al., 2006). The most common effects included emotional outbursts, difficulty sleeping, repetitive behaviors or thoughts, decrease in appetite, and irritability. Other reported side effects included parental reports of children's sadness, nightmares, dysphoria, and decreased levels of communication (Firestone et al., 1998).

Parents also may be wary of using medication to treat ADHD due to the potentially negative effects of medications listed above (Rushton, Fant, & Clark, 2004). A small number of medications are approved for use among pediatric populations in the United States, and as a result several medications are used for purposes that are not listed on published medication inserts (AAP Committee on Drugs, 2002). During the informed consent process for the off-label use of psychostimulants such as MPH, parents must be made aware of the evidence supporting the treatment, as well as risks, benefits, and alternative treatment options (Gleason et al., 2007). Given the lack of evidence, as well as the numerous risks, parents may experience apprehension in participating in informed consent and administering psychopharmacological treatments to their children (Spetie & Arnold, 2007). For instance, 55% of parents of school-aged children taking medication for ADHD indicated they were worried at first about the potential side effects and negative reports associated with medications (DosReis et al., 2003). In the PATS study, several potential participants declined further participation in study procedures due to strong concerns and beliefs against medication, as well as a preference for nonpharmacological treatment (Greenhill et al., 2006).

In sum, though several studies indicate preschoolers can be successfully treated using medication (Greenhill et al., 2004; Kollins, 2004; Short, Manos, Findling, & Schubel, 2004), little research has been conducted on the efficacy and side effects of these medications among very young children (Volkow & Insel, 2003). The literature available indicates fewer beneficial effects of medication for preschool children than for school-aged children (Greenhill et al., 2006). Several side effects have been noted, such as emotional problems, sleep disturbances, and restricted growth (Kollins et al., 2006;

Swanson et al., 2006). Many parents are hesitant or unwilling to consider medication for their children due to these adverse side effects, and report a preference for non-pharmacological treatments (DosReis et al., 2003; Rushton, Fant, & Clark, 2004). Furthermore, no data currently exist on the long-term benefits and effects of stimulants among preschool-aged children (Gleason et al., 2007; Sonuga-Barke et al., 2006). The literature on adverse side effects and lack of overall effects of psychostimulant treatments have prompted several researchers to recommend that medication be used as a last resort, particularly among preschool-aged populations (Sonuga-Barke, Daley, Thompson, & Swanson, 2003).

Psychotherapeutic treatment. Psychotherapeutic treatments for ADHD among preschool-aged students are composed of behavior modification interventions, primarily in the form of classroom behavioral and parent training programs (Murray, 2010). Several studies have demonstrated the effectiveness of behavior modification interventions in the treatment of ADHD among preschool populations. For instance, in their meta-analysis of 20 between-group studies investigating the effects of behavioral modification treatments in school and home settings, Fabiano et al. (2009) found a large effect size of .74. This effect size indicated that behavioral modification treatments lead to significant improvement of outcomes among preschool-aged students with ADHD. The literature that follows will review examples of evidence-based classroom and parent training interventions used to reduce behavior problems and symptoms associated with ADHD in the preschool years.

Classroom behavioral interventions. School-based interventions are a venue for reducing disruptive behaviors associated with ADHD among young children, although

studied infrequently. Classroom interventions primarily focus on social skills with peers, behaviors in the classroom, and academic achievement (Pfiffner & Barkley, 1998). One example of an intervention used in the classroom is The Good Behavior Game, which is shown to reduce aggressive behaviors among Kindergarten children at high risk for ADHD symptoms (Kellam et al., 1994). During this intervention, children were divided into teams and received reinforcement from teachers when they exhibited few aggressive and disruptive behaviors during instruction.

Other strategies utilized in the literature have included token economy systems, daily report cards, time-out, response cost, social skills training, and instruction in self-control. For example, Shelton et al. (2000) examined the effects of these strategies with 37 kindergarten students with especially high levels of challenging behaviors as compared to a group of comparison children. The strategies were implemented throughout the entirety of the children's Kindergarten school year. Immediately after the intervention, children improved in their levels of aggression, social skills, and self-control within the classroom. However, the strategies did not improve problem behaviors within the home setting. When reassessed two years later, treatment effects were no longer evident (Shelton et al., 2000).

In another study, Binder et al. (2000) administered a self-control intervention with three preschool-aged children with ADHD. The intervention consisted of choices, distracting activities, and large amounts of reinforcement for children's waiting turns. Significant improvements were evidenced in the three children's levels of self-control (Binder et al., 2000). A similar intervention was implemented by McGoey and DuPaul (2000) with four preschool students with ADHD. Teachers rewarded children for their

appropriate classroom behaviors by placing buttons on a behavior chart, and responded to inappropriate behaviors by removing buttons from the chart. Buttons were exchanged at the end of the day for various rewards. Children's disruptive behaviors declined as a result of these strategies (McGoey & DuPaul, 2000). In a recent meta-analysis conducted by DuPaul, Eckert, and Vilardo in 2012, school-based interventions identified in the literature were associated with moderate to large effects for academic and behavioral outcomes among students in kindergarten through the 12th grade. Contingency management strategies and cognitive-behavioral interventions were identified as having the strongest effects on behavior outcomes (DuPaul et al., 2012).

Parent training. One non-pharmacological treatment that has received the highest consumer satisfaction is behavior modification in the form of parent training (MTA Cooperative Group, 1999). Though most parent training programs are not specifically designed for children with ADHD, parent training is a well-established form of treatment for this disorder according to the American Psychiatric Association Presidential Task Force on Evidence-Based Practice (2006). The clinical guidelines of the National Institute for Health Care and Excellence (NICE) (2009) recommend parent training as a first line of treatment for preschool-aged children diagnosed with ADHD. The treatment applies principles from social learning theory through the manipulation of antecedents and consequences to behavior (Bandura, 1977; Murray, 2010). Currently available parent training curricula can be categorized into two different approaches: traditional parent programs and interaction therapies (Murray, 2010).

Traditional parent programs. Most traditional parent training programs entail psychoeducational presentations and didactic instruction in identifying and manipulating

antecedents and consequences to behavior, as well as using techniques to target problem behaviors. Parents are taught to praise and reward prosocial behaviors (e.g., via positive attention, token economy system) and reduce problem behaviors through effective commands, planned ignoring, and evidence-based disciplinary methods (e.g., time-out from reinforcement). Sessions may consist of a combination of modeling, role-play activities, and parents' practice of learned skills at home with their children. Parental risk factors, such as parents' stress or need for social support, are also typically addressed through parent training programs.

Several traditional parent programs and curricula have been developed and studied since the early 1980's. Many of these programs have similar goals and supporting theories, but often differ in delivery format and process. The first randomized study of the effects of parent training on ADHD symptoms was conducted by Pisterman, McGrath, and Firestone (1989). The study utilized material from two of the first traditional parent group training curricula developed in 1981: *Helping the Noncompliant Child* (Forehand & McMahon, 1981) and *Hyperactive Children* (Barkley, 1981). The parents of 23 children attended 12 sessions, 10 of which were in a group format. Two of the sessions were individual sessions with the therapist, in which children joined their parents. The first three sessions were didactic and instructed parents in behavior management principles. The following eight sessions prepared parents to apply differential attention, give effective commands, and use time-out with their children via didactic presentations, modeling, and role-playing. The last session served as a review for parents in managing future behavior problems. The study also included a wait-list control group of twenty-three parents. At post-treatment, the children whose parents

received the training had improved compliance with their parents' commands (Pisterman et al., 1989). Parents' use of appropriate commands, behavior management skills, and positive interactions with their children had also improved after the training. These results maintained for three months after the end of treatment. In contrast, the children in the control group demonstrated no changes over time.

Two more recently developed traditional parent training programs include the *Incredible Years Parent Training Series* (Webster-Stratton, 2001) and the *Triple P Positive Parenting Program* (Sanders, 1999). Both programs are considered to be evidence-based and aim to improve parents' behavior management skills in reducing their children's behavior problems. Through the *Incredible Years* series, parents learn how to play with their children, use incentives and praise to reinforce appropriate behavior, set limits, and address misbehavior using effective discipline strategies. The intervention is implemented in a group-format, in which parents view videos of parent models in natural settings and routines. The videos model effective parenting strategies. Parents engage in group discussions based on the videos, while therapists supplement knowledge through role-play. The *Triple P Positive Parenting Program* (Sanders; 1999) consists of five levels of intervention that increase in strength depending on families' needs. Interventions range from the distribution of parenting resources and brief parenting advice consultations to individually designed modules that teach specific parenting, mood management, and stress coping skills. Children join parents during a few of the sessions so parents can practice learned skills.

Interaction therapies. A more intensive form of parent training targets parent-child interactions through modifying interactional contingencies that maintain problem

behaviors (Gallagher, 2003). This type of training is particularly relevant to the literature regarding the etiology of ADHD, as family interaction patterns have been shown to contribute to the variance in ADHD symptom expression (DuPaul et al., 2001; Keown, 2012). Two interaction therapies have been developed: the *New Forest Parenting Package* (NFPP; Sonuga-Barke, Thompson, & Abikoff, 2006) and *Parent-Child Interaction Therapy* (PCIT; Eyberg, 1988). NFPP, the most recently developed program, is an eight-week home visiting program that has only been evaluated twice in the literature. In the first evaluative study of the program, 79 three-year-old children exhibiting ADHD symptoms were randomly assigned to NFPP, parent counseling, or a control group (Sonuga-Barke, Thompson, Daley, Laver-Bradbury, & Weeks, 2001). The intervention was provided by specialist health visitor therapists working in a mental health service. Children of parents who participated in NFPP had significantly lower ADHD rating scores than children in the two other groups immediately following treatment and after 15 weeks. A second randomized study was conducted to examine the effects of the intervention when delivered by non-specialist nurses in routine primary care. This study was designed to address the researchers' concerns that the large expenses associated with specialist services would prevent the majority of young children with ADHD from accessing treatment (Sonuga-Barke, Thompson, & Daley, 2004). After the program was implemented with a similar sample of 147 families of three-year-old children, no treatment effects were found when the intervention was provided as routine primary care, rather than in a specialized setting (Sonuga-Barke, Thompson, & Daley, 2004). Moreover, at post-treatment, mothers who had received the training indicated

they were more distressed, felt less effective in managing their children's behaviors, and were less satisfied with the NFPP treatment.

Although more research is needed to determine the efficacy of NFPP among preschool-aged children, PCIT remains the most empirically supported interaction treatment. Developed by Sheila Eyberg in 1988, PCIT is an evidence-based and data-driven parent training program for children in preschool with behavior problems (Brinkmeyer & Eyberg, 2003; Herschell, Calzada, Eyberg, & McNeil, 2002; Nixon, 2001). In particular, PCIT was designed to decrease problem behaviors among children with Oppositional Defiant Disorder (ODD) and Conduct Disorder (CD). The therapy utilizes live coaching during parent-child play interactions to improve child and parent outcomes. Numerous studies have demonstrated clinical and significant improvements in children's behavior and parents' interactions with their children using parent and teacher rating scales, structured observations, long-term follow-up, and the use of a wait-list control group (Hood & Eyberg, 2003; McNeil, Capage, Bahl, & Blanc, 1999; Nixon, 2001; Schuhmann et al., 1998).

Given PCIT's strong evidence base and direct relation to environmental contributions to the etiology of ADHD (DuPaul et al., 2001), PCIT has been selected as the independent variable in the current study. As such, the next section of the literature review will provide a thorough description of the therapy, including the treatment's purpose, goals, and theoretical foundations.

Parent-Child Interaction Therapy

Purpose and goals. PCIT works to improve children's behaviors through parent modeling, ignoring of inappropriate social behaviors, and labeled praise of appropriate

behaviors. Live coaching is provided during parent-child play interactions across two phases: child-directed interaction (CDI) and parent-directed interaction (PDI). The purpose of CDI is to enhance the relationship between parents and their young children, as well as improve children's social skills, through the development of positive parenting skills. PDI prepares parents to manage their children's behaviors through the use of firm and consistent discipline, effective commands, and use of a time-out chair and time-out room.

Theory of change. The CDI phase of PCIT is based upon attachment theory, which emphasizes the importance of sensitive and responsive parenting in order to foster children's understanding that their parents will respond to their needs (Ainsworth, 1989). Stable attachments between parents and their children help to promote children's social, behavioral, and emotional development and allow children to feel secure in their relationships (Thompson, 2008). In this way, parents' learning and practice of CDI skills work to provide children with a secure attachment.

The behavior principles used in the PDI phase are grounded in social learning theory. In particular, Patterson's (1982) coercion theory maintains that disruptive behaviors are developed through maladaptive parent-child interactions. These interactions are interrupted when parents begin delivering clear and consistent limit setting. Through PCIT parents thus learn to establish consistent contingencies for their children's behaviors while maintaining a positive and secure relationship with their children.

The theoretical behavior principles utilized in PCIT to increase appropriate behaviors in both children and their parents include positive and negative reinforcement,

stimulus control, and shaping. Positive reinforcement occurs when a stimulus or an event is introduced contingent on a behavior, which causes the behavior to increase in frequency (Martin & Pear, 1996). In PCIT, parents introduce positive reinforcers (e.g., verbal or physical attention, smiling, enthusiasm) in response to a child's appropriate behavior in order to increase the particular behavior. Parents also are positively reinforced by PCIT therapists when they successfully demonstrate the skills learned through the treatment. Parents thus increase the frequency with which they use these skills as a result of being positively reinforced for these verbalizations or behaviors. Negative reinforcement similarly increases the frequency of behavior through the removal or prevention of an aversive stimulus or event upon the occurrence of a behavior (Hineline, 1977). This principle occurs in PCIT when a child exhibits appropriate behavior in time-out. For instance, it is only when appropriate behaviors are demonstrated by the end of the time-out sequence that a child can return to play with his or her parent. Removal from the aversive event of time-out therefore increases the frequency of the child's appropriate behaviors. Stimulus control works to increase appropriate behavior through the presentation of a discriminative stimulus that makes appropriate behavior more likely to occur (Dinsmoor, 1995). For instance, when children do not comply with their parents' commands during PDI, they are given a verbal warning that reminds them they will go to the time-out chair if they do not comply. If the child does not comply, she or he is seated in the time-out chair, and the child forms an association between the verbal warning and the aversive experience of sitting in the time-out chair. As the PDI phase continues, children are more likely to choose compliant behavior after receiving a verbal warning due to their history associating the warning

with the time-out chair. Finally, shaping is used in PCIT to gradually produce target appropriate behaviors through the principles of extinction and differential reinforcement. The shaping principle can be used to teach children to stay in the time-out chair for three minutes during the PDI phase. Children who are very young or who are especially active can be first taught to stay in the time-out chair for 30 seconds to a minute. When children are successful with these shorter time periods, the duration of time-out can be gradually extended until the child can remain seated for three minutes. In sum, several theoretical behavioral principles that are founded in research are consistently used to increase desired behaviors among children and their parents in PCIT.

Several theoretical principles are also utilized to decrease the occurrence of inappropriate behaviors across the PCIT phases and include positive and negative punishment, extinction, and over-correction. Positive punishment is the presentation of an aversive or annoying stimulus in order to reduce undesired behaviors (Martin & Pear, 1996). An example of this principle in PCIT occurs when a parent repeatedly ignores the therapist's instruction to practice one of the PRIDE skills. In order to decrease the parent's non-compliant behaviors, the therapist repeats the instruction continuously until the parent complies. The instruction therefore acts as an aversive or annoying stimulus. Negative punishment is a similar behavioral principle characterized by the response-dependent removal of reinforcement (Baron, 1991). A certain stimulus becomes associated with or signals the removal of positive reinforcement. For instance, upon children's mild misbehaviors during play (e.g., whining), parents are taught to turn around and ignore their children until appropriate behavior is demonstrated. The parents' repositioning themselves so their backs are facing their children becomes a signal to the

child that their behaviors are soon to be ignored, thus functioning as a negative punishment. Extinction consists of a permanent and consistent removal of reinforcement in response to a behavior that had previously been reinforced. This behavior principle works to decrease and eventually make extinct a targeted undesired behavior. An example in the PCIT context includes parents' ignoring their children's whining behavior each time it occurs. Overcorrection is a strategy in which children demonstrate an appropriate behavior that is related to a prior inappropriate behavior (Foxx & Azrin, 1972). The strategy works through the over-teaching of an appropriate behavior in order to increase the occurrence of the behavior in the future. For instance, after a child sits in the time-out chair for three minutes due to noncompliance, the child is asked to comply with the original command, followed by a second command. By having the child practice compliance twice after exhibiting non-compliance, the desired compliant behavior is over-taught.

Two factors that are hypothesized to further predict positive outcomes among children and parents who participate in PCIT include the consistency with which children's caretakers implement disciplinary practices and parents' practice of skills within the home setting. Stakeholder consistency in parenting is one of the goals of PCIT, as consistent rules and expectations provide children with an increased sense of security and responsibility and reduce children's limit testing behaviors (Eyberg & Funderburk, 2011). Research suggests intensive parenting interventions may be most needed and most effective among children with behavior problems whose parents utilize inconsistent parenting practices (Kaminski et al., 2008). Moreover, parents' cognitions regarding their rationale for their use of parenting practices has been shown to account for a significant

amount of variance in treatment outcomes among children diagnosed with ADHD (Hoza et al., 2000). For example, when compared to children of fathers with high parenting efficacy, children of fathers with lower parenting efficacy demonstrated poorer outcomes after receiving a standard treatment for ADHD (Hoza et al., 2000). Similarly, parents' progression in the therapy greatly depends on their practice of evidence-based parenting skills at home (Urquiza, Zebell, Timmer, McGrath, & Whitten, 2011). In contrast to traditional parent training curricula that rely on role-play, parents' practice of PCIT skills via live play interactions with their children in their natural settings is crucial to parents' development of skills.

Impact of PCIT on Children Diagnosed with ADHD

Given the strong evidence for PCIT as an effective intervention in improving children's problem behaviors and parent-child relationships, PCIT has been viewed as a promising nonpharmacological treatment option for young children with ADHD (Matos, Bauermeister, & Bernal, 2009). However, few recent studies have examined this potential use of the intervention. For instance, only two out of five identified studies on this topic were conducted within the past decade (i.e., since 2003). The first study conducted by Eisenstadt et al. (1993) implemented PCIT with 24 children aged two and a half to seven, 71% of whom met DSM-III-R diagnostic criteria for ADHD. The remaining children were diagnosed with ODD or CD. Ninety percent of children were male. PCIT was implemented for a limited period of time (i.e., seven weeks). Fifteen and ten percent of children still met criteria for an ADHD diagnosis post-treatment and at a six week follow-up, respectively (Eisenstadt et al., 1993). In particular, children's ADHD symptoms as measured by the Werry-Weiss-Peters Activity Rating Scale (WWP;

Werry, 1968) reduced from clinical to normal limits from pre- to post-treatment. Furthermore, parent-reported ratings on the Eyberg Child Behavior Inventory (ECBI; Eyberg, 1974) and the CBCL (Achenbach, 1991) also reduced from significantly clinical levels to within normal limits (Eisenstadt et al., 1993).

Eyberg et al. (2001) examined the maintenance of effects found in the prior study conducted by Eisenstadt and colleagues in 1993. Follow-up sessions were scheduled one and two years after treatment, in which mothers completed the ECBI, CBCL, and Werry-Weiss-Peters Activity Rating Scale (Werry, 1968). After PCIT was completed, 11 out of 13 children available for follow-up assessments no longer met criteria for their respective diagnosis at the beginning of the study (Eyberg et al., 2001). After two years, mothers reported that their stress levels and their children's behavior problems remained at post-treatment levels. Moreover, only three children met criteria for ODD, CD, or ADHD, and only two mothers in the study had sought pharmacological treatment for their children (Eyberg et al., 2001).

Funderburk et al. (1998) recruited a larger sample of 84 boys aged two to seven, who were randomly assigned to receive PCIT or participate in a control group. Twelve families of boys diagnosed with ADHD, ODD, CD, or a combination of the three diagnoses received PCIT, while the remaining children served as comparison participants. The generalization of treatment effects was also assessed in the classroom following PCIT. Children whose parents received PCIT had significantly reduced behavior problems as measured by the CBCL and ECBI immediately after and 18 months after post-treatment (Funderburk et al., 1998). Children's ADHD symptoms as measured by the Hyperactivity Index of the Revised Conners Teacher Rating Scale (RCTRS;

Goyette, Conners, & Ulrich, 1978) reduced from pre- to post-treatment but no significant treatment effects were found. Generalization of behavior improvements was not evidenced in the school setting after 18 months. The researchers hypothesized this particular result was found due to the increased academic and attention demands in later elementary school years as compared to preschool or early elementary school years. As such, a recommendation for additional treatment was made for students with behavior disorders once they reach elementary school (Funderburk et al., 1998).

Both of the two most recent studies conducted in 2006 and 2009 utilized an adapted PCIT manual to address the ADHD symptoms of preschool-aged children aged four to six in Puerto Rico. In the first of these studies, nine families in Puerto Rico engaged in a psychoeducational module on common ADHD symptoms and associated difficulties, followed by eight CDI sessions and nine PDI sessions (Matos, Torres, Santiago, Jurado, & Rodriguez, 2006). Ten out of the twelve children recruited in the study were male, and seven had been diagnosed with ADHD Hyperactive-Type or Combined-Type. The treatment was modified in several ways to better adapt to the families' culture and individual needs. For instance, extended family members (e.g., grandparents) were included in treatment, and the loss of privileges was added as a PDI strategy for children who actively refused to sit in the time-out chair. At the end of treatment, mothers' reports via the CBCL indicated significant reductions in children's hyperactivity and behavior problems (Matos et al., 2006). Mothers also reported having less stress and improved parenting skills, as measured by translated versions of the Parent Practices Inventory (PPI; Salas, 2003) and The Therapy Attitude Inventory (TAI; Eyberg, 1993). PCIT was associated with high satisfaction levels among parents and results

maintained after three months post-intervention. Limitations included the absence of a control group and mothers' sole reporting of changes in children's behaviors and symptoms, parents' stress, and parenting skills. Moreover, the measures used in the study were not normed with the target population.

Matos, Bauermeister, and Bernal (2009) continued to study the effects of PCIT with Puerto Rican families using a larger sample size and adding a wait-list control group to the study design. Twenty families of children diagnosed with ADHD aged four to six were randomly assigned to receive PCIT, while twelve families were placed in a wait-list control group. PCIT was delivered in the same format and context as the first study. The same measures also were utilized to assess treatment effects. Treatment integrity was established via a checklist of therapists' actions during treatment sessions. Similar to results found in the first study (Matos et al., 2006), mothers reported significant declines in children's hyperactivity, impulsivity, and aggressive behavior problems (Matos et al., 2009). In particular, the effect sizes ranged from 1.37 to 2.04. An important finding of the study was that the effect sizes equated to or exceeded the effect sizes associated with children's stimulant use in the PATS study (Greenhill et al., 2006). In addition, mothers indicated reduced levels of stress related to children's behaviors, improved parenting skills, and more confidence in their behavior management practices. These positive results were again evident after three and a half months. The results from the two most recent studies conducted by Matos et al. (2006; 2009) suggest PCIT may be a suitable alternative to medication in the treatment of ADHD among very young children.

Purpose of the Current Study

Preschool students whose ADHD symptoms are not addressed are at greater risk of later functional impairment than children who receive treatment (Lahey et al., 2004). Early intervention that targets environmental factors contributing to the etiology of ADHD has the potential of reducing developmental risks, preventing further impairment, and improving children's readiness for school (Sonuga-Barke et al., 2003). It is therefore imperative to provide treatment for preschool-aged children in order to optimize student outcomes (Greenhill et al., 2008). Behavior modification in the form of parent training is a well-established form of treatment for ADHD that has received the highest consumer satisfaction and is recommended as the first line of treatment for preschool children with ADHD (APA, 2006; MTA Cooperative Group, 1999; NICE, 2009). One of the most empirically supported and data-driven parent training programs for children in preschool with behavior problems is PCIT (Eyberg, 1988). This study investigated the efficacy of PCIT in reducing the problem behaviors and symptoms associated with ADHD among preschool-aged children aged three to five. The results of the study will add to the extant literature investigating the efficacy of PCIT as an alternative to pharmacological treatment for this population.

PCIT is theorized to alleviate ADHD symptoms, as a variety of studies have indicated a connection between maladaptive and negative parent-child interactions during the first years of a child's life and exacerbated ADHD symptoms and other emergent problem behaviors (Jester et al., 2005; Gadeyne et al., 2004; Keown, 2012; Keown & Woodward, 2002; Morrell & Murray, 2003; Olson, Bates, Sandy, & Schilling, 2002; Peris & Baker, 2000). PCIT also may benefit this population because preschool-aged

children with ADHD function best when placed in structured environments that are characterized by specific commands and directions (McGoey, Eckert, & DuPaul, 2002). Further, since PCIT assigns parents as the implementers of the therapy, parent factors are theorized as an important process in the promotion of positive child outcomes (Hoza et al., 2000). In particular, two factors included in the current study as predictors of child outcomes include inconsistency of caregivers' parenting practices and mothers' practice of newly learned skills.

Very few recent studies have examined the use of PCIT to reduce problem behaviors that accompany ADHD symptoms among preschool-aged children as young as three (Eyberg et al., 2001). The two most recent studies conducted by Matos et al. in 2006 and 2009 utilized a culturally adapted version of the PCIT manual. In addition, these two studies offered a time-limited treatment, instead of allowing families to continue the intervention until all criteria indicating successful mastery of parenting skills were met. The intervention used in these two studies, while adapted to best suit families' needs, violated the originally designed and tested treatment protocol. The current study addressed this gap in the literature by requiring participants to meet all criteria prior to terminating treatment.

Chapter Three: Research Methods

This chapter reviews the research methods of the current study. The participants of the study will be described first. This section includes a discussion of recruitment procedures, inclusion/exclusion criteria, risks to participants, and protection of human subjects. The intervention under study will be described next, followed by the measures, research design, and procedures that were used in the study. The chapter will end with a review of the data analyses that were conducted to answer the study's research questions.

Participants

Participants included four male children aged three to five and their mothers. Mother-child dyads were recruited based on mothers' interest to participate in the study (i.e., convenience sample). The selected sample size satisfied *What Works Clearinghouse* (WWC) criteria for experimental control, in which attempts should be made to demonstrate at least three treatment effects at three different points in time (Kratochwill et al., 2010).

Recruitment procedures. Children and their mothers were recruited via referrals to the USF Division of Pediatric Neurobehavioral Health at Children's Medical Services. Referrals were made by healthcare professionals representing the university division. Healthcare professionals distributed study flyers to families they wished to refer and instructed parents to contact the Primary Investigator if they wished to participate in the study. Please see Appendix A for the study flyer that was used to recruit participants.

Inclusion/exclusion criteria. The following section will review the inclusion and

exclusion criteria used to recruit study participants.

Child participants. To be included in the study, children must have had an already established diagnosis of ADHD Predominantly Hyperactive/Impulsive Type or ADHD Combined Type. Diagnoses were considered established if conferred by qualified health care providers using several methods of assessment, including DSM-IV or DSM-5 criteria, interviews with multiple informants, and observations. Diagnoses based on DSM-IV and DSM-5 criteria were accepted as established, as the same number and types of ADHD symptoms are used in both editions for diagnosis (APA, 2013). Mothers were asked to present a signed psychological report indicating diagnostic criteria had been met. The research team reviewed the psychological report and returned it to the parent. No copies of the report were retained.

Children diagnosed with ADHD Inattentive type were excluded from the study, as children diagnosed with this disorder are not particularly at risk for developing disruptive behavior disorders (Barkley, 2006). Children with comorbid ODD and speech/language difficulties were included so as not to restrict recruitment opportunities. Moreover, PCIT has been shown to be effective with children diagnosed with comorbid ADHD and ODD (Eyberg, Funderburk, Hembree-Kigin, McNeil, Querido, & Hood, 2001; Gallagher, 2003). Children with comorbid ASD and pervasive developmental disorder were excluded, as children with these two comorbid conditions are less likely to benefit from PCIT (Hembree-Kigin & McNeil, 1995). Children were required to have an intelligence quotient (IQ) of at least 70 as measured during screening by two subtests of the Stanford-Binet Intelligence Scale, 5th Edition (SB5; Roid, 2003). Children also must have spoken

fluent English. Children were required to not take medication, receive other forms of psychotherapy, and show no evidence of significant sensory or neurological difficulties.

During a preliminary screening session, children must have met criteria on the Eyberg Child Behavior Checklist (ECBI; Eyberg & Pincus, 1999) and the Behavior Assessment System for Children, Second Edition – Progress Monitor (BASC-2 PMR; Reynolds & Kamphaus, 2009) to ensure the children's problem behaviors and ADHD symptoms were clinical in nature and would benefit from therapy. Once recruited, each of four child participants were screened to ensure that inclusion criteria were met.

Caregivers. Mothers also were required to be fluent in English and have access to transportation to and from the location where PCIT was provided. Mothers were to report absence of severe physical impairments in order to participate in the study (e.g., deafness, blindness).

Four mother-child dyads met the study inclusion criteria. One dyad declined further participation after six weeks of baseline and five weeks of intervention, leaving a sample of three parent-child dyads. The dyad chose to withdraw from the study due to discomfort with the time-out procedure as implemented through PCIT. Table 1 displays the demographic information for all four mother-child dyads who were recruited to participate in the study. The demographic data from the current sample were compared to the demographic profile of the 40 children and parents who received PCIT from June of 2011 to present at the university pediatric psychology clinic in which PCIT services were provided (see Table 2).

Table 1

Participating Parent and Child Demographic Information

Variable	Number	
	Mother	Child
Gender		
Male	0	4
Female	4	0
Average Age	37.75	4.23
Race/Ethnicity		
Black/African American	0	0
Hispanic/Latino	0	0
White	4	3
Bi-racial	0	1
Primary Diagnosis		
Attention-Deficit/Hyperactivity Disorder		2
Attention-Deficit/Hyperactivity Disorder with comorbid ODD		2
Marital Status	1	
Divorced	3	
Married		
Highest Level of Education		
Associate's degree	1	
Bachelor's degree	1	
Master's degree	2	
Adults in Home		
One	3	
Two or more	1	
Average Number of Children in Home	2.75	

Table 2

Child Demographic Data at the Pediatric Psychology Clinic

Variable	Number
Gender	
Male	31
Female	9
Average Age	5.7
Race/Ethnicity	
Black/African American	4
Hispanic/Latino	5
White	28
Bi-Racial	2
Primary Diagnosis	
Oppositional Defiant Disorder	22
Attention-Deficit/Hyperactivity Disorder	5
ASD	10
Reactive Attachment Disorder	3

Risks and costs to participants. Risks included mothers' increased stress levels due to the extra time needed to participate in the study. Mothers also may have experienced stress associated with the discipline procedures involved in PDI (i.e., placing children in the time-out chair and room). Children also may have not enjoyed CDI and PDI activities and procedures. Participants incurred travel costs for scheduled intervention sessions, which were not reimbursed.

Participant compensation. Mother-child dyads received a total of $70 for participating in the study. Specifically, dyads received $10, $15, $20, and $25 for completion of scales pre-intervention, after the CDI phase is completed, post-intervention, and at a three-month follow-up session, respectively.

Protection of human subjects. Each mother/child dyad was assigned a code number. Data collected via measures used in the study were coded using these assigned code numbers. Data were kept in a computer file owned by the primary investigator and protected by a password. Only the primary investigator had access to files containing

study data. Signed consent forms and collected data were and will continue to be stored in a locked file cabinet belonging to the principal investigator for at least five years after IRB approval has expired. Upon completing the study, the computer file containing data linked with participant names will be destroyed.

Setting

In the current study, PCIT was conducted at the Division of Pediatric Neurobehavioral Health located within the Children's Medical Services building at the University of South Florida. The clinic offers developmental and behavioral screenings, evaluations, consultation, and treatment services to families of children between the ages of birth to twelve years. Common services provided are related to concerns with children's noncompliant and/or destructive behavior, developmental delay, academic concerns, ASD, and inattention and/or hyperactivity and impulsivity.

The therapy was held in two adjoining rooms linked by a one-sided mirror. During the intervention, one of the rooms was used as a therapy room, while the other room served as an observation room. The therapy room contained two large chairs, a large couch, a desk, and a large rubber mat placed on the floor. While parents and their children played with toys on the mat in the therapy room, therapists observed and coached parents on the other side of the one-way mirror in the observation room. One of the chairs in the therapy room served as the time-out chair during PDI. The therapy room was also used as the time out room when needed. The therapist and mothers wore bluetooth "bug-in-the-ear" devices that allowed them to engage in two-way communication with each other during the training.

Parent-Child Interaction Therapy

The section that follows reviews the two phases of PCIT (i.e., CDI, PDI). The outline of treatment sessions will be discussed, followed by the behavior management skills associated with each phase. The review will conclude with a discussion of the coaching process and materials used in PCIT.

Outline of treatment sessions. Per the PCIT protocol (Eyberg & Funderburk, 2011), a similar outline of procedures was used in CDI and PDI phases. Please refer to Appendix B for a sample PCIT session protocol. The first CDI and PDI sessions were held without children present for the purpose of reviewing the skills associated with each phase. During these two teaching sessions, the therapist modeled skills and procedures for the parent, followed by role-play. In particular, the therapist and mother took turns role-playing the skills to allow the parent to practice skills. Mothers' caretaking partners (e.g., father of the child) were invited to attend the two teaching sessions if they wished to become involved in the intervention. Caretaking partners also were invited to observe PCIT sessions in the observation room. The fathers of three of the child participants attended the PDI Teach session but did not observe other PCIT sessions.

All remaining sessions were held with both mothers and their children, during which the therapist facilitated mothers' practice of skills. During the first three minutes of practice sessions, the therapist addressed any stressors in the mothers' lives that were unrelated to their children's behavior. At each session mothers were also asked if their child was receiving other treatments, such as medication or therapy. This question was asked in order to ensure that PCIT was the only treatment contributing to any changes in

the dependent variables. Throughout all PCIT sessions, each mother reported that her child was not receiving medication or any other form of therapy.

The therapist then reviewed the mothers' homework sheets and provided advice and feedback as needed. Mothers' play interactions with their children were next observed and coded. CDI skills were observed and coded for five minutes using the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg & Robinson, 1983) at the beginning of each session except for the first and last PDI sessions. PDI skills were observed and coded during each PDI session. Following the observations, the therapist prioritized coaching goals for the session. For instance, the therapist helped mothers practice any CDI and/or PDI skills in which they had not met criteria. At the end of the session, mothers were shown their progress in acquiring the CDI and PDI skills, as well as the graph displaying their ECBI scores. To conclude, the therapist asked mothers to practice the CDI and/or PDI skills each day for five minutes during play interactions with their children. Parents' practice of skills at home were recorded via a homework sheet from the PCIT manual.

CDI skills. In CDI, parents were taught parenting skills during periods of play in the form of an acronym: PRIDE. The acronym represents the skills of praise, reflections, imitation, descriptions, and enjoying. Table 3 lists the verbalizations parents were asked to avoid, while Table 4 displays the definition and example of the skills associated with each letter in PRIDE. Content featured in the tables were derived from the PCIT manual (Funderburk & Eyberg, 2011). For example, parents were taught to avoid criticism with their child and to ignore mild negative behaviors, such as whining and crying. Table 5 presents ways for parents to handle problem behaviors during play. Parents did not

progress to PDI until they met criteria for having mastered the skills shown in Table 4. In particular, within a five-minute observation, parents must have verbalized ten labeled praises, reflections, and behavioral descriptions. They must have also verbalized fewer than three commands and questions during the observation.

PDI skills. During PDI, the therapist facilitated the parents' use of both CDI and PDI skills during play. PDI skills consisted of mothers' use of effective commands and the time-out procedure. For example, the therapist taught mothers to give direct commands such as, "Please hand me the yellow block." Parents were advised to begin with very simple direct commands (e.g., handing parents a toy). As mothers experienced success in the PDI procedures, commands were used for more real-life situations (e.g., clean up, walking instead of running) and mothers were asked to practice the procedures during their play at home.

Table 3

Parent Verbalizations to Avoid

To Avoid	Reasons	Examples
Command: Commands tell child to do something	Takes the lead away from child Can cause conflict	Indirect Command: "Let's play with the farm next" Direct Command: "Give me the pigs"
Questions: Questions call for child to give an answer	Leads the conversation Many questions are commands and requires an answer May seem like parent is not listening or that parent disagrees	"We're building a tower, aren't we?" "You're drawing it red?"
Criticism and Sarcasm: Criticism and sarcasm express disapproval of child	Gives attention to negative behavior Lowers child's self-esteem Causes angry feelings between parent and child Teaches child negative social behavior	"That wasn't very smart" "I don't like your attitude"

Table 4

Parent CDI Skills

Skill	Reasons	Examples
Praise: Labeled praises tell child exactly what parent likes	Increases the behavior that is praised Shows approval Improves child's self-esteem Makes child feel good	"Good job building that tower" "You drew a pretty tree"
Reflect: Reflections repeat or paraphrase what the child says	Lets child lead the conversation Shows interest Demonstrates acceptance and understanding Improves child's speech Increases verbal communication	Child: "I drew a tree" Parent: "Yes, you made a tree"
Imitate: Imitation copies what the child is doing with the toys	Lets child lead Shows child parent approves of his/her game Makes the game fun for child Increases the child's imitation of the things that parent does Teaches child how to play with others and take turns	Child: (drawing circles on a piece of paper) Parent: "I'm drawing circles on my paper just like you"
Describe: Behavior descriptions say what the child is doing	Lets child lead the play Shows interest Teaches concepts Models good speech and vocabulary Holds child's attention on the task Organizes child's thoughts about the activity	"You're making a tower" "You drew a square"
Enjoy: Enjoyment is when a parent acts happy and warm when they play with child	Lets child know that parent is enjoying time with child Adds to warmth of play Increases closeness between parent and child	Child: (carefully placing a blue Lego on a tower) Parent: (gently touching child's back) "You are really being gentle with the toys"

Table 5

Parents' Handling of Problem Behaviors

Handling Problem Behaviors	Reasons	Examples
Ignore Minor Misbehavior: Ignoring includes looking away, showing no expression, and saying nothing to child. First positive behavior from child is praised	Helps child notice the difference between parents' responses to positive and negative behaviors Although the ignored behavior may get worse at first, consistent ignoring reduces attention-seeking behavior	Child: (crashing into parent's tower with toy plane) "I crashed yours" Parent: (looks away) "My plane flies in circle"
Stop the Play for Aggressive and Destructive Behaviors	Aggressive and destructive behaviors cannot be ignored because they can be dangerous	Child: (hits parent) Parent: (gathering toys) "Special time is over because you hit me" Child: "Oh, oh, oh Mom. I'm sorry. Please, I'll be good" Parent: "Special time is over today. We will play again tomorrow"

Mothers were then taught how to react to a child's compliance or non-compliance. If a child complied with the mothers' requests, mothers were encouraged to praise their child for following directions. If a child did not comply with the parent's request within five seconds, the therapist guided parents through a series of discipline steps. The first step was to give the child a warning such as, "If you do not give Mommy the yellow block, you will have to go to the time-out chair." If the child obeyed after this warning, labeled praise was given to the child for complying. If the child continued to disobey, the mother physically placed the child in a time-out chair for three minutes and five quiet seconds. For instance, after three minutes, if a child continued to yell in the time-out chair, the mother waited until the child was quiet for five consecutive seconds to end the time-out procedure.

The therapist then instructed the mother to ignore her child's behaviors and verbalizations while in the time-out chair. Once a child achieved three minutes and five quiet seconds in the time-out chair, the mother approached the child and asked if he was ready to comply with the original task (e.g., "You're sitting quietly. Are you ready to hand me the yellow block?"). If the child indicated he was not ready, the time-out procedure occurred again for three minutes and five quiet seconds. If the child indicated he was ready, the mother guided him back to the play area and repeated the direct command. Once the child complied, the parent acknowledged the compliance (e.g., by saying "fine") and gave the child another command. This particular procedure was completed to "over-teach" compliance to the child by providing many practice opportunities for the child to follow directions.

Mothers subsequently learned how to react when their child did not achieve three minutes and five quiet seconds in the time-out chair (i.e., by leaving the chair, which transpires when 50% or more of a child's body is off the chair). If a child left the time-out chair, parents progressed to the time-out room procedure. During this procedure, children were left alone in the therapy room for one minute and five quiet seconds. This procedure was conducted in order to remove all potential parent attention from the child, including the mother's presence in the room. Children were given a warning the first time they attempted to leave the time-out chair (e.g., "Sit in the time-out chair until I say you can get off or you will have to go to the time-out room"). This warning was only given once to the child. If the child continued to leave the time-out chair, the mother told the child, "You got out of the chair, so now you're in the time-out room) and left the therapy room. Mothers joined the therapist in the adjoining room and watched the child

to ensure his safety and waited for the five quiet seconds after one minute had elapsed. After the child achieved five quiet seconds in the time-out room, the mother returned to the room and placed the child in the time-out chair, saying, "Sit here until I say you can get off." The time-out room procedure was conducted again if the child continued to leave the time-out chair. Conversely, if the child successfully sat in the time-out chair for three minutes and five quiet seconds, mothers engaged in the over-correction procedure described above. Throughout both the time-out chair and time-out room phases, the therapist was responsible for timing the procedures and making parents aware of when it was time to proceed to the next steps.

Once the behavior management skills were perfected in a controlled setting, mothers practiced the skills at home and in public settings in order to generalize their skills and children's appropriate responses. Mothers and children met PDI mastery criteria when 75% of parents' commands were effective and when parents showed 75% correct follow-through behaviors after direct commands. These criteria have been established as indicators of parents' consistency in using the PDI skills (Querido, Bearss, & Eyberg, 2002).

Process and materials. Throughout both CDI and PDI phases, live coaching was provided by a trained therapist. The therapist utilized the PCIT manual to guide mothers through the treatment steps and monitor progress. Other required materials included appropriate toys (e.g., blocks), bluetooth headphones, photocopies of worksheets and homework, and fidelity checks.

During both phases, the therapist was positive, enthusiastic, supportive, and brief and quick in her feedback and comments. At the very beginning of CDI, the therapist

used primarily positive reinforcement (e.g., using labeled praise to mothers' use of reflections, behavioral descriptions, etc.) to increase mothers' comfort in the therapy, establish rapport, and increase mothers' use of CDI skills. The therapist gradually applied corrective feedback and directive coaching (e.g., providing parents with language to use with child) as PCIT continued. During PDI, the therapist directed mothers immediately before their behaviors or verbalizations. The therapist worked to prevent mothers' errors and praised mothers for their compliance to the therapist's directive feedback. The therapist also praised mothers for their efforts in practicing the skills at home each week and for completing the homework sheets.

Measures

Screening measures. Three measures were used to screen children's ADHD symptoms, behavior problems, and cognitive abilities to ensure inclusion/exclusion criteria were met. These included the Child Behavior Checklist (CBCL; Achenbach, 1991), ECBI (Eyberg & Pincus, 1999), and two subtests of the SB5 (Roid, 2003). However, the CBCL and ECBI also served as outcome measures and will therefore be described later.

Stanford-Binet Intelligence Scale, 5th Edition (SB5). The SB5 (Roid, 2003) is a measure of general cognitive abilities among individuals aged two to 85. The scale includes ten subtests that measure five cognitive abilities, including Fluid Intelligence, Crystallized Knowledge, Quantitative Knowledge, Visual Processing, and Short-Term Memory. The subtests provide a Full Scale IQ score, as well as five factor indexes for the cognitive abilities listed above. The subtests also yield domain scores for Verbal and Nonverbal IQ. Full Scale IQ raw scores are converted to standard scores with a mean of

100 and a standard deviation of 15. Subtest scores are also converted to standard scores with a mean of 10 and a standard deviation of three. Subtest scores between seven and 13 fall within an Average range.

The SB5 was standardized with 4,800 individuals, including 1,400 children between the ages of two and five (Roid, 2003). The Full Scale IQ has an internal consistency coefficient of .98, and the Factor Index Scores have internal consistency coefficients ranging from .90 to .92. Test-retest reliability coefficients range from .82 to .92 for the factor index scores and range from .92 to .95 for the Full Scale, Verbal, and Nonverbal IQs (Roid, 2003). Finally, a criterion-related validity coefficient of .83 was established with the Wechsler Preschool and Primary Scale of Intelligence – Revised (WPPSI-R; Wechsler, 1989).

In the proposed study, two subtests measuring Fluid Reasoning (i.e., Nonverbal Fluid Reasoning) and Crystallized Intelligence (i.e., Verbal Knowledge) were administered during screening. Children's scaled scores on each of these subtests were added and then converted to an abbreviated IQ score (ABIQ). Children whose ABIQ scores were below 70 were not recruited as participants for the study. The subtests took approximately 15 minutes to complete.

Outcome measures. The tools used to measure the dependent variables of ADHD symptoms, behavior problems, parenting practices, and mothers' attitudes towards treatment are described in the following paragraphs.

Demographic questionnaire. A demographic questionnaire was completed by each mother at the beginning of the study. The questionnaire collected parent demographic data, such as age, race/ethnicity, marital status, and highest level of

education obtained. Demographic data collected for the child included the child's name, date of birth, and race/ethnicity. To assess family household dynamics, mothers were additionally asked to report the number of additional adult caretakers (e.g., father of the child) and other children living within the home. A copy of the demographic questionnaire is presented in Appendix C.

Child Behavior Checklist (CBCL). The CBCL (Achenbach, 1991) consists of five DSM-5-oriented scales with a total of 120 items: Affective Problems, Anxiety Problems, Pervasive Developmental Programs, Attention-Deficit/Hyperactivity Problems, and Oppositional Defiant Problems. The scales also yield competence and adaptive scale scores, internalizing and externalizing problem scores, and a total problem score. Items are rated as not true (0), somewhat or sometimes true (1), or very/often true (2). Ratings of children's symptoms and behaviors are based on the previous two months. CBCL scores at or above 65 on the problem scales are considered to be at risk, while scores at or above 70 are considered clinically significant. The scale takes approximately 15 minutes to complete. Examples of items include, "Demands must be met immediately," and, "Doesn't get along with other children."

The total problem scale of the CBCL has a high internal consistency value of .95 and a test-retest reliability value of .90 (Achenbach, Dumenci, & Rescorla, 2003). The individual domain scales, including the scale specific to attention problems, have internal consistency alphas ranging from .75 to .84 and test-retest reliability values ranging from .78 to .88 (Achenbach et al., 2003). During screening, all 120 items of the CBCL were administered to confirm a diagnosis of ADHD and any other existing clinical problems. The checklist was administered again immediately after dyads complete PCIT, as well as

during the follow-up session. During data analysis, only scores from the scale specific to attention problems were used to compare any changes in ADHD symptoms pre-, post-, and two months after treatment.

Eyberg Child Behavior Inventory (ECBI). The ECBI (Eyberg & Pincus, 1999) is a parent-report measure that assesses disruptive behaviors of children ages two to sixteen. The ECBI features 36 items, with each item corresponding with a unique behavior. Examples of ECBI items include, "Refuses to obey until threatened with punishment," and, "Is careless with toys and other objects." The scale is written at a 6th grade reading level.

The ECBI consists of an Intensity Scale and Problem Scale. The Intensity Scale determines the frequency of children's behaviors on a seven-option Likert scale from 1 (never) to 7 (always). The Problem Scale evaluates the extent to which the same disruptive behaviors measured via the Intensity Scale are problematic for caregivers. Assessors respond to items on this scale with "yes" or "no." The two scale scores of the ECBI are converted to T-scores with a mean of 50 and a standard deviation of 10. T-scores equal to or greater than 60 are clinically significant, while T-scores below this cut-off are within a normal range. As such, higher scores indicate greater frequency and intensity of behavior problems, as well as greater impact on parents. During screening, children must have obtained ECBI Intensity and Problem Scale scores greater than or equal to 60 to participate in the study. Similar criteria were also used to determine the clinical nature of children's behavior problems throughout the study (i.e., score of 60 or greater was considered significant, while lower scores were considered sub-clinical).

The ECBI was standardized with a normative sample of 798 children (Eyberg & Pincus, 1999). The Intensity and Problem Scales have established high internal consistency with coefficients of .95 and .93, respectively (Eisenstadt, McElreath, Eyberg, & McNeil, 1994). Test-retest reliability of the ECBI has also been established at .75 for both scales (Funderburk, Eyberg, Rich, & Behar, 2003). The Intensity Scale in particular has been found to correctly identify 96% of preschoolers with disruptive behaviors (Rich & Eyberg, 2001). The ECBI took approximately five minutes for mothers to complete.

Behavior Assessment System for Children, Second Edition: Parent Monitor Ratings for ADHD (BASC-2 PMR). The BASC-2 PMR (Reynolds & Kamphaus, 2009) is a parent-report measure assessing externalizing and ADHD problems among children ages two to 21. The 18-item measure is based on the original Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) and was created to differentiate among the three subtypes of ADHD as included in DSM-IV criteria. Examples of items include, "Disrupts the play of other children," and, "Acts without thinking." The BASC-2 PMR yields T-scores with a mean of 50. T-scores within the range of 10 to 60 indicate a normal risk level, while T-scores between 61 and 70 indicate an elevated risk level. T-scores equal to or above 71 suggest an Extremely Elevated risk level. The measure is written at a 7th grade reading level and takes approximately five minutes to complete.

The standardization sample for the BASC-2 PMR consists of the 3,483 participants aged four to 18 for whom normative data were analyzed for the original BASC (Reynolds & Kamphaus, 1992). The internal consistency of the BASC-2 PMR hyperactivity and internalizing subscales are .57 and .83, respectively. Test-retest

reliability coefficients for ages four to five ranged from .60 to .93. The BASC-2 PMR has been shown to effectively differentiate children with ADHD from children without ADHD (Vaughn, Riccio, Hynd, & Hall, 1997). The BASC-2 PMR was used as an outcome measure of children's ADHD symptoms throughout the study. Children's ADHD symptoms were considered significant if BASC-2 PMR T-scores continued to exceed 60.

Dyadic Parent-Child Interaction Coding System (DPICS). The DPICS (Eyberg & Robinson, 1983) was used as an outcome measure of parenting practices (see Appendix D). The tool assessed the quality of social interactions between children and their parents during PCIT. Parent and child behaviors were observed and recorded for five minutes during three phases: Child-Directed Interaction, Parent-Directed Interaction, and clean-up. Assessed parent behaviors included the frequency of labeled and unlabeled praise, behavioral descriptions, reflections, direct and indirect commands, questions, and critical statements. Children's compliance and non-compliance behaviors were also assessed, particularly during PDI. The DPICS was standardized with 22 families. Reliability was established using video-tapes of 60 mother-child dyads. Correlations between raters ranged from .69 to .99 (Bessmer, Brestan, & Eyberg, 2005). Table 6 displays Pearson Correlation values for each of the behaviors listed above combined across CDI, PDI, and clean-up situations.

Table 6

Reliability Estimates for the DPICS

Behavior	Pearson Correlation
Labeled Praise	.89
Unlabeled Praise	.88
Behavioral Descriptions	.69
Reflections	.75
Direct Commands	.99
Indirect Commands	.92
Questions	.93
Critical Statements	.94
Child Compliance	.92
Child Noncompliance	.85

High convergent validity and treatment sensitivity rates have also been established for the DPICS. In particular, Bessmer et al. (2005) found that seven DPICS categories (i.e., Mothers' and children's inappropriate behaviors and prosocial behaviors, children's compliance, and parents' direct commands and total commands) accounted for significant variance in the ECBI Intensity Scale scores, Parenting Stress Index (PSI) Child Domain, Parent Domain, and Parental Locus of Control scores. In examining treatment sensitivity, Schuhmann, Foote, Eyberg, Boggs, and Algina (1998) observed significantly higher rates of parents' praise and behavioral descriptions and lower rates of critical statements among 64 families treated with PCIT compared to a wait-list control group. Children's compliance was also significantly higher than the control group.

To supplement parent ratings of children's ADHD symptoms, children's hyperactive and impulsive behaviors were also observed and recorded as part of the DPICS coding procedure. A partial interval sampling method was used to measure the specific hyperactive and impulsive behaviors associated with ADHD as listed in the DSM-5 (APA, 2013). These behaviors were grouped into the following four categories: Verbal Interference (i.e., interrupting mother), Physical Interference (i.e., taking mothers'

toys or items without asking), Minor Motor Movements (i.e., fidgeting or tapping hands or feet, squirming while sitting for at least three seconds), and Gross Motor Movements (i.e., standing up then leaving play interactions with mother, running around room, climbing furniture). Children's ADHD symptoms were observed during the first ten minutes of baseline and intervention sessions using 15-second intervals. The behavior categories (i.e., Verbal Interference, Physical Interference, Minor Motor Movements, Gross Motor Movements) were recorded if the behaviors occurred during any portion of the 15-second intervals. The percentage of the total 40 intervals in which the behaviors occurred was computed. This methodology in recording ADHD symptoms was based on two published ADHD coding systems designed for student observations in the classroom, including the Classroom Observation Code (COC; Abikoff & Gittelman, 1985) and the ADHD School Observation Code (ADHD-SOC; Gadow, Sprafkin, & Nolan, 1996). In particular, these two coding systems utilized partial interval time sampling to record ADHD symptoms as commonly expressed in the school classroom. A time sampling observation form was created to record children's ADHD symptoms and can be found in Appendix E.

Parenting Practices Interview (PPI). The PPI was adapted from the Oregon Social Learning Center's (OSLC) Discipline Questionnaire by Webster-Stratton, Reid, and Hammond (2001). Seventy-two items are used to create summary scales for seven unique parenting constructs: Harsh Discipline (14 items), Harsh for Age (nine items), Inconsistent Discipline (six items), Appropriate Discipline (16 items), Positive Parenting (15 items), Clear Expectations (three items), and Monitoring (nine items). Response formats vary across items and include five- to seven-point Likert scales ranging from

"Never" to "Always," "Not at all likely" to "Extremely is likely," "Strongly disagree to "Strongly Agree," and "None or almost none" to "All or almost all." The PPI is presented in Appendix F.

To answer the research questions of the current study, only the 15 items associated with the Positive Parenting Summary Scale were completed by mothers (i.e., items 6B, 6C, 6D, 6E, 6F, 7, 8A, 8B, 9A, 9B, 9C, 9D, 9E, 9F, 9G). The internal consistency of this particular summary scale is .72 (Webster-Stratton et al., 2001). Examples of items include the frequency with which caregivers "praise or compliment their child" and how much caregivers agree or disagree with the following statement: "It is important to praise children when they do well." The average of the 15 items served as the summary scale scores, with values ranging from one (i.e., low levels of positive parenting) to seven (i.e., high levels of positive parenting).

Therapy Attitude Inventory (TAI). The TAI (Eyberg, 1993) is a 10-item measure of parents' satisfaction with the impact of treatment on parenting skills and children's behaviors (see Appendix G). Items are rated on a scale from 1 (dissatisfaction with treatment) to 5 (maximum satisfaction with treatment). Response options vary depending on the item. For instance, when responding to the item, "The major behavior problems that my child presented at home before the program started are at this time:," parents are asked to select one of five response options: "considerably worse," "somewhat worse," "the same," "somewhat improve," or "greatly improved." Another example item is, "Regarding the relationship between myself and my child, I feel we get along:," to which parents are asked to choose from the following options: "much worse than before, " "somewhat worse than before," "the same as before," "somewhat better than before," or

"very much better than before." The scores of the ten items are added to yield a total score, with higher scores indicating high levels of satisfaction. When evaluated with 62 mother-child dyads, the TAI was associated with high internal consistency (.91), high stability (.85), and moderate external validity (.36 to .49) (Brestan, Jacobs, Rayfield, & Eyberg, 1999).

Intervention Integrity

To measure intervention integrity, the research team completed checklists of therapists' actions during each session. The checklists were obtained from the manual and varied according to the specific steps involved in each individual treatment session. A sample session checklist can be found in Appendix H. The number of completed prompts (i.e., check marks) on the checklist indicating completed steps of the therapy was divided by the total number of prompts that were to be completed. This percentage was computed for each therapy session and then averaged across sessions. The percentages indicated the extent to which the therapy was completed with integrity.

Inter-rater agreement was established for at least 20% of data points in the baseline, intervention, and follow-up phases to satisfy WWC criteria for meeting evidence standards (Kratochwill et al., 2010). In particular, 20% of all ECBI, BASC-2 PMR, and PPI administrations were verified for correct scoring. All but two sessions were videotaped for the purpose of establishing inter-rater agreement of the DPICS and ADHD Symptom Observation coding (Kratochwill et al., 2010). Agreement was established for the DPICS CDI skills by dividing the frequency count of each of the six CDI skills (i.e., LP, BD, RF, QU, CO, CR) obtained by the primary investigator by the frequency count obtained from the rater. Quotients were then averaged to compute a total inter-rater

agreement percentage. Agreement was established for the DPICS PDI skills via percent of exact agreement. In particular, the number of PDI steps in which raters recorded the same parent response (e.g., labeled praise or unlabeled praise for listening) was divided by the total number of possible steps. Similarly, inter-rater agreement for the ADHD Symptom Observation form was computed by dividing the number of intervals in which raters recorded the same behavior (e.g., verbal interference) by the total number of intervals.

Research Design

The current study was conducted using a concurrent multiple baseline single-case design. A multiple baseline design was selected for its methodological rigor in identifying changes in the dependent variable as a result of an intervention by means of staggering treatment phases across time. The design is also conducive to the use of select statistical analyses (e.g., multi-level modeling) for the purpose of detecting significant treatment effects (Biglan, Ary, & Wagenaar, 2000). Finally, a multiple baseline design was believed to be the most ethically appropriate design for the current study, as the withdrawal of a potentially effective intervention (i.e., by use of an ABAB design) among children at risk would have been considered a violation to ethical standards.

Procedure

The following paragraphs describe in detail the ethical procedures, screening methods, random assignment strategies, and assessment schedule that were utilized in the proposed study. The study's three stages also reviewed: pre-treatment sessions, treatment sessions, and a three-month post-intervention follow-up session.

Ethical considerations. The current study was submitted for approval to the

University of South Florida Division of Research Integrity and Compliance Institutional Review Board (IRB). Informed consent and parent permission forms were distributed to parents (see Appendices I and J). All caregiver and child information and data were kept confidential. Mother-child dyads were identified by code numbers, and all data were kept in a locked file cabinet. Data were entered into data entry sheets protected by a password.

In addition to the protection of study data, the research team modified the PCIT treatment protocol once during a therapy session in order to protect and best serve one of the parent-child dyads. In particular, one of the child participants exhibited aggressive behaviors towards his mother (i.e., kicking, hitting, pulling hair) for two consecutive weeks, causing the therapy session to end early and reducing the opportunities for skill practice. During the third week in which these aggressive behaviors were observed, the research team did not end the therapy session and instead instructed the mother to leave the play room after telling the child play time had ended due to his behavior. After the child became visibly calm, his mother returned to the playroom and asked him if he was ready to play nicely. This procedure was conducted twice during the session, after which the child chose to play gently with his mother for the remainder of the session. As a result of this modification in the treatment protocol, the mother was able to practice the skills, meet criteria to continue to the PDI phase of the intervention, and leave the intervention setting in harmony with her child. The adaptation made to the protocol was reported to the IRB and was subsequently approved.

Screening. Mothers interested in participating in the study were instructed to contact the principal investigator by phone for an initial screening session. During the

phone screening session, mothers were asked a series of questions to determine whether they met inclusion criteria for the study. For instance, mothers were asked if they had access to transportation. They were also asked to report any severe physical impairment such as deafness or blindness. To verify that children met the inclusion criteria, mothers were asked if their children were currently prescribed medication or receiving any form of therapy to address ADHD symptoms and behavior problems. Finally, mothers were asked to report whether their child had a comorbid diagnosis of ODD. Two of the four children (i.e., Dyads 2 and 4) recruited for the study had a comorbid diagnosis of ODD. A phone screening script that was used to recruit parents is featured in Appendix K.

Participants who met the criteria listed above were asked to participate in a second screening session held in a clinical setting, during which mothers completed the ECBI and CBCL. Children also completed two subtests of the SB5 during the screening session. The subtests verified that children achieved Fluid Reasoning and Crystallized Intelligence abilities that were comparable to normally developing same-age peers (i.e., ABIQ of at least 70). The first four mother-child dyads who met inclusion criteria during the screening sessions were recruited for the study. No other dyads contacted the primary investigator with interest to participate in the study.

To conclude the screening session, each mother-child dyad who had met inclusion criteria for the study completed the informed consent process and scheduled subsequent baseline and treatment sessions. During informed consent, the investigator ensured that each caregiver was given time to review the consent form and ask questions as needed. Contact information for the primary investigator was included on the consent form so that participants could ask questions at any time, and each participant was provided with a

copy of the consent form.

Random assignment. Random assignment of participants is often used in single-case designs to increase internal validity (Kratochwill & Levin, 2010). In the current study, the four mother-child dyads were randomly assigned using an online random assignment tool to one of five multiple baseline conditions. Due to difficulty in recruiting a fifth family for the study, the random assignment of participants included one invisible family that was assigned to the fifth baseline condition (Ferron & Jones, 2006). This procedure was conducted in order to increase the number of randomization outcomes, which is necessary to establish the power needed to make accurate inferences about treatment effects. For example, the inclusion of five multiple baseline conditions, which equates to a total of 120 potential randomization outcomes (i.e., $5! = 4 \times 3 \times 2 \times 1$), greatly exceeds the randomization outcomes possible with the inclusion of only four conditions (i.e., 24).

Each mother-child dyad started the intervention at pre-established start points. The first dyad was randomly assigned to started treatment sessions at the fourth data point (i.e., after the three baseline observations). The second dyad started treatment sessions at the fifth data point (i.e., after four baseline observations). The third dyad was randomly assigned to start treatment at the seventh data point (i.e., after six baseline points), and the fourth dyad started treatment at the sixth data point (i.e., after five baseline points).

Assessment schedule. Please refer to Table 7 for the assessment schedule that was utilized in the study. The demographic questionnaire was completed by mothers at the beginning of the baseline phase. The ECBI, CBCL, and two subtests of the SB5 were administered during screening. Mothers completed measures of their parenting practices

and their children's ADHD symptoms and problem behaviors (i.e., ECBI, BASC-2 PMR, PPI) during each week of the baseline and treatment phases, as well as during the follow-up session. These measures were completed by mothers at the very beginning of each session. The DPICS and ADHD Observation Form were used to record mother-child interactions and children's ADHD symptoms during baseline, treatment, and follow-up phases. The TAI and CBCL were administered to mothers on the last day of the intervention. The CBCL was also administered to mothers during follow-up.

Table 7

Assessment Schedule

Time Label	Measures
Screening	SB5, CBCL, ECBI
Pre-Intervention/ Baseline Assessments	Demographic Questionnaire, ECBI, BASC-2 PMR, PPI, DPICS, ADHD Symptom Observation
Each Week of Baseline and Intervention	ECBI, BASC-2 PMR, PPI, DPICS, ADHD Symptom Observation
Post-Intervention	CBCL, ECBI, BASC-2 PMR, PPI, DPICS, ADHD Symptom Observation, TAI
Follow-Up (Three months post-intervention)	CBCL, ECBI, BASC-2 PMR, PPI, DPICS, ADHD Symptom Observation

Pre-treatment sessions. After mother-child dyads were recruited and randomly assigned to conditions, at least three pre-treatment sessions were scheduled with each dyad. The sessions were led by the primary investigator and a research assistant at Children's Medical Services. The purpose of the first pre-treatment session was to administer the demographic questionnaire and indicators of the dependent variables, and collect the first baseline observation data point. Mothers also received $10 in compensation immediately after the first pre-treatment session.

Throughout the pre-treatment sessions with the mother-child dyads, at least three baseline observations were conducted in order to meet WWC standards, in which each phase must have a minimum of three data points (Kratochwill et al., 2010). Moreover, three data points are required to attain a trend line (Crosbie, 1993). It is important to note that each mother completed the ECBI, BASC-2 PMR, and PPI at the very beginning of the first treatment session (i.e., CDI Teach) prior to receiving any instruction or consultation related to PCIT. The ECBI, BASC-2 PMR, and PPI scores derived from this time point are therefore considered additional baseline data points. As such, at least four baseline observations were collected for these three dependent variables.

The DPICS and ADHD Symptom Observation Form were used to code each observation. During baseline observations, parents were asked to play with their child with the toys provided. CDI was observed for ten minutes during this time, in which any of the mothers' observed behaviors and verbalizations that would be considered CDI skills (e.g., labeled praise, reflections) were recorded. PDI was then observed for ten minutes, in which mothers were instructed to give their children commands. Mothers' responses to children's compliance and non-compliance during this time were recorded using the DPICS. Finally, mothers were asked to engage their children in a five-minute clean-up session, during which mothers' responses to children's compliance or non-compliance (i.e., PDI behaviors) were recorded again.

Treatment sessions. Treatment sessions were held for approximately one hour per week. The CDI phase of the treatment ended and the PDI phase began when parents attained ten behavioral descriptions, reflections, and labeled praises during a five-minute coding observation at the beginning of each session using the DPICS. Parents were also

required to verbalize fewer than three commands, questions, or criticisms during this observation in order to progress to the PDI phase. Similarly, the PDI phase ended when 75% or more of parents' commands were direct, and 75% of follow-throughs (e.g., correct time-out sequence after non-compliance) were executed correctly after the direct commands. After the CDI phase was completed, mother-child dyads received $15 in compensation. After the PDI phase, dyads received $20.

Follow-up session. Three months post-intervention, a follow-up session was scheduled with each mother-child dyad remaining in the study in order to assess the long-term maintenance of any treatment effects. Follow-up data were collected for Dyads 1 and 2 only, as Dyad 3 refused further participation in the study and Dyad 4 chose not to attend the scheduled follow-up session. During the follow-up sessions, all dependent variable measures except for the TAI were administrated, and mother-child interactions were observed with the DPICS using the same procedure utilized during the pre-treatment sessions. At the end of the session, participants received $25 as compensation for completing the study.

Data Analysis

Evaluation of data. Subsequent to the weekly administration of the measures, research team members checked the questionnaire forms for skipped items. Participants were asked to complete any skipped items that were found.

Data analysis. The single case data collected through the study were analyzed in several ways. First, data obtained from repeated measures of the dependent variables (i.e., ECBI, CBCL, BASC-2 PMR, DPICS, ADHD Observation Form, PPI) were displayed on graphs and visually analyzed. A visual permutation test and inferential

statistical analysis (i.e., multi-level modeling) were additionally employed.

Visual analysis. Visual analysis was completed using the four-step process recommended by WWC (Kratochwill et al., 2010). First, the baseline data pattern was analyzed for stability. Baselines were considered stable and predictable if the baseline trend was neutral or in the opposite direction of the expected behavior change. Baseline estimates were also derived using Neuman and McCormick's (1995) methodology, in which 85% of baseline data for all four participants must have been within a 15% range of the average of all data points during the baseline phase.

Second, the intervention phase data were surveyed to identify predictable patterns of the dependent variables. Following this step, the baseline and intervention phases were compared to determine if PCIT was associated with any changes in caregiver-reported and observed behavior problems and ADHD symptoms, as well as parenting practices. Finally, the changes in data patterns across the four participants were evaluated for the presence of at least three demonstrations of a treatment effect. To analyze and compare phases in the four steps listed above, six variables were additionally examined. These variables included the level (i.e., mean), trend (i.e., slope), variability (i.e., range of data deviating from the trend), immediacy of effect, overlap, and consistency of data patterns in each phase (Kratochwill et al., 2010).

A treatment effect was considered immediate if there was a change in level when the last three data points in baseline were compared with the three first data points in the treatment phase. More immediate effects, fewer overlapping data, and greater consistency in data patterns were desired in order to demonstrate causal relation and a more convincing treatment effect (Kratochwill et al., 2010). However, immediate effects in

children's ECBI, BASC-2 PMR, and ADHD observation scores were not required for the recognized presence of a treatment effect, as extinction bursts are expected and anticipated as part of the behavioral modification process (Lerman & Iwata, 1995). When extinction bursts were identified, the overall change in level between baseline and the PDI phase, overlap of data, and stability of data patterns in each phase were visually analyzed to best determine the presence of a treatment effect.

The Percent of All Non-Overlapping Data (PAND; Parker, Hagan-Burke, & Vannest, 2007), a nonparametric effect size, was obtained for each participant to assess overlap of data across phases. This particular effect size is less sensitive to outlier data and more sensitive to the size of an effect compared to the Percent of Non-Overlapping Data (PND; Scruggs, Mastropieri, & Casto, 1987). Effect size values were computed by finding the minimum number of data points in either the baseline or intervention phase that, if removed, would eliminate any overlap. These data points were deleted, and the percent of the remaining data was obtained. Values were interpreted according to percentile ranks attained from Parker and Vannest's (2009) field test of 200 published data sets. In particular, a PAND at the 10^{th}, 50^{th}, and 90^{th} percentiles correspond to values of .60, .82, and 1.00, respectively.

Visual permutation test. A visual permutation test replaced a traditional randomization test in the current study in order to control Type 1 error rates (Ferron & Jones, 2006). The test was conducted by two visual analysts, who estimated which dyad received the intervention at each of the four randomly assigned conditions (Ferron & Jones, 2006). The data analysts were members of the research team who were blind to the participants' assignments to each of the four conditions (Ferron & Jones, 2006). If

the estimations aligned correctly with the actual assignments, a *p* value was computed. The *p* value was approximated by dividing one by the number of possible assignments (i.e., 120). If the estimations did not align correctly with the actual assignments, the null hypothesis of the study was not rejected and no treatment effects were assumed.

Multi-level modeling. Hierarchical linear modeling (HLM) was used to synthesize behavior changes across the four mother-child dyads. In particular, a Level-1 model analyzed dependent variable data for each of the four participants, while a Level-2 model examined the variability of data across all participants. Average treatment effects, as well as individual effects, were estimated assuming autocorrelation and changes in trend and level. Degrees of freedom were obtained using the Kenward-Roger strategy. Effect estimates were attained at time points corresponding with the end of the CDI phase and the end of the PDI phase. Estimates were not obtained at the beginning of the CDI phase, as extinction bursts are often observed and expected among children with behavior problems (Lerman, & Iwata, 1995).

HLM was used to reduce any negative effects of confounding variables throughout the course of treatment. For instance, the disciplinary practices of extended family members or others in the community that are inconsistent with those maintained by PCIT are thought to hinder positive treatment effects for families. Other examples of deterring variables included any other treatments received by children throughout the study, and the number of days in which mothers practice learned CDI and PDI skills with their children. The variables were measured by asking mothers to report the days of the week in which conflicting variables were present (e.g., reinforcement of problem behaviors by others, inability to practice on certain days of the week). In the current study, Dyad 4

reported inconsistent disciplinary practices used by caretaking partners until the ninth week of treatment, at which point her caretaking partners began applying PDI strategies consistently. All other dyads had caretaking partners who used disciplinary practices recommended by PCIT. Dyads' practice of PCIT skills at home was quantified using the percent of total weeks during the intervention in which mothers practiced PCIT skills with their children at least five days a week. Dyads' practice of skills ranged from 36.36% to 100%. Finally, dyads denied the use of or participation in any other treatments for the purpose of alleviating ADHD symptoms and behavior problems.

These confounding and often uncontrollable variables were measured and added as individual predictors to the multi-level model. These data were quantified and added to the Level 1 model. In particular, the weeks in which mothers reported inconsistent parenting practices by other caregivers were represented as (1), and weeks in which they were not present were represented as (0). The percent of total weeks during intervention in which mothers practiced PCIT skills with their children at least five days also was added to the Level 1 model in order to control for this confounding variable.

Chapter Four: Results

This chapter presents the data collected through the current study in order to address the two research questions. The first research question investigated whether mother-child dyads' participation in PCIT would produce positive changes in mothers' parenting practices, children's problem behaviors, and children's ADHD symptoms from baseline to intervention and three-month follow-up. These changes were measured via the DPICS (Eyberg & Robinson, 1983), PPI (Webster-Stratton et al., 2001), ECBI (Eyberg & Pincus, 1999), BASC-2 PMR (Reynolds & Kamphaus, 2009), ADHD Symptom Observation Form, and CBCL (Achenbach, 1991). The second research question determined whether parents reported a positive attitude towards PCIT upon completion of the therapy (measured by the TAI; Eyberg, 1993). The chapter begins with a discussion of intervention integrity, followed by results of visual analyses. Results from visual permutation tests and multi-level modeling for each of the dependent variables are then reviewed. The chapter ends with a summary of parents' satisfaction with the intervention under study.

Intervention Integrity

To measure intervention integrity, the number of completed prompts (i.e., check marks) on each PCIT session checklist was divided by the total number of prompts that were to be completed. This percentage was computed for each therapy session and then averaged across sessions. The average percent of completed therapy session steps ranged

from 87% to 100%. The overall average of therapy session completeness was 99.14% with a standard deviation of 2.83. These data indicate the intervention was implemented with high levels of integrity.

Inter-rater agreement was established for at least 20% of the dependent variable data points collected throughout each study phase. Trained members of the research team verified the correct scoring of 20% of all ECBI, BASC-2 PMR, and PPI administrations. All but two sessions were videotaped for the purpose of establishing inter-rater agreement of the DPICS and ADHD Symptom Observation coding (Kratochwill et al., 2010). All but two sessions were videotaped for the purpose of establishing inter-rater agreement of the DPICS and ADHD Symptom Observation coding (Kratochwill et al., 2010). Agreement was established for the DPICS CDI skills by dividing the frequency count of each of the six CDI skills (i.e., LP, BD, RF, QU, CO, CR) obtained by the primary investigator by the frequency count obtained from the rater. These six quotients were then averaged to compute a total inter-rater agreement percentage. Agreement was established for the DPICS PDI skills by dividing the number of PDI steps in which raters recorded the same parent response (e.g., labeled praise or unlabeled praise for listening) by the total number of possible steps. Inter-rater agreement for the ADHD Symptom Observation form was computed by dividing the number of intervals in which raters recorded the same behavior (e.g., verbal interference) by the total number of intervals. Inter-rater agreement for parents' DPICS CDI and PDI skills across phases ranged from 81.06% to 100%. Average agreement for DPICS CDI skills was 94.36% with a standard deviation of 4.49, while average agreement for DPICS PDI skills was 97.99% with a standard deviation of 3.60. Inter-rater agreement for children's ADHD symptoms using

the ADHD symptom observation tool ranged from 50% to 85% The average agreement for this tool was 72.95% with a standard deviation of 11.11.

The integrity with which mothers practiced PCIT skills during the week also was measured. In particular, the percent of total weeks during intervention in which mothers reported practicing PCIT skills with their children for at least five days during the week was computed. These data were derived from weekly homework sheets mothers used to track daily practice of their skills. Dyads 3 and 4 practiced PCIT skills for at least five days during the week for 100% of weeks during the intervention phase. Dyads 1 and 2 practiced PCIT skills for at least five days a week for 76.92% and 36.36% of total intervention phase weeks, respectively. These data suggest three of the four mothers practiced PCIT skills during the majority of the intervention phase for at least five days during the week, as recommended by the PCIT protocol (Eyberg & Funderburk, 2011).

Visual Analysis

Visual analyses were conducted using the four-step process recommended by What Works Clearinghouse (WWC) (Kratochwill et al., 2010). Treatment effects were identified when data patterns within the dependent variables were associated with stable baselines, changes in level across baseline and treatment phases in the direction of the expected behavior change, and fewer overlapping data. In addition, at least three demonstrations of a treatment effect must have been identified across the four participants in order for changes in a dependent variable to be considered a cause of the intervention under study. Given the frequency with which extinction bursts occur during behavioral modification training with children with behavior problems, exacerbation of behavior problems and ADHD symptoms were anticipated during visual analyses

(Lerman, & Iwata, 1995). As such, positive changes in dependent variables did not need to be immediate (i.e., changes within the first three data points after CDI or PDI) to be considered treatment effects, though immediate treatment effects are ideal according to WWC guidelines (Kratochwill et al., 2010). Rather, when extinction bursts were identified, the change in level between baseline and the PDI phase, data overlap, and stability of data patterns in each phase were analyzed to determine the existence of a treatment effect.

Visual analysis results for each dyad are discussed for the following dependent variables: mothers' parenting practices (i.e., PPI, DPICS), children's behavior problems (i.e., ECBI), and children's ADHD symptoms (BASC-2 PMR, ADHD Symptom Observation, CBCL). Discussion of results for each dependent variable is accompanied by figures displaying the multiple-baseline graphs across participants for the baseline and intervention phases. In addition, descriptive statistics (i.e., mean, range, trend) and overlap effect sizes are presented in tables for each dependent variable.

Mothers' parenting practices.

Parenting Practices Interview (PPI). Parent-child Dyads 1 and 4 had PPI baseline trends in the opposite direction of the expected behavior change, suggesting baseline stability (see Figure 1). Dyads 2 and 4 had positive baseline trends in the direction of the expected behavior change. Results from baseline stability analyses (Neuman and McCormick, 1995) indicated that at least 85% of the baseline data for Dyads 1 and 2 were within a 15% range of the average of all data points during baseline. Only Dyad 1 met baseline stability criteria for PPI using both trend and baseline stability analyses.

A positive trend in the direction of the expected behavior change was demonstrated within the intervention phase data (i.e., CDI and PDI phases) for Dyads 1, 2, and 4. Dyad 3 had a negative trend in the opposite direction of the expected behavior change. Mean levels of PPI were higher during intervention compared to baseline for all participants (see Table 8). Dyad 1 had increased variability in the intervention phase when compared to baseline, as indicated by a range of 4.87 points at the beginning of CDI to 6.40 at the end of PDI. Dyads 3 and 4 maintained similar variability in PPI across phases, while Dyad 2 demonstrated very little variability during the intervention phase.

For Dyads 1 and 4, the negative trend of the last three baseline data points was discriminably different from the positive trend indicated by the first three intervention data points. The difference in trend and level across phases for these dyads suggests a more immediate intervention effect. In contrast, Dyad 2 maintained positive trends and little variability in PPI during both baseline and intervention phases. Dyad 3 maintained a positive trend in baseline, followed by a decline in PPI that continued until the dyad declined further participation in the study. At follow-up, Dyad 1 reported a slight increase in PPI scores, while Dyad 2 reported a slight decrease. Analyses of data overlap across phases using PAND suggest moderate nonparametric effect sizes for Dyad 2 only (see Table 9). Overall, analysis of changes in data patterns in PPI scores suggest at least three demonstrations of a treatment effect were not observed across the four participants.

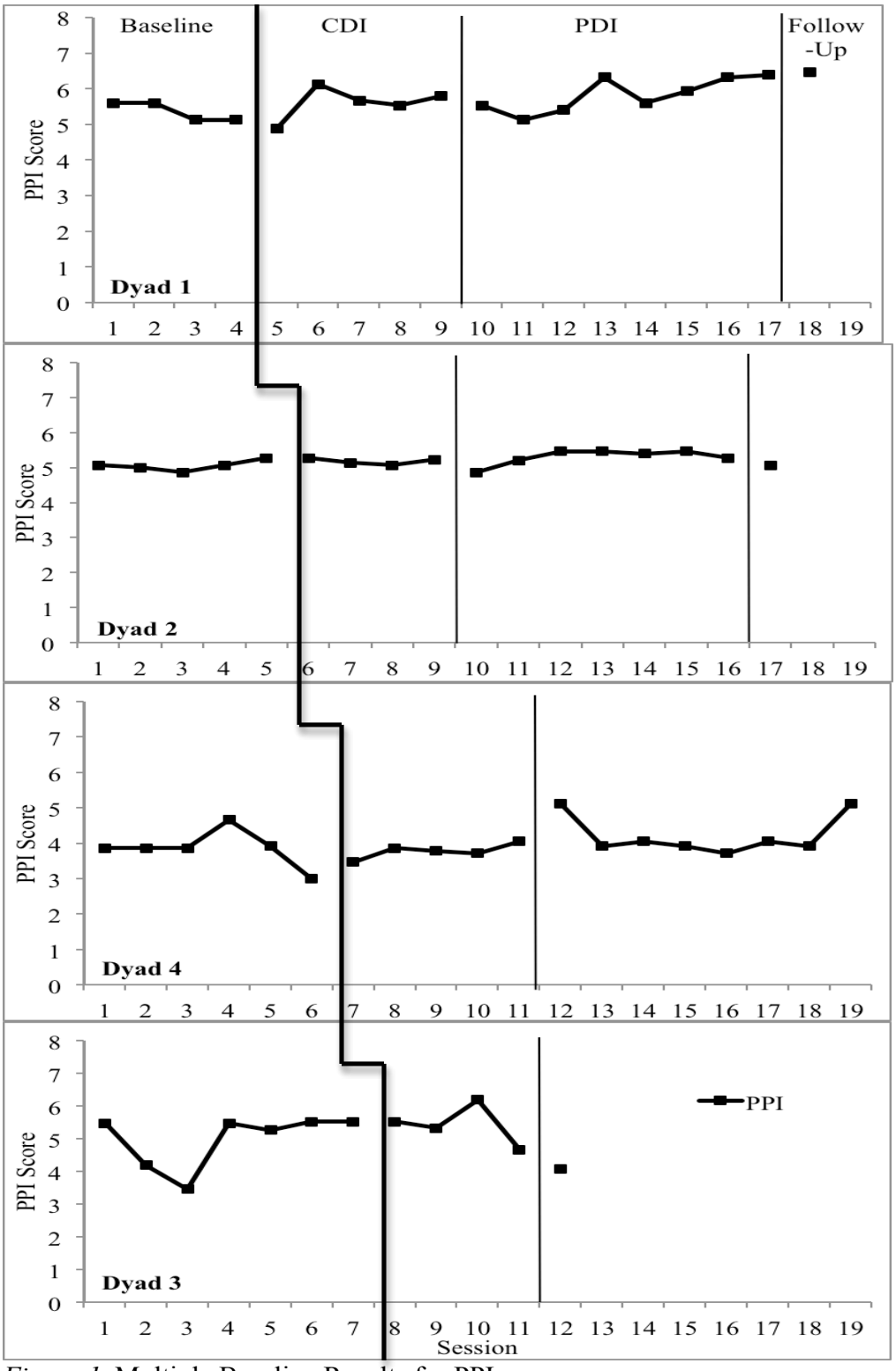

Figure 1. Multiple Baseline Results for PPI

Table 8

Descriptive Statistics for Parenting Practices Interview

	Baseline Phase			Intervention Phase	
	Mean (SD)	Range	Baseline Estimate	Mean (SD)	Range
Dyad 1	5.37 (0.27)	5.13-5.60	100%	5.74 (0.47)	4.87-6.40
Dyad 2	5.06 (0.14)	4.87-5.27	100%	5.26 (0.19)	4.87-5.47
Dyad 3	4.99 (0.82)	3.47-5.53	71.43%	5.16 (0.82)	4.07-6.20
Dyad 4	3.87 (0.53)	3.00-4.67	66.67%	4.07 (0.50)	3.47-5.13

Table 9

Percent of All Non-Overlapping Data for Parenting Practices Interview

Dyad 1	Dyad 2	Dyad 3	Dyad 4
76.47%	81.25%	66.67%	73.68%

Dyadic Parent-Child Interaction Coding System (DPICS). Visual analysis results for the DPICS positive and negative skills are summarized first (see Figures 2 and 3), followed by visual analysis results for PDI skills (see Figure 4). Descriptive statistics are provided in Tables 10 and 12. It is important to note that DPICS data are missing for the third week of CDI for Dyad 4, during which therapy ended early due to the child's aggressive behaviors towards his mother.

Dyad 1 had DPICS baseline trends in a neutral or opposite direction of the expected behavior change for the following CDI skills: Labeled Praises, Reflections, and Criticism. Baseline estimate analysis indicated that 100% of Labeled Praises and Questions for Dyad 1 were within a 15% range of the average of all baseline data points. Dyad 2 had baseline trends in the opposite direction of the expected behavior change for Behavior Descriptions, Reflections, and Questions. One hundred percent of Questions for Dyad 2 were within a 15% range of the average of all baseline data points. Dyads 3 and 4 had baseline trends in the opposite direction of expected behavior change for Behavior Descriptions, Reflections, and Commands. The trend for Questions for Dyad 4

was also in the opposite direction. None of the DPICS skills for Dyads 3 and 4 had baseline estimates that met stability criteria using Neuman and McCormick's (1995) methodology. In sum, Dyads 1 and 2 met baseline stability criteria using both methodologies for Labeled Praises and Questions, respectively.

Observed trends during the intervention phase for the DPICS positive skills (i.e., labeled praises, behavior descriptions, reflections) were positive and in the direction of the expected behavior change for Dyads 1, 2, and 3. Dyad 4 maintained positive trends for reflections and behavior descriptions. Dyads 1, 2, and 4 maintained mean levels of at least 10 for labeled praises during the entire intervention phase. Mothers' use of DPICS positive skills during intervention had increased variability compared to baseline for all dyads with the exception of Dyad 3's verbalizations of reflections.

Intervention phase trends for the DPICS negative skills (i.e., questions, commands, criticism) were neutral or negative and in the direction of the expected behavior change for Dyads 1, 2, and 3. Dyad 4 maintained a neutral trend for verbalizations of criticism but demonstrated positive trends for questions and commands during intervention. Mean levels of DPICS negative skills during intervention were below three for Dyads 1, 2, and 4. In addition, all dyads demonstrated very little variability in DPICS negative skills throughout the intervention. In particular, mothers' use of commands during intervention had less variability than during baseline. Dyads 1, 3, and 4 had less variability in mothers' use of questions in intervention compared to baseline, while Dyads 2, 3, and 4 had less variability in mothers' critical statements towards their children during intervention.

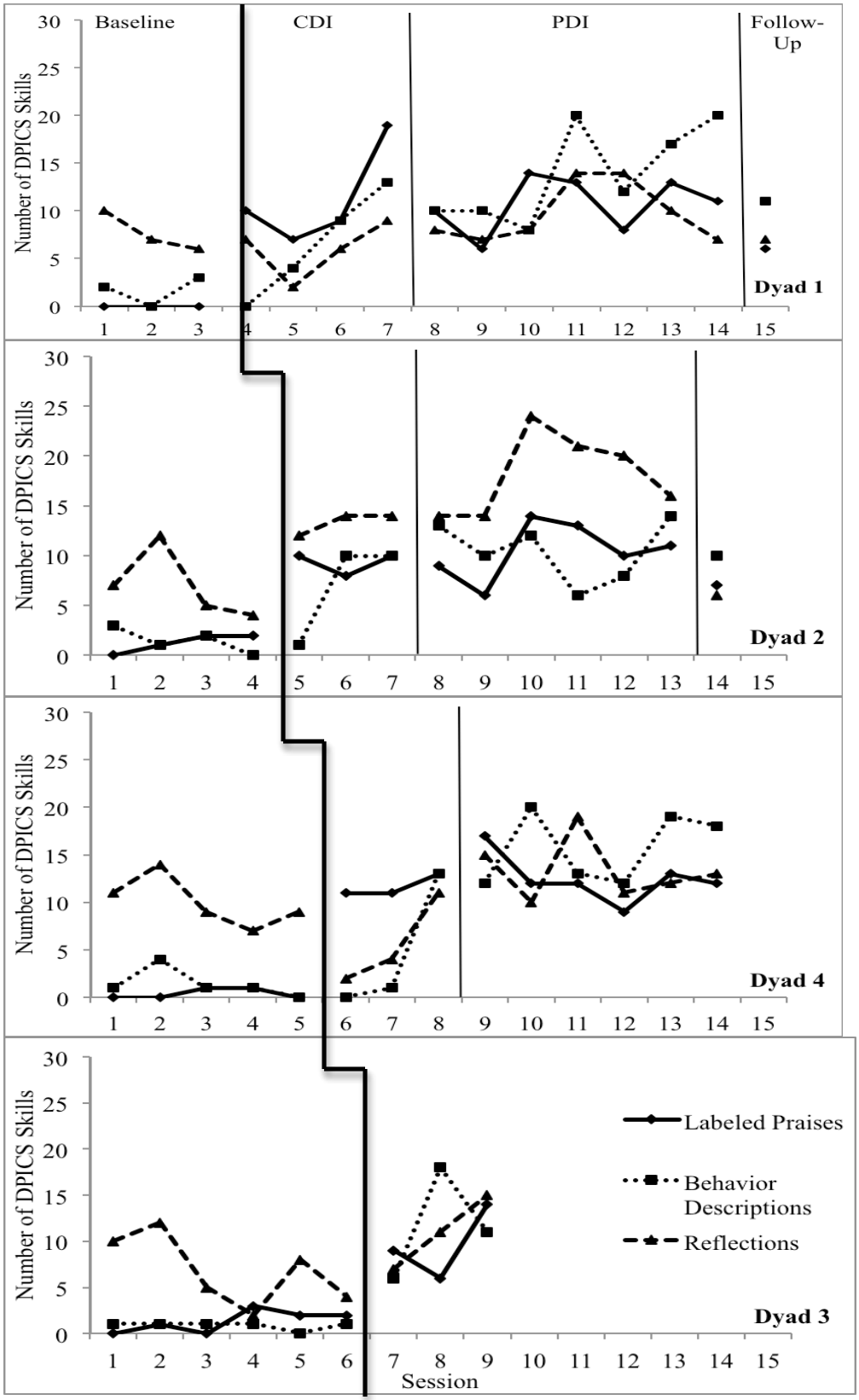

Figure 2. Multiple Baseline Results for DPICS Positive Skills

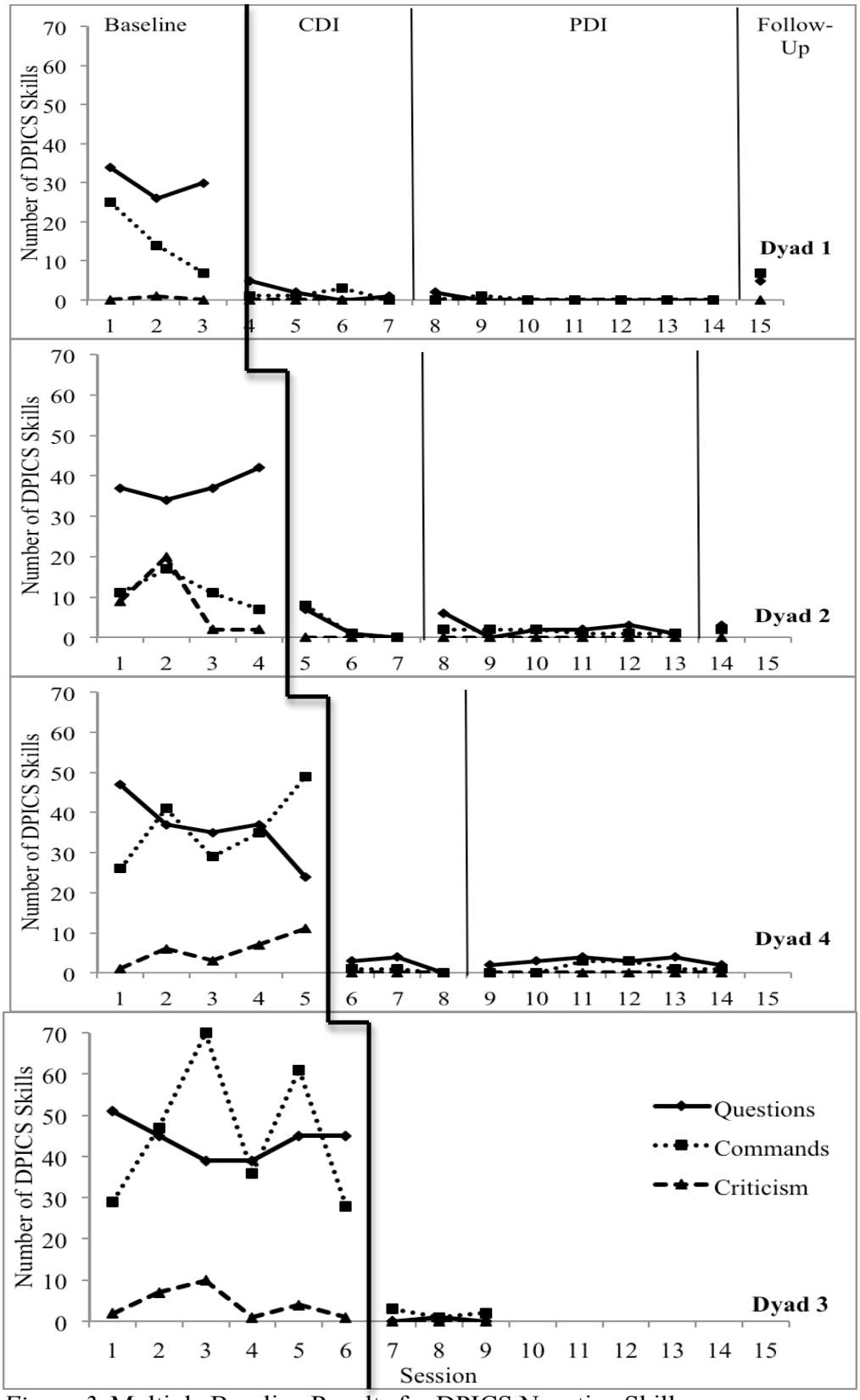

Figure 3. Multiple Baseline Results for DPICS Negative Skills

Table 10

Descriptive Statistics for Dyadic Parent-Child Interaction Coding System: Child-Directed Interaction Skills

		Baseline Phase			Intervention Phase	
		Mean (*SD*)	Range	Baseline Estimate	Mean (*SD*)	Range
Dyad 1	LP	0.00 (0.00)	0.00-0.00	100%	10.91 (3.70)	6.00-19.00
	BD	1.67 (1.53)	0.00-3.00	0%	11.18 (6.23)	0.00-20.00
	RF	7.67 (2.08)	6.00-10.00	33%	8.36 (3.44)	2.00-14.00
	QU	30.00 (4.00)	26.00-34.00	100%	0.91 (1.58)	0.00-5.00
	CO	15.33 (9.07)	7.00-25.00	33%	0.55 (0.93)	0.00-3.00
	CR	0.33 (0.58)	0.00-1.00	0%	0.00 (0.00)	0.00-0.00
Dyad 2	LP	1.25 (0.96)	0.00-2.00	0%	10.63 (2.00)	8.00-14.00
	BD	1.50 (1.29)	0.00-3.00	0%	9.25 (4.23)	1.00-14.00
	RF	7.00 (3.56)	4.00-12.00	25%	16.88 (4.26)	12.00-24.00
	QU	37.50 (3.32)	37.00-42.00	100%	2.75 (2.49)	0.00-6.00
	CO	11.50 (4.12)	7.00-17.00	50%	2.00 (2.51)	0.00-8.00
	CR	8.25 (8.5)	2.00-20.00	25%	0.00 (0.00)	0.00-0.00
Dyad 3	LP	1.33 (1.21)	0.00-3.00	0%	9.67 (4.04)	6.00-14.00
	BD	0.83 (0.41)	0.00-1.00	0%	11.67 (6.03)	6.00-18.00
	RF	6.83 (3.82)	2.00-12.00	0%	11.00 (4.00)	7.00-15.00
	QU	44.00 (4.52)	39.00-51.00	83.33%	0.33 (0.58)	0.00-1.00
	CO	45.17 (17.38)	28.00-70.00	16.67%	2.00 (1.00)	1.00-3.00
	CR	4.17 (3.66)	1.00-10.00	16.67%	0.00 (0.00)	0.00-0.00
Dyad 4	LP	0.40 (0.55)	0.00-1.00	0%	12.22 (2.17)	9.00-17.00
	BD	1.40 (1.52)	0.00-4.00	0%	12.00 (7.21)	0.00-20.00
	RF	10.00 (2.65)	7.00-14.00	60%	10.78 (5.19)	2.00-19.00
	QU	36.00 (8.19)	24.00-47.00	60%	2.78 (1.30)	0.00-4.00
	CO	36.00 (9.27)	26.00-49.00	40%	1.11 (1.17)	0.00-3.00
	CR	5.60 (3.85)	1.00-11.00	20%	0.00 (0.00)	0.00-0.00

Note. LP = Labeled Praises. BD = Behavioral Descriptions. RF = Reflections. QU = Questions. CO = Commands. CR = Commands

A comparison of DPICS positive skills across baseline and intervention phases indicates that for Dyad 4, the negative trend of the last three baseline data points is different from the positive trend evidenced by the first three intervention data points, indicating immediate intervention effects. Dyad 4 also appeared to have immediate intervention effects in commands and criticism. Dyad 2 demonstrated immediate intervention effects for behavior descriptions, reflections, and questions. Dyad 3 also had

immediate intervention effects for behavior descriptions, labeled praises, and questions.

Table 11

Percent of All Non-Overlapping Data for Dyadic Parent-Child Interaction Coding System: Child-Directed Interaction Skills

	Dyad 1	Dyad 2	Dyad 3	Dyad 4
LP	100%	100%	100%	100%
BD	92.86%	91.67%	100%	85.71%
RF	71.43%	91.67%	77.78%	71.43%
QU	100%	100%	100%	100%
CO	100%	91.67%	100%	100%
CR	100%	100%	100%	100%

Note. LP = Labeled Praises. BD = Behavioral Descriptions. RF = Reflections. QU = Questions. CO = Commands. CR = Commands

Though two dyads had immediate intervention effects for labeled praises, all dyads experienced a considerable change in level in the direction of the expected behavior change with no overlap between phases for this dependent variable. At follow-up, Dyads 1 and 2 demonstrated similar or decreased number of positive DPICS skills and similar or increased number of DPICS negative skills. Analyses of data overlap across phases using PAND suggest moderate to strong nonparametric effect sizes for all dyads in all DPICS skills except for reflections (see Table 11). Analysis of DPICS data patterns suggest at least three demonstrations of a treatment effect were only observed for labeled praises.

In regard to parents' accurate use of PDI skills, all dyads had neutral baseline DPICS PDI skill trends, as well as 100% of baseline data that fell within 15% of the average of all baseline data points. All dyads demonstrated immediate intervention effects in the accuracy with which they used PDI skills. Dyads 1, 2, and 4 had positive trends in the direction of the expected behavior change for PDI skills during the intervention phase. Dyads 1, 2, and 4 had PDI accuracy levels above 75% by the end of

the intervention, indicating mastery of PDI skills.

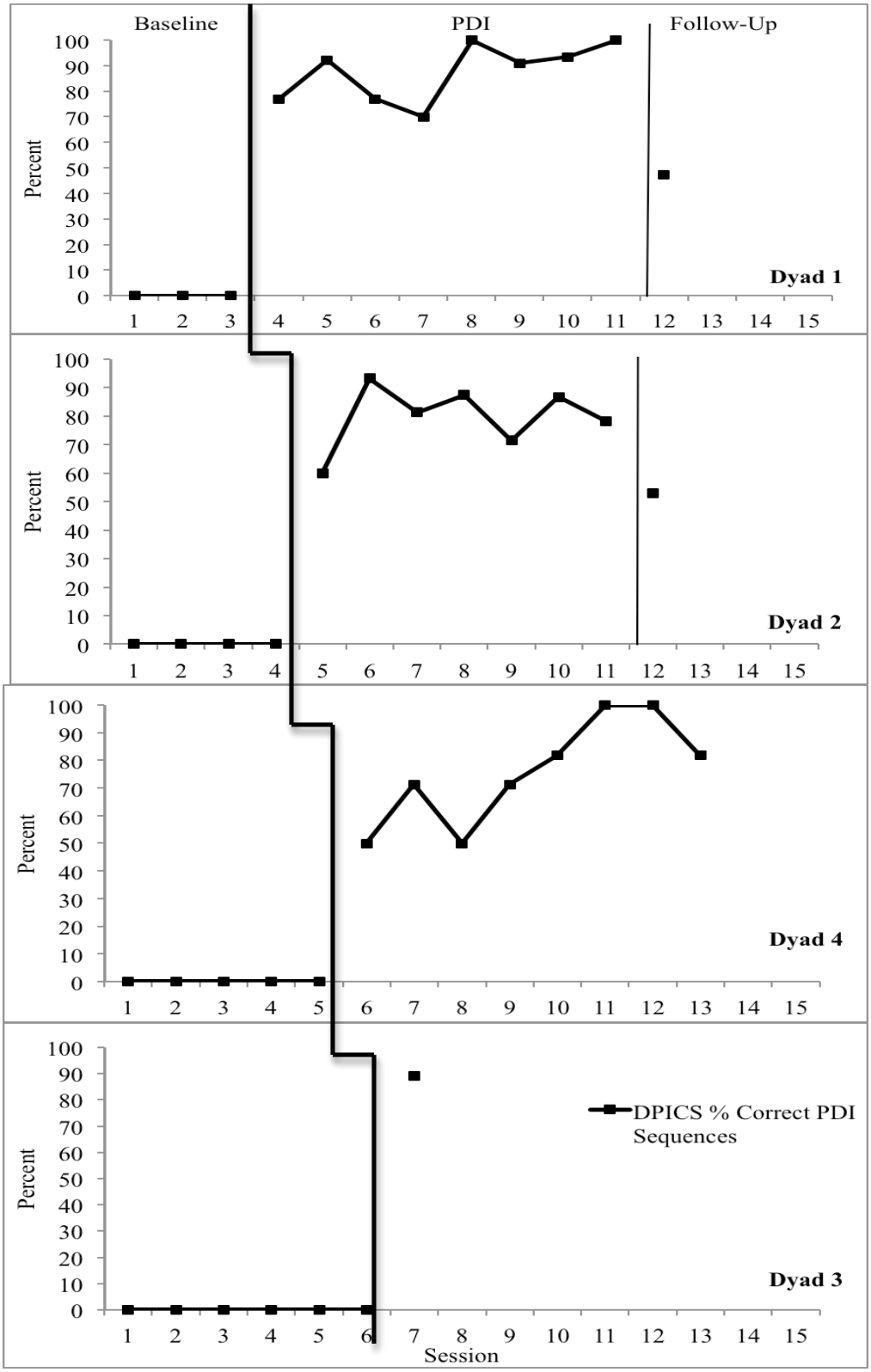

Figure 4. Multiple Baseline Results for PDI

Although only one PDI data point was collected for Dyad 3 prior to the participants' withdrawal from the study, the percentage of PDI skills implemented with accuracy for this dyad was 88.89%. At follow-up, Dyads 1 and 2 demonstrated less accurate implementation of PDI skills. PAND estimates for PDI suggest strong nonparametric effect sizes for all dyads (see Table 13). In sum, four demonstrations of a treatment effect were observed in mothers' PDI skills across dyads.

Table 12

Descriptive Statistics for Dyadic Parent-Child Interaction Coding System: Parent-Directed Interaction Skills

		Baseline Phase			Intervention Phase	
		Mean (*SD*)	Range	Baseline Estimate	Mean (*SD*)	Range
Dyad 1	% Correct PDI Sequences	0.00 (0.00)	0.00-0.00	100%	87.54 (11.41)	76.9-100.00
Dyad 2	% Correct PDI Sequences	0.00 (0.00)	0.00-0.00	100%	79.78 (11.23)	60.00-93.33
Dyad 3	% Correct PDI Sequences	0.00 (0.00)	0.00-0.00	100%	88.89	88.89-88.89
Dyad 4	% Correct PDI Sequences	0.00 (0.00)	0.00-0.00	100%	75.81 (19.32)	50.00-100.00

Note. PDI = Parent-Directed Interaction.

Table 13

Percent of All Non-Overlapping Data for Dyadic Parent-Child Interaction Coding System: Parent-Directed Interaction Skills

Dyad 1	Dyad 2	Dyad 3	Dyad 4
100%	100%	100%	100%

Children's behavior problems. Parent-child Dyads 1, 3, and 4 had ECBI baseline trends in the opposite direction of the expected behavior change, while Dyad 2 had a negative baseline trend. One hundred percent of all dyads' baseline data were within 15% range of the average of all baseline data points (see Figure 5). An overall negative trend in the direction of the expected behavior change was demonstrated within

the intervention phase ECBI Intensity data (i.e., CDI and PDI phases) for all dyads. Similarly, a negative trend was demonstrated for ECBI Problem data across the intervention phase for all dyads. Mean levels of ECBI Intensity and Problem scores for all dyads declined throughout the intervention phase as compared to baseline with the exception of the ECBI Problem score for Dyad 4 (see Table 14). Dyads 1 and 2 exhibited an increase in their ECBI Intensity scores immediately after beginning PCIT, suggesting the occurrence of expected extinction bursts. Similarly, all dyads except for Dyad 1 experienced an increase in ECBI Problem scores after the intervention was introduced. Dyads 1, 2, and 4 had increased data variability during the intervention phase when compared to baseline for both ECBI scale scores.

A comparison of baseline and intervention phase levels indicate an improvement in ECBI Intensity levels over time for all dyads, with all ratings of children's behavior problems falling within a sub-clinical range upon completion of PCIT. While the first three dyads experienced improvement in behavior problems within the first three weeks of PCIT, the ECBI Intensity scores for Dyad 4 increased until the ninth week of PCIT.

For Dyads 1 and 3, the positive trend of the last three baseline data points is discriminably different from the negative or neutral trend indicated by the first three intervention data points. The difference in trend and level across phases for these dyads' ECBI Intensity scores suggest a more immediate intervention effect. Dyad 2 had neutral or negative trends in ECBI Intensity scores during the last three baseline data points, as well as during the first three intervention data points. Dyad 4 had positive trends in ECBI Intensity scores across baseline and the beginning three data points of the intervention.

A comparison of phases also revealed an improvement in ECBI Problem scores

for all dyads. With the exception of Dyad 4, all ECBI Problem scores fell within a sub-clinical range after treatment. The first three mothers experienced improvement in their perceptions of their children's behaviors by the fourth week of PCIT. Dyad 4 continued to endorse high ECBI Problem scores until the last three weeks of intervention. An immediate intervention effect for ECBI Problem was identified for Dyad 2.

Dyad 1 had a positive ECBI Problem score trend at the end of baseline, followed by a neutral trend at the beginning of PCIT. During baseline, Dyads 3 and 4 maintained a negative trend in the direction of the expected behavior change for their ECBI Problem scores. Immediately after the dyads began the intervention, Dyad 3 continued to demonstrate a negative ECBI Problem trend while Dyad 4 demonstrated a positive ECBI Problem trend. At follow-up, Dyads 1 and 2 continued to report sub-clinical ECBI Intensity and Problem scores. ECBI Intensity scores at follow-up were lower than scores obtained during the dyads' last intervention sessions. While ECBI Problem scores for Dyad 1 continued to decline at follow-up, scores for Dyad 2 experienced a slight increase. Analyses of data overlap across phases for both ECBI Intensity and Problem scores suggest moderate to strong nonparametric effect sizes for Dyads 1, 2, and 3 (see Table 15). ECBI Intensity data overlap between baseline and the PDI phases yielded strong nonparametric effect sizes for all dyads (i.e., 100%), and ECBI Problem data overlap between baseline and PDI yielded strong nonparametric effect sizes for all dyads except for Dyad 4. Given the identification of expected extinction bursts and the consistent reductions of ECBI Intensity and Problem scores to sub-clinical levels post-treatment among at least three dyads, at least three demonstrations of a treatment effect were evident for ECBI Intensity and Problem (i.e., Dyads 1, 2, and 3).

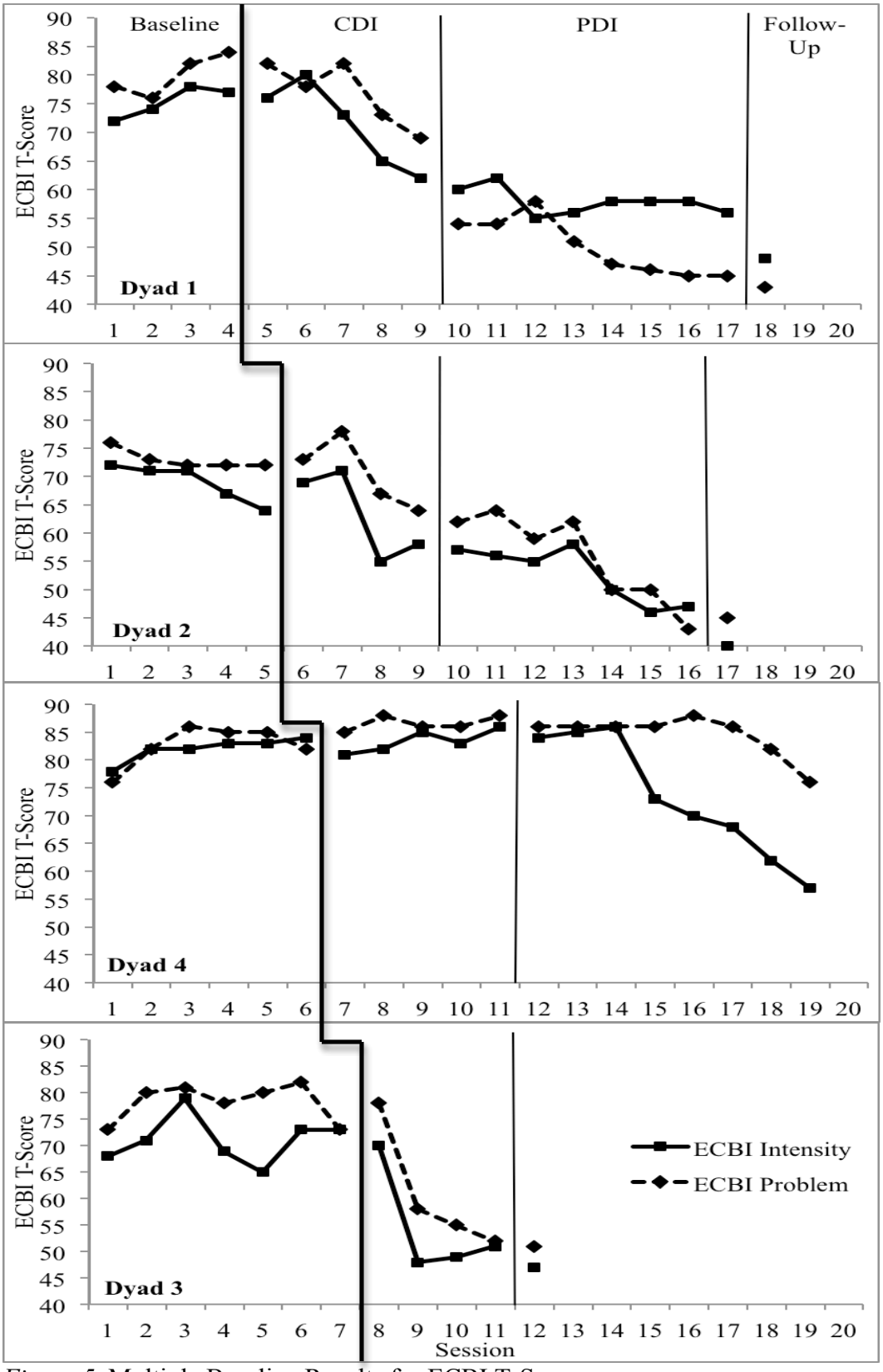

Figure 5. Multiple Baseline Results for ECBI T-Scores

Table 14

Descriptive Statistics for Eyberg Child Behavior Inventory

		Baseline Phase			Intervention Phase	
		Mean (SD)	Range	Baseline Estimate	Mean (SD)	Range
Dyad 1	Intensity	75.25 (2.75)	72.00-78.00	100%	63.00 (8.22)	55.00-80.00
	Problem	80.00 (3.65)	76.00-84.00	100%	60.31 (14.47)	45.00-82.00
Dyad 2	Intensity	69.00 (3.39)	64.00-72.00	100%	56.55 (7.87)	46.00-71.00
	Problem	73.00 (1.73)	72.00-76.00	100%	61.09 (10.29)	43.00-78.00
Dyad 3	Intensity	71.14 (4.49)	65.00-79.00	100%	53.00 (9.62)	47.00-70.00
	Problem	78.14 (3.72)	73.00-82.00	100%	58.80 (11.08)	51.00-78.00
Dyad 4	Intensity	82.00 (2.10)	78.00-84.00	100%	73.13 (10.99)	57.00-86.00
	Problem	82.67 (3.67)	76.00-86.00	100%	84.5 (3.82)	76.00-88.00

Table 15

Percent of All Non-Overlapping Data for Eyberg Child Behavior Inventory

	Dyad 1	Dyad 2	Dyad 3	Dyad 4
Intensity	82.35%	87.50%	91.67%	57.89%
Problem	82.35%	87.50%	91.67%	68.42%

Children's ADHD symptoms.

***Behavior Assessment System for Children, Second Edition*.** Parent-child Dyads 1 and 4 had BASC-2 PMR baseline trends in the opposite direction of the expected behavior change, and 100% of all dyads' baseline data were within 15% range of the average of all baseline data points (see Figure 6).

A negative trend in the direction of the expected behavior change was demonstrated within the intervention phase for all dyads. By the end of the intervention, all dyads had BASC-2 PMR scores that fell within the sub-clinical range (see Table 16). Mean levels of ADHD symptoms decreased from baseline to intervention for all dyads by at least eight score points, with Dyads 1 and 3 experiencing the most improvement in symptomatology over time. Dyads 1, 2, and 4 had increased data variability during the intervention phase when compared to baseline.

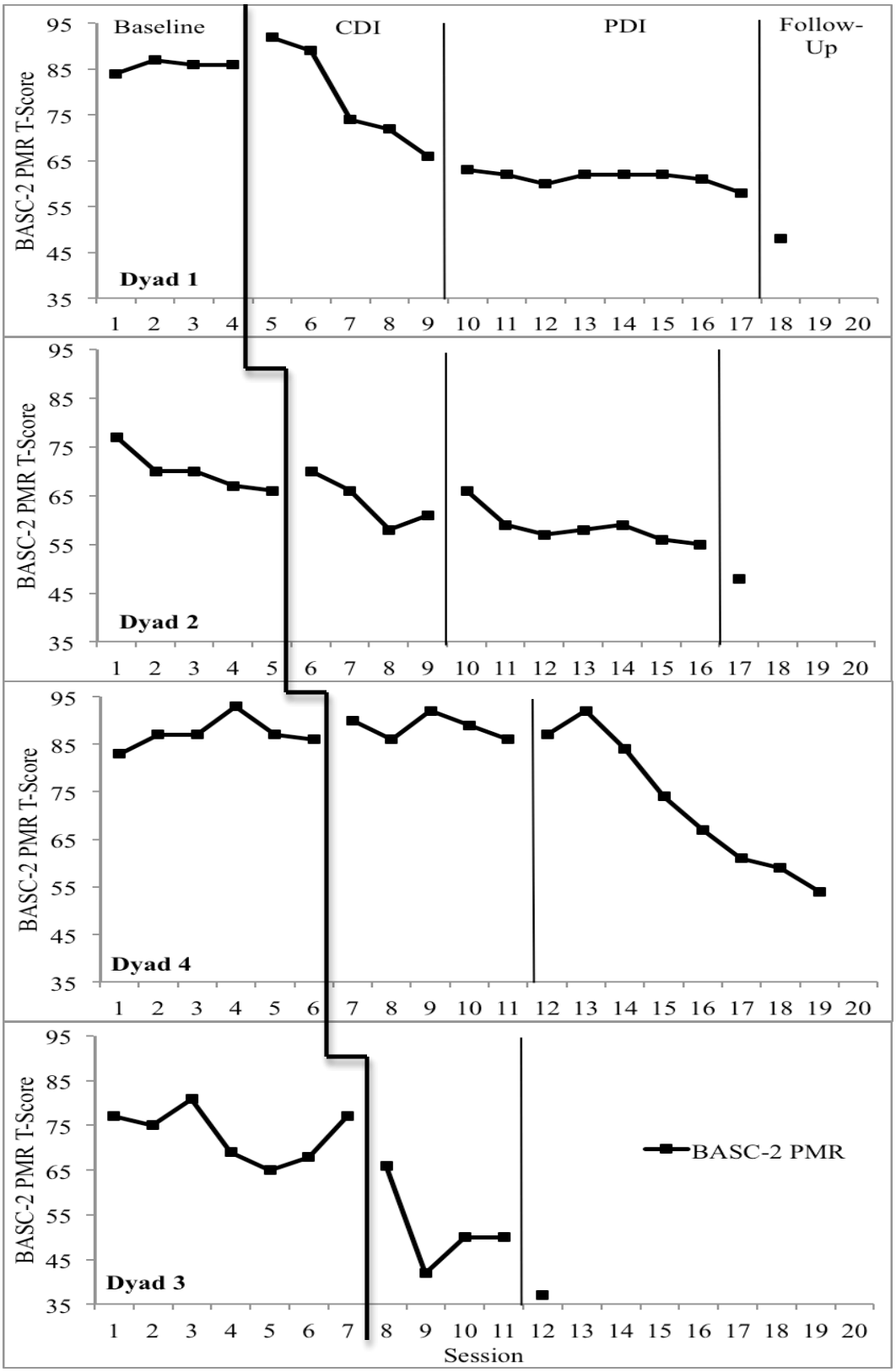

Figure 6. Multiple Baseline Results for BASC-2 T-Scores

An immediate intervention effect was observed for Dyad 3, whose positive trend at the end of baseline was discriminably different from the negative trend at the beginning of the intervention. Dyad 3 continued to report very low levels of ADHD symptoms on their last day of PCIT. The remaining dyads experienced increases in ADHD symptoms immediately after the first week of the intervention, suggesting extinction bursts had occurred. Similarly, Dyads 2 and 4 demonstrated additional extinction bursts in ADHD symptoms after the families began PDI. After the first week of the intervention, Dyad 1 experienced a gradual decline in ADHD symptoms that continued until the end of the intervention.

Dyad 2 also saw a decline in ADHD symptoms across CDI, followed by an increase in ADHD symptoms until the first week of PDI. By the end of the intervention, Dyad 2 had sub-clinical levels of ADHD symptoms. Dyad 4 experienced little changes in ADHD symptoms until the third week of PDI, at which point ADHD symptoms decreased for the remainder of the intervention. Follow-up BASC-2 scores for Dyads 1 and 2 were lower than their scores at the end of the intervention phase. Analyses of data overlap across phases using PAND suggest moderate to strong nonparametric effect sizes for Dyads 1, 2, and 3 (see Table 17). BASC-2 PMR data overlap between baseline and the PDI phases yielded moderate to strong nonparametric effect sizes for all dyads (i.e., 85.71% to 100%). Given the identification of expected extinction bursts and the consistent reductions of BASC-2 PMR scores to sub-clinical levels post-treatment, at least three demonstrations of a treatment effect were evident for BASC-2 PMR scores.

Table 16

Descriptive Statistics for Behavior Assessment System for Children, Second Edition: Parent Monitor Ratings for ADHD

	Baseline Phase			Intervention Phase	
	Mean (*SD*)	Range	Baseline Estimate	Mean (*SD*)	Range
Dyad 1	85.75 (1.26)	84.00-87.00	100%	67.92 (11.01)	58.00-92.00
Dyad 2	70.00 (4.30)	66.00-77.00	100%	60.45 (4.80)	55.00-70.00
Dyad 3	73.14 (5.84)	65.00-81.00	100%	49.00 (11.00)	37.00-66.00
Dyad 4	87.17 (3.25)	83.00-93.00	100%	78.54 (13.73)	54.00-92.00

Table 17

Percent of All Non-Overlapping Data for Behavior Assessment System for Children, Second Edition: Parent Monitor Ratings for ADHD

Dyad 1	Dyad 2	Dyad 3	Dyad 4
88.24%	87.50%	91.67%	57.89%

ADHD Symptom Observations. All parent-child dyads had Verbal Interference (VI) and Physical Interference (PI) baseline trends that were neutral or positive and in the opposite direction of the expected behavior change (see Figure 7). Dyad 4 had a positive MM baseline trend, while Dyads 1 and 3 had positive GM baseline trends. Dyad 1 had a stable baseline estimate for PI based on Neumann and McCormick's methodology.

Data trends for children's VI during the intervention phase were negative and in the direction of the expected behavior change for Dyad 1, neutral for Dyad 4, and positive for Dyads 2 and 3. Mean levels of VI decreased from baseline to intervention among Dyads 2 and 3, while mean levels of VI increased among Dyads 1 and 4 (see Table 18). Greater variability was observed for Dyad 1 in levels of VI compared to the remaining dyads. In particular, Dyad 1's VI behaviors increased slowly at the beginning of the intervention then declined over time until the end of the intervention, during which no VI behaviors were observed.

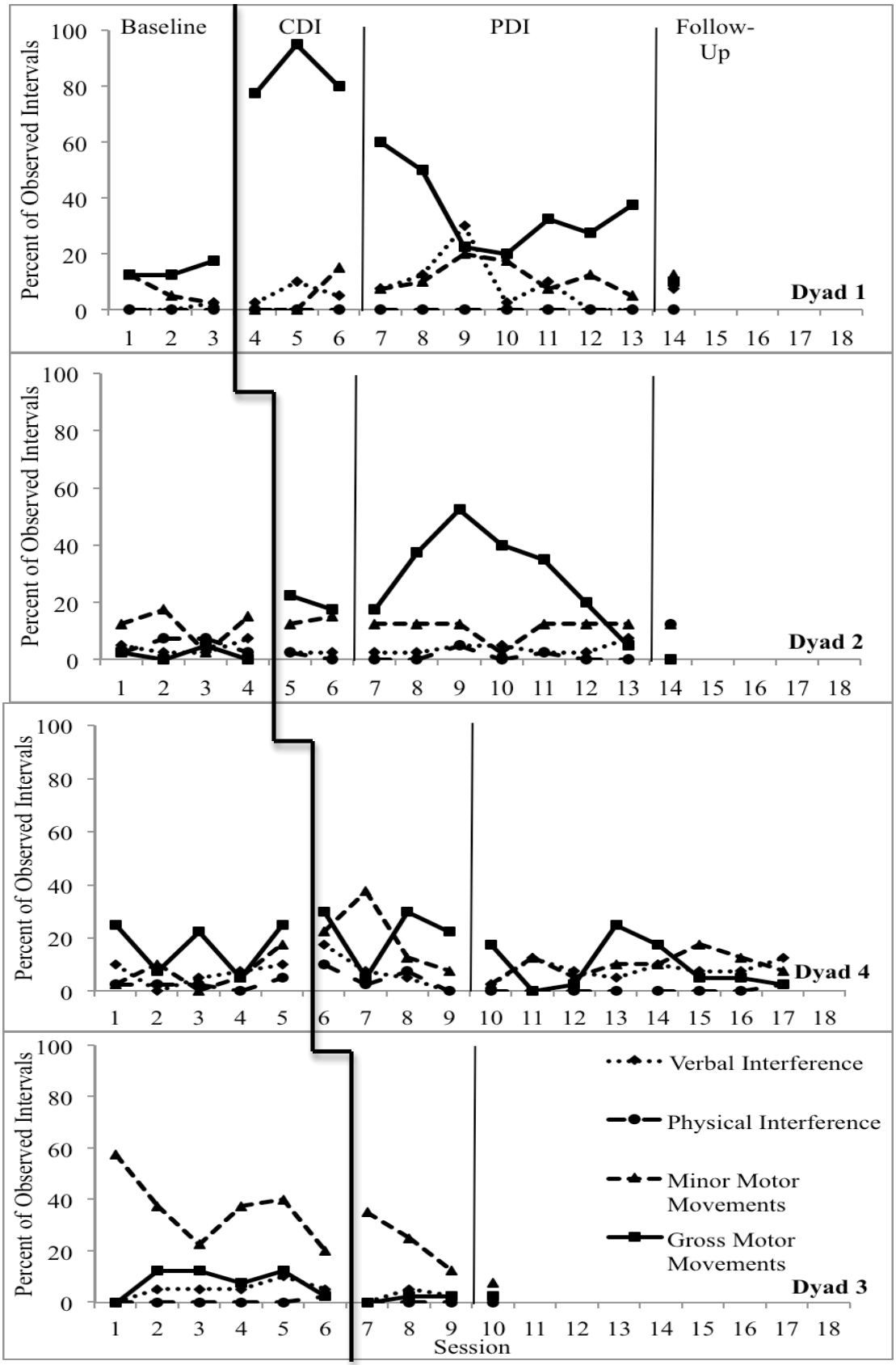

Figure 7. Multiple Baseline Results for Observed ADHD Symptoms

Each child participants' PI data trend was either neutral or negative during the intervention phase with little to no variability. No PI behaviors were observed for Dyad 1 or Dyad 3 during the intervention phase, and mean levels of PI among all dyads were lower or had remained constant when compared to baseline.

Data trends for children's Minor Movement (MM) behaviors were negative during the intervention phase for all dyads with the exception of Dyad 1, who experienced a positive trend for this dependent variable. MM data patterns were additionally associated with increased variability among dyads.

Table 18

Descriptive Statistics for ADHD Symptom Observation

		Baseline Phase			Intervention Phase	
		Mean (*SD*)	Range	Baseline Estimate	Mean (*SD*)	Range
Dyad 1	VI	0.83 (1.44)	0.00-2.50	0%	8.00 (8.88)	0.00-30.00
	PI	0.00 (0.00)	0.00-0.00	100%	0.00 (0.00)	0.00-0.00
	MM	6.67 (5.20)	2.50-12.50	0%	9.50 (6.85)	0.00-20.00
	GM	14.17 (2.89)	12.50-17.50	66.67%	50.25 (26.68)	20.00-95.00
Dyad 2	VI	4.38 (2.39)	2.50-7.50	25%	3.61 (1.82)	2.50-7.50
	PI	5.00 (2.89)	2.50-7.50	0%	1.11 (1.82)	0.00-5.00
	MM	11.88 (6.57)	2.50-17.50	25%	11.67 (3.54)	2.50-15.00
	GM	1.88 (2.39)	0.00-5.00	0%	27.50 (14.68)	5.00-52.50
Dyad 3	VI	5.00 (3.16)	0.00-10.00	66.67%	2.50 (2.04)	0.00-5.00
	PI	0.42 (1.02)	0.00-2.50	0%	0.00 (0.00)	0.00-0.00
	MM	35.83 (13.57)	20.00-57.50	50%	20.00 (12.42)	7.50-35.00
	GM	7.92 (5.57)	0.00-12.50	16.67%	1.88 (1.25)	0.00-2.50
Dyad 4	VI	6.50 (4.18)	0.00-10.00	0%	7.92 (4.75)	0.00-17.50
	PI	2.50 (1.77)	0.00-5.00	60%	1.88 (3.39)	0.00-10.00
	MM	7.00 (6.94)	0.00-17.50	0%	13.13 (9.36)	5.00-37.50
	GM	17.00 (9.91)	5.00-25.00	0%	13.54 (11.40)	0.00-30.00

Note. VI = Verbal Interference. PI = Physical Interference. MM = Minor Motor Movements. GM = Gross Motor Movements.

Table 19

Percent of All Non-Overlapping Data for ADHD Symptom Observation

	Dyad 1	Dyad 2	Dyad 3	Dyad 4
Verbal Interference	30%	69.23%	80%	58.82%
Physical Interference	76.92%	84.62%	50%	70.59%
Minor Motor Movements	53.85%	76.92%	80%	58.82%
Gross Motor Movements	76.92%	0%	80%	76.47%

Mean levels of MM decreased when compared to baseline among Dyads 2 and 3 and increased among Dyads 1 and 4. Gross Motor (GM) data trends were negative for all dyads except for Dyad 3, whose GM levels increased slightly during the intervention. Dyads 1 and 2 experienced an increase in this dependent variable at the beginning of CDI. While GM levels for Dyad 2 continued to increase until the last few weeks of PDI, GM levels for Dyad 1 declined but steadily increased until the last intervention session.

Comparison between baseline and intervention phases suggest immediate changes in levels from positive to negative or neutral among Dyad 4 for all ADHD symptoms. Treatment effects were also observed for Dyad 2's VI behaviors, as well as Dyad 3's PI behaviors. During follow-up for Dyads 1 and 2, no ADHD symptoms were observed for more than 12.5% of observed intervals. An analysis of data overlap across phases using PAND suggests a moderate nonparametric effect for PI levels among Dyad 2 (see Table 19). Overall, analysis of changes in data patterns in observed ADHD symptoms suggest at least three demonstrations of a treatment effect were not observed across the four participants.

Child Behavior Checklist. At baseline, all dyads indicated borderline (i.e., at or above 65) or clinically elevated (i.e., at or above 70) levels of ADHD symptoms among child participants as measured by the DSM-based scale scores of the CBCL (see Figure 8). CBCL scores at this time point ranged from 70 to 77, with a mean of 70.75 and

standard deviation of 4.57. The three dyads who remained in the study experienced a decline in scores to sub-clinical levels after the completion of PCIT. In particular, post-intervention CBCL scores ranged from 50 to 60 with a mean of 53.67 and a standard deviation of 5.51. CBCL scores at follow-up among Dyads 1 and 2 remained sub-clinical and ranged from 51 to 53.

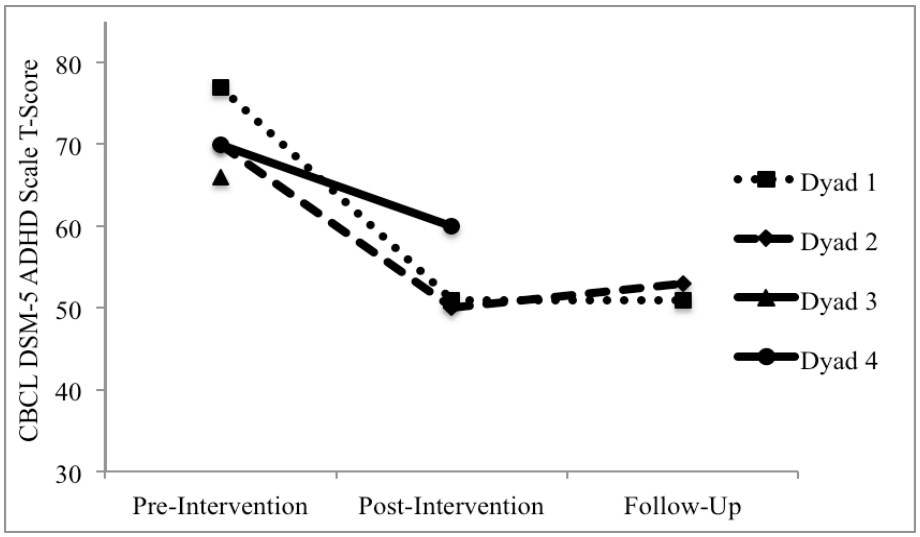

Figure 8. CBCL Attention Sub-Scale Scores Pre-Intervention, Post-Intervention, and at Follow-Up

Visual Permutation Test

A certified PCIT therapist and an expert in single-case design served as the visual analysts in the current study. Both analysts were blind to the participants' assignments to conditions and uninvolved in the therapy process. The visual analysts studied masked graphs of each dependent variable and estimated which dyad received the intervention at each of the five randomly assigned conditions (Ferron & Jones, 2006). The first analyst's estimations aligned correctly for the following dependent variables: DPICS Labeled Praises (p = .01) and DPICS Commands (p = .01). The second analyst's estimations aligned correctly for the following variables: DPICS Labeled Praises (p = .01), DPICS

Reflections (p = .01), DPICS Questions (p = .01), DPICS Commands (p = .01), and DPICS PDI skills (p = .01). The null hypothesis is thus rejected for these dependent variables, indicating PCIT was associated with treatment effects for DPICS Labeled Praises, Reflections, Questions, Commands, and PDI skills. The estimations of the remaining dependent variables (i.e., PPI, BASC-2 PMR, ECBI, Behavior Descriptions, and Criticism) were not aligned with the assignments, indicating no treatment effects.

Multilevel Modeling

Hierarchical linear modeling was conducted assuming a change in trend and level between baseline and intervention phases, as well as autocorrelation. Treatment effects were observed at the end of CDI and at the end of PDI, as young children with problem behaviors tend to experience initial extinction bursts in behavior upon receiving therapy.

Mothers' parenting practices.

Parenting Practices Interview (PPI). The average treatment effects for PPI at the end of CDI (b = 0.35, p = 0.268) and at the end of PDI (b = 0.42, p = 0.089) were positive but not statistically significant at the .05 level, indicating no confidence in the presence of an effect caused by PCIT (see Table 20). The variance within dyads was statistically significant after CDI (0.28) and after PDI (0.27). No variance was found in the treatment slope or in changes in slope. Some variance between subjects was evident at baseline after CDI (0.38) and after PDI (0.47) but was not statistically significant. Autocorrelation was not statistically significant after CDI (0.28 with a standard error of 0.08) or after PDI (0.30 with a standard error of 0.16). No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 21).

Table 20

Hierarchical Linear Modeling (HLM) Fixed Effects for Parenting Practices Interview

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	4.82	0.34	3.01	14.34	0.0007*
	Treatment	0.35	0.30	10.90	1.17	0.2675
	Treatment*Time	0.14	0.31	24.8	0.46	0.6521
	Caregivers' Inconsistency	-0.44	0.49	11.70	-0.90	0.3887
	Practice of Skills	-0.00	0.00	24.60	-0.34	0.7335
After PDI	Intercept	4.84	0.37	3.48	13.11	0.0004*
	Treatment	0.42	0.22	11.60	1.86	0.0885
	Treatment*Time	0.02	0.08	26.40	0.25	0.8052
	Caregivers' Inconsistency	0.16	0.45	29.20	0.35	0.7285
	Practice of Skills	0.00	0.00	31.30	0.31	0.7585

**significant at the .05 level*

Table 21

Hierarchical Linear Modeling (HLM) Random Effects for Parenting Practices Interview

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	0.48	0.37	3.49	1.31	0.2690
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	0.68	0.38	3.65	1.78	0.1570
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 2	After CDI	Intercept	0.17	0.37	3.58	0.46	0.6710
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	0.16	0.39	3.92	0.42	0.6967
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After CDI	Intercept	0.19	0.36	3.41	0.51	0.6405
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	0.06	0.38	3.76	0.16	0.8833
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After CDI	Intercept	-0.84	0.39	3.81	-2.16	0.1002
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	-0.90	0.39	3.76	-2.34	0.0837
		Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

Dyadic Parent-Child Interaction Coding System (DPICS).

Labeled praises. The average treatment effects for Labeled Praises at the end of CDI ($b = 11.17$, $p = 0.002$) and at the end of PDI ($b = 10.67$, $p < 0.0001$) were positive and statistically significant at the .05 level, indicating confidence in the presence of an effect caused by PCIT (see Table 22). After CDI, more variability was found within subjects (3.75) than between dyads (2.37). The variance within subjects at this time point was statistically significant at the .05 level. No variance was found in the baseline slope or in changes in slope after CDI. After PDI, no variance was found in the baseline or treatment slopes. Some variance was found in changes in slope after treatment, but this estimate was not statistically significant. Autocorrelation was statistically significant after CDI (-0.16 with a standard error of 0.26) but not statistically significant after the intervention was completed (-0.02 with a standard error of 0.15). Deviations of individual estimates from the average estimates can be found in Table 23. No individual deviations were statistically significant after CDI or PDI.

Table 22

Hierarchical Linear Modeling (HLM) Fixed Effects for Dyadic Parent-Child Interaction Coding System: Labeled Praises

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	0.91	0.39	7.35	2.30	0.0529
	Treatment	11.17	1.32	3.64	8.47	0.0016*
	Treatment*Time	0.63	2.22	13.70	0.28	0.7827
	Caregivers' Inconsistency	1.76	2.26	1.91	0.78	0.5204
	Practice of Skills	0.02	0.03	12.30	0.58	0.57111
After PDI	Intercept	0.83	0.55	17.90	1.51	0.1477
	Treatment	10.67	1.07	18.10	10.02	<.0001*
	Treatment*Time	0.35	0.54	1.00	0.64	0.6388
	Caregivers' Inconsistency	2.89	5.78	1.00	0.50	0.7049
	Practice of Skills	-0.00	0.01	1.00	-0.12	0.9258

**significant at the .05 level*

Table 23

Hierarchical Linear Modeling (HLM) Random Effects for Dyadic Parent-Child Interaction Coding System: Labeled Praises

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After	Intercept	0.00				
	CDI	Treatment	1.30	1.28	1.56	1.02	0.4417
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	-0.06	0.47	1.00	-0.13	0.9156
Dyad 2	After	Intercept	0.00				
	CDI	Treatment	-1.09	1.56	1.55	-0.70	0.5758
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.02	0.21	1.00	0.11	0.9330
Dyad 3	After	Intercept	0.00				
	CDI	Treatment	-0.22	1.49	1.55	-0.15	0.9008
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.03	0.22	1.00	0.15	0.9072
Dyad 4	After	Intercept	0.00				
	CDI	Treatment	-299E-17	1.54	1.00	-0.00	1.0000
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.01	0.33	1.00	0.02	0.9858

**significant at the .05 level*

Behavior descriptions. The average treatment effects for mothers' use of Behavior Descriptions at the end of CDI ($b = 12.73$, $p = 0.013$) and at the end of treatment ($b = 14.84$, $p < 0.002$) were positive and statistically significant at the .05 level. These effects indicate confidence in the presence of an effect caused by PCIT (see Table 24). The variance found within dyads after CDI (4.67) and after PDI (11.07) was statistically significant. After CDI, no variance was found in baseline but some variance was found in treatment slope and changes in slope.

Table 24

Hierarchical Linear Modeling (HLM) Fixed Effects for Dyadic Parent-Child Interaction Coding System: Behavior Descriptions

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	1.21	0.27	10.80	4.52	0.0009*
	Treatment	12.73	1.27	1.84	10.06	0.0127*
	Treatment*Time	5.96	3.03	1.55	1.97	0.2239
	Caregivers' Inconsistency	-4.25	2.60	1.70	-1.63	0.2650
	Practice of Skills	-0.02	0.04	1.56	-0.43	0.7161
After PDI	Intercept	1.33	0.81	12.00	1.66	0.1232
	Treatment	14.84	2.16	4.33	6.87	0.0017*
	Treatment*Time	0.40	0.86	19.70	0.46	0.6486
	Caregivers' Inconsistency	-1.50	3.29	22.10	-0.46	0.6534
	Practice of Skills	0.01	0.01	21.10	1.09	0.2872

Table 25

Hierarchical Linear Modeling (HLM) Random Effects for Dyadic Parent-Child Interaction Coding System: Behavior Descriptions

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	0.00				
		Treatment	-0.64	1.56	1.44	-0.41	0.7357
		Treatment*Time	-0.32	1.09	1.52	-0.29	0.8049
	After PDI	Intercept	0.00				
		Treatment	1.99	2.19	3.07	0.91	0.4295
		Treatment*Time	0.00				
Dyad 2	After CDI	Intercept	0.00				
		Treatment	-0.96	1.62	1.44	-0.59	0.6317
		Treatment*Time	-0.32	1.09	1.52	-0.29	0.8049
	After PDI	Intercept	0.00				
		Treatment	-2.95	2.64	3.66	-1.12	0.3311
		Treatment*Time	0.00				
Dyad 3	After CDI	Intercept	0.00				
		Treatment	1.60	1.62	1.45	0.99	0.4589
		Treatment*Time	-1.14	1.34	1.21	-0.85	0.5310
	After PDI	Intercept	0.00				
		Treatment	-2.14	2.50	3.57	-0.86	0.4455
		Treatment*Time	0.00				
Dyad 4	After CDI	Intercept	0.00				
		Treatment	5.53E-15	1.68	1.00	0.00	1.0000
		Treatment*Time	1.34	1.34	1.22	1.00	0.4735
	After PDI	Intercept	0.00				
		Treatment	3.11	2.36	3.33	1.32	0.2714
		Treatment*Time	0.00				

**significant at the .05 level*

However, these estimates were not statistically significant. After PDI, no variance was found at baseline or in changes in slope. Some variance was found in the treatment slope after PCIT, but this estimate was not statistically significant. Autocorrelation was statistically significant after CDI (-0.66 with a standard error of 0.18) but not statistically significant after the intervention was completed (0.06 with a standard error of 0.18). Deviations of individual estimates from the average estimates can be found in Table 25 above. No deviations were statistically significant after CDI or PDI.

Reflections. The average treatment effect for mothers' reflections after CDI (b = 4.81, p = 0.089) was positive but not statistically significant. The average treatment effect after PDI (b = 6.39, p = 0.007) was positive and statistically significant at the .05 level, indicating confidence in the presence of a treatment effect (see Table 26). The predictor variable of mothers' practice of skills at home after PCIT was statistically significant (b = 0.03, p = 0.009). The variance found within dyads after CDI (9.87) was statistically significant, though no variance was found in baseline or changes in slope. Variance was found in the treatment slope after CDI but this estimate was not statistically significant.

Table 26

Hierarchical Linear Modeling (HLM) Fixed Effects for Dyadic Parent-Child Interaction Coding System: Reflections

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	7.78	0.87	5.28	8.95	0.0002*
	Treatment	4.81	2.29	5.35	2.10	0.0858
	Treatment*Time	-2.21	3.45	17.70	-0.64	0.5306
	Caregivers' Inconsistency	-3.64	3.75	2.30	-0.97	0.4218
	Practice of Skills	0.06	0.04	15.50	1.30	0.2129
After PDI	Intercept	8.09	1.23	12.40	6.59	<.0001*
	Treatment	6.39	2.01	14.50	3.17	0.0065*
	Treatment*Time	-1.19	0.72	22.30	-1.65	0.1122
	Caregivers' Inconsistency	3.74	3.40	34.30	1.10	0.2786
	Practice of Skills	0.03	0.01	24.00	2.86	0.0086*

**significant at the .05 level*

Table 27

Hierarchical Linear Modeling (HLM) Random Effects for Dyadic Parent-Child Interaction Coding System: Reflections

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After	Intercept	0.00				
	CDI	Treatment	-1.61	2.54	1.00	-0.63	0.6413
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 2	After	Intercept	0.00				
	CDI	Treatment	0.48	2.73	1.00	0.18	0.8890
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After	Intercept	0.00				
	CDI	Treatment	1.13	2.68	1.00	0.42	0.7469
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After	Intercept	0.00				
	CDI	Treatment	1.34E-15	2.14	1.00	0.00	1.0000
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

After PDI, no variance between dyads was found at baseline, treatment, or the changes in slope over time. Autocorrelation was statistically significant after treatment was complete (0.45 with a standard error of 0.14) but not statistically significant after CDI (0.29 with a standard error of 0.24). No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 27 above).

Questions. The average treatment effect for mothers' use of questions at the end of CDI (b = -40.17, p = <0.0001) was negative and statistically significant. The average

treatment effect at the end of treatment (b = -40.67, p = <0.0001) was negative and statistically significant at the .05 level, indicating confidence in the presence of an effect caused by PCIT (see Table 28). The variance found within dyads after CDI (48.53) and after PDI (36.95) was statistically significant. No variance was found in baseline or in treatment slope after CDI. Some variance was found in the change in slope over time after CDI but this estimate was not statistically significant. After PDI, no variance between dyads was found at baseline, treatment, or the changes in slope over time. Autocorrelation was statistically significant after CDI (0.70 with a standard error of 0.19) and after the treatment was complete (0.74 with a standard error of 0.13). Deviations of individual estimates from the average estimates can be found in Table 29. No deviations were statistically significant after CDI or PDI.

Table 28

Hierarchical Linear Modeling (HLM) Fixed Effects for Dyadic Parent-Child Interaction Coding System: Questions

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	38.52	2.49	3.00	15.48	0.0006*
	Treatment	-40.17	4.92	16.10	-8.16	<.0001*
	Treatment*Time	-5.0779	5.55	2.41	-0.91	0.4423
	Caregivers' Inconsistency	9.62	8.46	7.96	1.14	0.2884
	Practice of Skills	0.04	0.07	2.22	0.53	0.6434
After PDI	Intercept	38.99	2.22	4.88	17.58	<.0001*
	Treatment	-40.67	3.63	16.00	-11.20	<.0001*
	Treatment*Time	-0.24	1.08	42.20	-0.23	0.8225
	Caregivers' Inconsistency	1.05	4.44	42.80	0.24	0.8150
	Practice of Skills	-0.01	0.01	44.50	-0.91	0.3702

**significant at the .05 level*

Table 29

Hierarchical Linear Modeling (HLM) Random Effects for Dyadic Parent-Child Interaction Coding System: Questions

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	-0.80	2.77	1.00	-0.29	0.8223
	After	Intercept					
	PDI	Treatment					
		Treatment*Time					
Dyad 2	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	0.29	1.89	1.00	0.15	0.9038
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	1.04	2.63	1.00	0.40	0.76
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	-0.54	2.64	1.00	-0.20	0.8728
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

Commands. No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 30). The average treatment effect for mothers' verbalizations of commands at the end of CDI (b = -24.97, p = 0.022) was negative and statistically significant. The average treatment effect at the end of treatment (b = -26.84, p = 0.000) was negative and statistically significant at the .05 level, indicating confidence in the presence of an effect caused by PCIT (see Table 31). The variance found within dyads after CDI (155.16) and after PDI (93.52) was statistically significant. No variance was found in treatment slope or changes in slope after CDI or

after PDI. Some variance was found in the baseline slope after CDI and PDI but these estimates were not statistically significant.

Table 30

Hierarchical Linear Modeling (HLM) Random Effects for Dyadic Parent-Child Interaction Coding System: Commands

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	-5.08	8.67	3.17	-0.59	0.5968
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	4.27	5.88	3.67	0.73	0.5114
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 2	After CDI	Intercept	-8.76	8.65	3.18	-1.01	0.3816
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	-8.80	6.19	3.88	-1.42	0.2304
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After CDI	Intercept	8.11	8.25	3.15	0.98	0.3950
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	8.81	6.11	3.82	1.44	0.2261
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After CDI	Intercept	5.73	9.32	3.18	0.62	0.5797
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	4.26	5.92	3.69	0.72	0.5147
		Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

After PDI, no variance between dyads was found at baseline, treatment, or the changes in slope over time. Autocorrelation was not statistically significant after CDI (0.36 with a standard error of 0.30) but was statistically significant after the treatment was complete (0.38 with a standard error of 0.19). No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 30 above).

Table 31

Hierarchical Linear Modeling (HLM) Fixed Effects for Dyadic Parent-Child Interaction Coding System: Commands

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	27.49	6.02	3.66	4.57	0.0127*
	Treatment	-24.97	8.36	6.44	-2.99	0.0224*
	Treatment*Time	-15.33	11.72	23.00	-1.31	0.2040
	Caregivers' Inconsistency	-9.10	14.60	9.57	-0.62	0.5477
	Practice of Skills	0.17	0.14	23.70	1.19	0.2444
After PDI	Intercept	27.47	5.32	3.89	5.17	0.0072*
	Treatment	-26.84	4.82	8.64	-5.57	0.0004*
	Treatment*Time	-3.97	2.11	24.50	-1.88	0.0722
	Caregivers' Inconsistency	-4.58	9.46	31.10	-0.48	0.6319
	Practice of Skills	0.04	0.03	29.50	1.44	0.1617

**significant at the .05 level*

Criticism. The average treatment effect for criticism after CDI (b = -4.44, p = 0.107) was not statistically significant. The average effect after PDI (b = -4.59, p = 0.009) was statistically significant, indicating a treatment effect (see Table 32). The variance within dyads after CDI (18.44) and PDI (10.69) was statistically significant. No variance was found between dyads in baseline, treatment, or changes in slope after CDI or PDI. Autocorrelation was not statistically significant after CDI (0.26; standard error of 0.21) or PDI (0.26; standard error of 0.16). No individual estimates were statistically significant after CDI or PDI (see Table 33).

Table 32

Hierarchical Linear Modeling (HLM) Fixed Effects for Dyadic Parent-Child Interaction Coding System: Criticism

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	4.62	1.18	7.58	3.91	0.0050*
	Treatment	-4.44	2.57	13.50	-1.73	0.1072
	Treatment*Time	-0.43	3.74	24.30	-0.12	0.9090
	Caregivers' Inconsistency	-1.04	3.59	11.70	-0.29	0.7764
	Practice of Skills	0.00	0.04	24.10	0.08	0.9382
After PDI	Intercept	4.60	0.92	13.10	5.02	0.0002*
	Treatment	-4.59	1.50	13.60	-3.06	0.0088*
	Treatment*Time	-0.06	0.55	16.30	-0.11	0.9139
	Caregivers' Inconsistency	-0.7631	2.77	22.50	-0.28	0.7853
	Practice of Skills	0.00	0.01	16.90	0.05	0.9622

**significant at the .05 level*

Table 33

Hierarchical Linear Modeling (HLM) Random Effects for Dyadic Parent-Child Interaction Coding System: Criticism

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 2	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After	Intercept	0.00				
	CDI	Treatment	0.00				
		Treatment*Time	0.00				
	After	Intercept	0.00				
	PDI	Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

PDI. The average treatment effect for mothers' effective use of PDI skills (b = 91.21, $p < 0.0001$) was positive and statistically significant at the .05 level, indicating confidence in the presence of a treatment effect (see Table 34). The predictor variable of other caregivers' use of inconsistent parenting practices was statistically significant (b = -18.98, $p = 0.032$). The variance found within dyads (58.76) was statistically significant. No variance between dyads was found at baseline or change in slope. Variance was found in treatment slope but was not statistically significant. Autocorrelation was not statistically significant (-0.15 with standard error of 0.18). Deviations of individual

estimates from the average estimates were not statistically significant (see Table 35).

Table 34

Hierarchical Linear Modeling (HLM) Fixed Effects for Dyadic Parent-Child Interaction Coding System: Accuracy of Parent-Directed Interaction

Parameter	Estimate	Std. Error	df	t	Sig.
Intercept	-0.16	1.58	12.10	-0.10	0.9213
Treatment	91.21	3.90	5.43	23.40	<.0001*
Treatment*Time	1.35	2.53	11.30	0.53	0.6041
Caregivers' Inconsistency	-18.98	8.25	21.20	-2.30	0.0316*
Practice of Skills	0.01	0.04	10.20	0.35	0.7311

**significant at the .05 level*

Table 35

Hierarchical Linear Modeling (HLM) Random Effects for Dyadic Parent-Child Interaction Coding System: Accuracy of Parent-Directed Interaction

	Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	Intercept	0.00				
	Treatment	3.69	4.15	1.61	0.89	0.4867
	Treatment*Time	0.00				
Dyad 2	Intercept	0.00				
	Treatment	-4.18	5.12	1.53	-0.82	0.5212
	Treatment*Time	0.00				
Dyad 3	Intercept	0.00				
	Treatment	-0.58	5.50	1.22	-0.11	0.9307
	Treatment*Time	0.00				
Dyad 4	Intercept	0.00				
	Treatment	1.08	4.64	1.57	0.23	0.8428
	Treatment*Time	0.00				

**significant at the .05 level*

Children's Behavior Problems.

ECBI Intensity. The average treatment effect for ECBI Intensity scores at the end of CDI (b = -16.29, p = 0.045) was negative and statistically significant. The average treatment effect at the end of treatment (b = -20.29, p = 0.000) was negative and statistically significant at the .05 level, indicating confidence in the presence of an effect caused by PCIT (see Table 36). The average change in slope over time was statistically significant after PDI (b = -2.35, p = 0.004). The predictor variable of other caregivers'

use of inconsistent parenting practices was statistically significant ($b = 9.50$, $p = 0.030$).

Table 36

Hierarchical Linear Modeling (HLM) Fixed Effects for Eyberg Child Behavior Inventory Intensity Scale

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	74.39	2.94	3.03	25.31	0.0001*
	Treatment	-16.29	3.56	1.99	-4.58	0.0449*
	Treatment*Time	-8.28	5.47	1.97	-1.51	0.2712
	Caregivers' Inconsistency	19.33	7.27	1.57	2.66	0.1498
	Practice of Skills	0.06	0.06	1.85	0.98	0.4359
After PDI	Intercept	73.69	3.41	3.49	21.63	0.0001*
	Treatment	-20.29	2.26	10.50	-9.00	0.0001*
	Treatment*Time	-2.35	0.76	30.20	-3.09	0.0042*
	Caregivers' Inconsistency	9.50	4.20	34.80	2.26	0.0301*
	Practice of Skills	0.01	0.01	37.4	0.92	0.3644

**significant at the .05 level*

The variance found within dyads after CDI (19.90) and after PDI (23.10) also was statistically significant. Some variance was found in baseline slope, treatment slope, and in changes in slope over time after CDI but was not statistically significant. After PDI, no variance between dyads was found in treatment slope or the changes in slope over time. Variance was observed after PDI in baseline slope, but this estimate was not statistically significant. Autocorrelation was statistically significant after treatment was complete (0.41 with a standard error of 0.15) but not statistically significant after CDI (0.15 with a standard error of 0.58). Deviations of individual estimates from the average estimates can be found in Table 37. No deviations were statistically significant after CDI or PDI.

Table 37

Hierarchical Linear Modeling (HLM) Random Effects for Eyberg Child Behavior Inventory Intensity Scale

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	1.46	3.66	3.98	0.40	0.7101
		Treatment	2.17	5.59	1.00	0.39	0.7644
		Treatment*Time	-1.00	2.09	1.78	-0.48	0.6850
	After PDI	Intercept	0.27	3.53	3.65	0.08	0.9433
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 2	After CDI	Intercept	-4.35	3.50	3.82	-1.24	0.2850
		Treatment	1.06	5.70	1.00	0.19	0.8832
		Treatment*Time	0.36	2.39	1.00	0.15	0.9041
	After PDI	Intercept	-5.56	3.64	3.91	-1.53	0.2033
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After CDI	Intercept	-3.79	3.37	3.62	-1.12	0.3308
		Treatment	-3.23	5.61	1.00	-0.57	0.6681
		Treatment*Time	-1.58	2.31	1.36	-0.68	0.5920
	After PDI	Intercept	-2.85	3.59	3.79	-0.79	0.4735
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After CDI	Intercept	6.68	3.32	3.75	2.01	0.1195
		Treatment	5.42E-16	4.08	1.00	0.00	1.0000
		Treatment*Time	2.21	2.23	1.37	0.99	0.4635
	After PDI	Intercept	8.15	3.58	3.76	2.27	0.0896
		Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

ECBI Problem. Average treatment effects for ECBI Problem scores at the end of CDI (b = -15.11, p = 0.190) and PDI (b =23.67, p = 0.069) were not statistically significant (see Table 38). Only variance found within dyads after PDI (24.68) was statistically significant.

Table 38

Hierarchical Linear Modeling (HLM) Fixed Effects for Eyberg Child Behavior Inventory Problem Scale

	Parameter	Estimate	Std. Error	df	t	Sig.
After	Intercept	77.89	0.87	1.33	90.03	0.0017*
CDI	Treatment	-15.11	6.15	1.36	-2.46	0.1900
	Treatment*Time	-4.64	8.98	1.55	-0.52	0.6694
	Caregivers' Inconsistency	22.55	11.88	1.00	1.90	0.3088
	Practice of Skills	0.01	0.11	1.50	0.13	0.9102
After	Intercept	78.01	2.08	2.75	37.42	<.0001*
PDI	Treatment	23.67	8.57	3.06	-2.76	0.0686
	Treatment*Time	-2.64	4.90	1.58	-0.54	0.6558
	Caregivers' Inconsistency	-0.91	5.90	48.50	-0.15	0.8784
	Practice of Skills	-0.01	0.06	1.65	-0.14	0.9024

**significant at the .05 level*

Variance was observed between dyads in baseline and treatment and in changes in slope after CDI and PDI but estimates were not statistically significant. Autocorrelation was statistically significant after PDI (0.54 with a standard error of 0.24) but not after CDI (0.64 with a standard error of 0.42). No deviations of individual estimates from the average estimates were statistically significant (see Table 39).

Table 39

Hierarchical Linear Modeling (HLM) Random Effects for Eyberg Child Behavior Inventory Problem Scale

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	0.80	5.48	1.00	0.15	0.9172
		Treatment	3.01	10.78	1.00	0.28	0.8264
		Treatment*Time	0.42	3.43	1.70	0.12	0.9151
	After PDI	Intercept					
		Treatment					
		Treatment*Time					
Dyad 2	After CDI	Intercept	-0.65	5.58	1.00	-0.12	0.9258
		Treatment	1.84	10.92	1.00	0.17	0.8935
		Treatment*Time	-0.15	4.10	1.14	-0.04	0.9756
	After PDI	Intercept					
		Treatment					
		Treatment*Time					
Dyad 3	After CDI	Intercept	-0.99	5.71	1.00	-0.17	0.8898
		Treatment	-4.86	10.86	1.00	-0.45	0.7323
		Treatment*Time	-4.02	3.66	1.50	-1.10	0.4177
	After PDI	Intercept					
		Treatment					
		Treatment*Time					
Dyad 4	After CDI	Intercept	0.85	5.59	1.00	0.15	0.9044
		Treatment	-131E-17	5.84	1.00	-0.00	1.0000
		Treatment*Time	3.75	3.51	1.54	1.07	0.4240
	After PDI	Intercept					
		Treatment					
		Treatment*Time					

**significant at the .05 level*

Children's ADHD symptoms.

***Behavior Assessment System for Children, Second Edition*.** The average treatment effect for BASC-2 PMR scores at the end of CDI (b = -19.16, p = 0.033) was negative and statistically significant. The average treatment effect at the end of treatment (b = -25.76, p = 0.000) was negative and statistically significant at the .05 level, indicating confidence in a treatment effect caused by PCIT (see Table 40). The average change in slope over time was significant after PDI (b = -2.56, p = 0.018). The variance

found within dyads after CDI (30.63) and after PDI (46.62) also was significant. The variance found in baseline slope, treatment slope, and in changes in slope after CDI was not statistically significant. Variance observed after PDI in baseline slope also was not significant. Autocorrelation was statistically significant after treatment was complete (0.66 with a standard error of 0.16) but not statistically significant after CDI (0.35 with a standard error of 0.20). No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 41).

Table 40

Hierarchical Linear Modeling (HLM) Fixed Effects for Behavior Assessment System for Children, Second Edition – Parent Monitor Rating

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	78.98	4.22	3.10	18.74	0.0003*
	Treatment	-19.16	4.21	2.37	-4.55	0.0326*
	Treatment*Time	-8.81	5.58	2.68	-1.58	0.2231
	Caregivers' Inconsistency	18.26	8.82	1.62	2.07	0.2030
	Practice of Skills	0.06	0.07	2.43	0.92	0.4408
After PDI	Intercept	78.07	3.59	4.33	21.77	<.0001*
	Treatment	-25.76	3.91	6.79	-6.59	0.0003*
	Treatment*Time	-2.56	1.04	39.20	-2.46	0.0183*
	Caregivers' Inconsistency	6.29	5.59	51.5	1.12	0.2663
	Practice of Skills	0.00	0.01	53.60	0.08	0.9338

**significant at the .05 level*

Table 41

Hierarchical Linear Modeling (HLM) Random Effects for Behavior Assessment System for Children, Second Edition – Parent Monitor Rating

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	5.92	5.27	3.97	1.12	0.3241
		Treatment	0.86	6.95	1.00	0.12	0.9214
		Treatment*Time	-1.56	2.19	1.28	-0.71	0.5840
	After PDI	Intercept	2.26	4.46	3.35	0.51	0.6435
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 2	After CDI	Intercept	-6.44	5.03	3.87	-1.28	0.2718
		Treatment	1.30	6.91	1.00	0.19	0.8815
		Treatment*Time	0.57	1.93	1.00	0.29	0.8184
	After PDI	Intercept	-3.17	4.59	3.39	-0.69	0.5335
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After CDI	Intercept	-6.47	4.87	3.69	-1.33	0.2606
		Treatment	-2.16	6.93	1.00	-0.31	0.8073
		Treatment*Time	-0.00	2.22	1.00	-0.00	0.9987
	After PDI	Intercept	-4.65	4.70	3.40	-0.99	0.3875
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After CDI	Intercept	6.98	4.83	3.92	1.45	0.2231
		Treatment	3.18E-16	3.48	1.00	0.00	1.0000
		Treatment*Time	1.00	2.18	1.00	0.46	0.7263
	After PDI	Intercept	5.56	4.48	3.36	1.24	0.2940
		Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

ADHD Symptom Observation.

Verbal interference. The average treatment effects for children's verbal interference behaviors at the end of CDI (b = -0.95, p = 0.677) and after treatment (b = -0.58, p = 0.809) were not statistically significant, indicating no confidence in the presence of an effect caused by PCIT (see Table 42). The variance found within dyads after CDI (12.05) and after PDI (27.78) was statistically significant. No variance was found at this time point in baseline slope or treatment slope. Some variance was found in

changes in slope over time after CDI but these estimates were not statistically significant.

Table 42

Hierarchical Linear Modeling (HLM) Fixed Effects for ADHD Observation: Verbal Interference

	Parameter	Estimate	Std. Error	df	t	Sig
After CDI	Intercept	4.67	0.92	6.56	5.05	0.0018*
	Treatment	-0.95	2.24	15.00	-0.42	0.6770
	Treatment*Time	3.64	7.59	4.81	0.48	0.6523
	Caregivers' Inconsistency	-3.23	3.93	13.90	-0.82	0.4259
	Practice of Skills	-0.06	0.09	3.78	-0.65	0.5521
After PDI	Intercept	4.74	1.45	14.60	3.27	0.0053*
	Treatment	0.58	2.35	14.40	0.25	0.8090
	Treatment*Time	0.89	0.85	17.80	1.05	0.3076
	Caregivers' Inconsistency	-2.39	4.49	23.90	-0.53	0.5986
	Practice of Skills	-0.02	0.01	20.50	-1.32	0.2006

**significant at the .05 level*

After PDI, no variance between dyads was found in baseline slope, treatment slope, or the changes in slope over time. Variance was observed after PDI in baseline slope, but this estimate was not statistically significant. Autocorrelation was not statistically significant after CDI (0.22 with a standard error of 0.23) or PDI (0.23 with a standard error of 0.16). Deviations of individual estimates from the average estimates can be found in Table 43. No deviations were statistically significant after CDI or PDI.

Table 43

Hierarchical Linear Modeling (HLM) Random Effects for ADHD Observation: Verbal Interference

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	0.09	2.44	2.45	0.04	0.9727
	After PDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 2	After CDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	-0.03	2.95	1.15	-0.01	0.9926
	After PDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 3	After CDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	2.56	2.52	1.69	1.02	0.4322
	After PDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	0.00				
Dyad 4	After CDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	-2.62	2.53	1.70	-1.04	0.4246
	After PDI	Intercept	0.00				
		Treatment	0.00				
		Treatment*Time	0.00				

**significant at the .05 level*

Physical interference. The average treatment effect for children's physical interference behaviors at the end of CDI (b = -2.21, p = 0.142) was not statistically significant. The average treatment effect after PDI (b = -2.19, p = 0.045) was statistically significant, indicating confidence in the presence of an effect caused by PCIT (see Table 44). The variance found within dyads after CDI (3.85) and after PDI (4.18) was statistically significant. No variance between subjects was found at this time point in treatment slope or changes in slope over time.

Table 44

Hierarchical Linear Modeling (HLM) Fixed Effects for ADHD Observation: Physical Interference

	Parameter	Estimate	Std. Error	df	t	Sig.
After	Intercept	2.06	1.05	3.13	1.95	0.1420
CDI	Treatment	-2.21	0.99	9.36	-2.24	0.0511
	Treatment*Time	2.33	3.49	17.90	0.67	0.5130
	Caregivers' Inconsistency	2.17	1.54	7.36	1.41	0.1987
	Practice of Skills	-0.04	0.04	16.60	-1.15	0.2669
After	Intercept	1.87	0.82	4.19	2.29	0.0810
PDI	Treatment	-2.19	0.93	8.27	-2.36	0.0447*
	Treatment*Time	0.24	0.49	1.36	0.48	0.6962
	Caregivers' Inconsistency	-0.94	3.05	6.99	-0.31	0.7667
	Practice of Skills	-0.01	0.01	1.53	-1.00	0.4500

**significant at the .05 level*

Some variance was found in baseline slope after CDI but this estimate was not statistically significant. After PDI, no variance between dyads was found in treatment slope. Variance was observed after PDI in baseline slope and changes in slope, but these estimates were not statistically significant. Autocorrelation was not statistically significant after CDI (-0.26 with a standard error of 0.29) or PDI (0.24 with a standard error of 0.20). No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 45).

Table 45

Hierarchical Linear Modeling (HLM) Random Effects for ADHD Observation: Physical Interference

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	-1.28	1.16	3.87	-1.11	0.3321
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	-0.74	1.17	2.47	-0.63	0.5805
		Treatment	0.00				
		Treatment*Time	0.06	0.31	1.00	0.21	0.8697
Dyad 2	After CDI	Intercept	2.48	1.16	3.88	2.13	0.1021
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	1.30	1.12	2.31	1.16	0.3530
		Treatment	0.00				
		Treatment*Time	-0.02	0.17	1.00	-0.14	0.91
Dyad 3	After CDI	Intercept	-1.58	1.13	3.64	-1.40	0.2417
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	-0.69	1.07	2.37	-0.64	0.5781
		Treatment	0.00				
		Treatment*Time	0.01	0.21	1.00	0.04	0.9728
Dyad 4	After CDI	Intercept	0.38	1.19	4.08	0.32	0.7631
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	0.13	1.08	2.36	0.12	0.9160
		Treatment	0.00				
		Treatment*Time	-0.05	0.24	1.00	-0.21	0.8708

**significant at the .05 level*

Minor motor movements. The average treatment effects for children's minor motor movements at the end of CDI (b = -0.97, p = 0.888) and after treatment (b = -0.58, p = 0.809) were not statistically significant, indicating no confidence in the presence of an effect caused by PCIT (see Table 46). The variance found within dyads after CDI (181.77) was not statistically significant, while within-subject variance was statistically significant after treatment (103.28). No variance between subjects was found after CDI in treatment slope or changes in slope over time. Some variance was found in baseline slope after CDI but this estimate was not statistically significant. After PDI, no variance

between dyads was found in treatment slope. Variance was observed after PDI in baseline slope and changes in slope, but these estimates were not statistically significant. Autocorrelation was not statistically significant after CDI (0.58 with a standard error of 0.55) but was statistically significant after PDI (0.52 with a standard error of 0.19). Deviations of individual estimates from the average estimates can be found in Table 47. No deviations were statistically significant after CDI or PDI.

Table 46

Hierarchical Linear Modeling (HLM) Fixed Effects for ADHD Observation: Minor Motor Movements

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	17.00	3.52	4.06	4.83	0.0082*
	Treatment	-0.97	12.99	3.38	-0.15	0.8881
	Treatment*Time	13.48	24.42	17.10	0.55	0.5881
	Caregivers' Inconsistency	-3.85	22.84	5.28	-0.17	0.8723
	Practice of Skills	-0.19	0.26	16.70	-0.71	0.4902
After PDI	Intercept	16.57	5.34	4.16	3.10	0.0343*
	Treatment	-5.31	5.69	6.69	-0.93	0.3831
	Treatment*Time	1.34	2.74	1.00	0.49	0.7111
	Caregivers' Inconsistency	-8.89	14.26	16.70	-0.62	0.5412
	Practice of Skills	-0.03	0.04	1.00	-0.90	0.5348

**significant at the .05 level*

Table 47

Hierarchical Linear Modeling (HLM) Random Effects for ADHD Observation: Minor Motor Movements

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	3.52	18.25	1.00	0.19	0.8786
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	-4.33	7.00	3.44	-0.62	0.5746
		Treatment	0.00				
		Treatment*Time	0.67	1.78	1.00	0.38	0.7709
Dyad 2	After CDI	Intercept	-1.14	18.25	1.00	-0.06	0.9602
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	-1.18	6.67	3.40	-0.18	0.8700
		Treatment	0.00				
		Treatment*Time	-0.24	1.17	1.00	-0.21	0.8690
Dyad 3	After CDI	Intercept	7.78	17.83	1.00	0.44	0.7382
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	10.45	6.63	3.38	1.58	0.2025
		Treatment	0.00				
		Treatment*Time	-0.44	1.63	1.00	-0.27	0.8308
Dyad 4	After CDI	Intercept	-3.11	18.13	1.00	-0.17	0.8918
		Treatment	0.00				
		Treatment*Time	0.00				
	After PDI	Intercept	-4.94	6.48	3.35	-0.76	0.4957
		Treatment	0.00				
		Treatment*Time	0.02	1.63	1.00	0.01	0.9941

**significant at the .05 level*

Gross motor movements. The average treatment effects for children's gross motor movements at the end of CDI (b = 27.57, p = 0.360) and after treatment (b = -0.09, p = 0.993) were not statistically significant, indicating no confidence in the presence of an effect caused by PCIT (see Table 48). The variance found within dyads after CDI (47.02) and after PDI (170.01) was statistically significant. No variance between subjects was found after CDI in changes in slope over time. Some variance was found in baseline slope and treatment slope after CDI but these estimates were not statistically significant.

After PDI, no variance between dyads was found in baseline slope. Variance was observed after PDI in treatment slope and changes in slope, but these estimates were not statistically significant. Autocorrelation was statistically significant after CDI (-0.48 with a standard error of 0.19) and after PDI (0.58 with a standard error of 0.14). No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 49).

Table 48

Hierarchical Linear Modeling (HLM) Fixed Effects for ADHD Observation: Gross Motor Movements

	Parameter	Estimate	Std. Error	df	t	Sig.
After CDI	Intercept	10.15	3.18	2.99	3.19	0.0500*
	Treatment	27.57	23.82	2.04	1.16	0.3600
	Treatment*Time	-3.32	13.71	19.60	-0.24	0.8112
	Caregivers' Inconsistency	-19.58	47.46	2.01	-0.41	0.7199
	Practice of Skills	0.05	0.14	19.30	0.32	0.7514
After PDI	Intercept	11.78	4.49	7.65	2.62	0.0317*
	Treatment	-0.09	9.00	4.06	0.01	0.9926
	Treatment*Time	-3.48	5.77	1.00	-0.60	0.6548
	Caregivers' Inconsistency	-25.09	14.88	38.30	-1.69	0.0998
	Practice of Skills	-0.00	0.07	1.02	-0.03	0.9778

Table 49

Hierarchical Linear Modeling (HLM) Random Effects for ADHD Observation: Gross Motor Movements

		Parameter	Estimate	Std. Error	df	t	Sig.
Dyad 1	After CDI	Intercept	2.88	3.73	4.19	0.77	0.4810
		Treatment	45.19	23.82	2.03	1.90	0.1963
		Treatment*Time	0.00				
	After PDI	Intercept	0.00				
		Treatment	8.14	13.50	1.00	0.60	0.6545
		Treatment*Time	-2.23	2.82	1.00	-0.79	0.5740
Dyad 2	After CDI	Intercept	-7.18	3.58	3.90	-2.00	0.1176
		Treatment	-11.61	23.95	2.07	-0.48	0.6743
		Treatment*Time	0.00				
	After PDI	Intercept	0.00				
		Treatment	1.69	12.79	1.00	0.13	0.9162
		Treatment*Time	0.81	2.61	1.00	0.31	0.8088
Dyad 3	After CDI	Intercept	-1.48	3.44	3.59	-0.43	0.6916
		Treatment	-33.58	23.94	2.07	-1.40	0.2920
		Treatment*Time	0.00				
	After PDI	Intercept	0.00				
		Treatment	-6.21	13.04	1.00	-0.48	0.7170
		Treatment*Time	1.31	3.56	1.00	0.37	0.7753
Dyad 4	After CDI	Intercept	5.77	3.50	3.71	1.65	0.1795
		Treatment	2.02E-13	40.87	1.97	0.00	1.0000
		Treatment*Time	0.00				
	After PDI	Intercept	0.00				
		Treatment	-3.62	12.75	1.00	-0.28	0.8238
		Treatment*Time	0.11	3.17	1.00	0.04	0.9776

**significant at the .05 level*

Variance was observed after PDI in treatment slope and changes in slope, but these estimates were not statistically significant. Autocorrelation was statistically significant after CDI (-0.48 with a standard error of 0.19) and after PDI (0.58 with a standard error of 0.14). No deviations of individual estimates from the average estimates were statistically significant after CDI or PDI (see Table 49).

Parent Satisfaction with PCIT

Caregiver satisfaction with the impact of treatment on parenting skills and

children's behaviors was assessed on the last day of PCIT using the TAI. The TAI was completed by the mothers of Dyads 1, 2, and 4. Overall TAI scores ranged from 46 to 50, with a mean of 48.67 and standard deviation of 2.31. The three mothers' responses to each of the 10 items ranged from four to five. In particular, after PCIT all mothers rated their children's behavior problems, compliance, and general behavioral progress as a five (i.e., "greatly improved," "very satisfied"). Mothers additionally reported their relationship with their children and the extent to which PCIT helped with other personal or family problems as a five (i.e., "very much better than before," "helped very much"). Each of the three mothers rated their general feeling towards PCIT as a five (i.e., "I liked it very much"). When asked to report the degree to which they had learned discipline techniques and way to teach their children new skills, two mothers indicated a five (i.e., "very many useful techniques"), while one mother indicated a four (i.e., "several useful techniques"). In regards to mothers' confidence in their ability to discipline their child, two mothers endorsed a five (i.e., "much more confident") and one mother endorsed a four (i.e., "somewhat more confident"). Finally, two mothers rated PCIT as a five in its effectiveness in improving their children's behaviors (i.e., "good), while one mother PCIT as a four (i.e., "very good").

With the exception of the CBCL and TAI, the data gleaned from visual analyses, a visual permutation test, and HLM were triangulated to determine the presence of a treatment effect. A treatment effect was considered truly present for a dependent variable when: 1) visual analysis results indicated at least three demonstrations of a treatment effect, 2) visual permutation tests conducted by both analysts led to the rejection of the null hypothesis, and 3) the HLM average treatment effect after PDI was statistically

significant. When two of the three statistical analyses yielded significant results, partial evidence of treatment effect was assumed. No treatment effect was assumed when all three statistical analyses yielded insignificant results. Triangulation of data indicated PCIT was partially effective in increasing the number of specific labeled praises and reducing the number of commands mothers use during daily interactions with their children. PCIT also was partially effective in teaching and promoting mothers' use of effective and consistent discipline practices to reduce misbehavior and promote compliance in their children. Treatment effects were not identified for any of the other dependent variables. A comprehensive summary of the results for each variable based on the three statistical analyses is presented in the next chapter.

Chapter Five: Discussion

Early intervention has the potential to reduce ADHD symptoms and behavior problems among preschool-aged children and prevent negative outcomes later in life such as low academic achievement (Sonuga-Barke & Halperin, 2010). One such early intervention, parent-based behavior modification training, is recommended as a first line of treatment for preschool children with ADHD (AAP, 2011; APA, 2006; NICE, 2008). Limited research exists to support the effects of such training on symptoms and behavior problems of young children as observed at home or at school. However, Parent-Child Interaction Therapy (PCIT) is considered a promising intervention that may be implemented in lieu of medication to treat the symptoms and behavior problems of young children with ADHD (Matos et al., 2009). The purpose of this study was to contribute to the literature by investigating the efficacy of PCIT as an alternative to medication for children aged three to five with ADHD. Using a multiple baseline single case design, the study measured the impact of PCIT on the frequency and severity of preschool-aged children's ADHD symptoms and problem behaviors, as well as the positive parenting practices and attitudes towards the therapy among children's mothers. Two research questions were proposed to determine whether mothers' participation in PCIT would result in significant and positive changes in these dependent variables from baseline to intervention and a three-month follow-up. This chapter includes a discussion of the results related to the research questions, followed by a presentation of the limitations of

the study, ideas for future research, and implications for practice.

Research Question One

Will mother-child dyads' participation in PCIT produce positive changes in mothers' parenting practices, children's problem behaviors, and children's ADHD symptoms from baseline to intervention and three-month follow-up?

The scores obtained from repeated measures of the dependent variables (i.e., PPI, DPICS, CBCL, ECBI, BASC-2 PMR, ADHD Symptom Observations) were analyzed via visual analysis, visual permutation, and/or hierarchical level modeling (HLM) from baseline to the completion of PCIT. These dependent variables were additionally measured during a three-month follow-up. The data obtained from the three statistical analyses for each dependent variable with the exception of the CBCL were triangulated to determine the presence of a treatment effect. A treatment effect was deemed truly present when: 1) visual analysis results indicated at least three demonstrations of a treatment effect, 2) visual permutation tests conducted by both analysts led to the rejection of the null hypothesis, and 3) the HLM average treatment effect after PDI was statistically significant. When two of the three statistical analyses yielded significant results, partial evidence of treatment effect was assumed. No treatment effect was assumed when all three statistical analyses yielded insignificant results. The triangulation of data is presented in Table 50 for each dependent variable with the exception of the CBCL and TAI results, and results for all dependent variables are discussed in the following paragraphs.

Table 50

Triangulation of Results

Dependent Variable	Visual Analysis	Visual Permutation		Hierarchical Linear Modeling
		Visual Analyst #1	Visual Analyst #2	
PPI				
DPICS Labeled Praises	X	X	X	X
DPICS Behavior Descriptions				X
DPICS Reflections			X	X
DPICS Questions			X	X
DPICS Commands		X	X	X
DPICS Criticism				X
DPICS PDI Skills	X		X	X
ECBI Intensity	X			X
ECBI Problem	X			
BASC-2 PMR	X			X
ADHD Symptom Observation: VI				
ADHD Symptom Observation: PI				X
ADHD Symptom Observation: MM				
ADHD Symptom Observation: GM				

*X indicates evidence of treatment effect or statistically significance

Mothers' parenting practices. No statistical analyses yielded significant results for mothers' positive parenting practices as measured by the PPI. While average PPI levels for all participants increased slightly from baseline to intervention, visual analyses yielded no treatment effects and only one moderate effect size was observed for Dyad 2. These findings suggest PCIT was not effective in increasing mothers' acceptance, knowledge, and use of affection, verbal praise, and tangible positive reinforcement to increase their children's positive behaviors. This finding was unexpected, given previous studies have found significantly improved parenting practices as measured by the PPI among parents of young children diagnosed with ADHD who participated in PCIT

(Matos et al., 2006; 2009).

Analysis of the DPICS skills revealed an increase in mean verbalizations of the positive skills (i.e., labeled praises, behavior descriptions, reflections) and a decrease of mean verbalizations of the negative skills (i.e., questions, commands, criticism) from baseline to intervention. Though moderate to strong nonparametric effect sizes were computed for all skills among all dyads with the exception of reflections, visual analyses only yield three demonstrations of a treatment effect for labeled praises. Partial evidence of a treatment effect was indicated for DPICS labeled praises and commands, as two of the three analyses yielded significant results for these dependent variables. Visual analysis, HLM analyses, and the visual permutation test of one visual analyst also suggested partial evidence of a treatment effect for mothers' PDI skills. Labeled praises declined, commands increased, and accuracy in using the PDI skills reduced to sub-criteria levels (i.e., under 75% accuracy) at the three-month follow-up observation for two of the parent participants. In sum, PCIT was partially effective in increasing the number of specific labeled praises and reducing the number of commands mothers use during daily interactions with their children. PCIT also was partially effective in teaching and promoting mothers' use of effective and consistent discipline practices to reduce misbehavior and promote compliance in their children. Follow-up data suggest positive changes in mothers' CDI and PDI skills as a result of PCIT were not maintained over time.

In regards to the remaining dependent variables measuring positive parenting practices, PCIT was not found to lead to significant positive changes in PPI scores or verbalizations of behavior descriptions, reflections, questions, and criticism. Though

mothers did demonstrate positive changes in mean levels of these dependent variables over time, analyses suggest these changes were due to chance or other factors and not due to the intervention under study. Several reasons have been hypothesized as to why significant changes in these constructs were not observed. The PPI measure, which measured both the frequency of positive reinforcement activities and mothers' beliefs regarding the importance of positive parenting practices, may have not been sensitive to change as a weekly progress monitoring tool. This hypothesis is based on research suggesting recall bias may affect outcomes of retrospective measures that depend on participants' accurate memory of past events (Hassan, 2006). As such, mothers may have had difficulty recalling the frequency with which they implemented positive parenting practices such as positive reinforcement during the previous week, even though they had documented evidence of practicing labeled praises during the week as part of the intervention. In contrast, mothers' use of labeled praises during PCIT sessions was measured in real time using the DPICS tool and did not require mothers' memory and self-reflection. Regarding mothers beliefs regarding positive parenting practices, mothers' practice of labeled praises at home may have not translated to their acceptance of or belief that positive reinforcement is important in improving child outcomes, leading to lower scores on the PPI.

The absence of significant changes in the remaining DPICS skills could be attributed to the time necessary to develop mastery of positive parenting practices (e.g., use of more reflections, use of fewer questions). The less frequent practice of skills at home by Dyads 1 and 2 compared to the other two dyads also may have compromised the effectiveness of PCIT in producing significant changes in the remaining DPICS skills.

In addition, any levels of anxiety experienced by the mothers as a result of their skills being observed in the PCIT clinic room could have affected the frequency with which they applied the DPICS skills during observations (Zisser & Eyberg, 2010).

Children's problem behaviors. The frequency of children's behavior problems as measured by the ECBI Intensity scale declined from clinically significant at baseline to sub-clinical levels post-intervention for all dyads. Given the identification of expected extinction bursts among two dyads, as well as changes in level between baseline and PDI, three demonstrations of a treatment effect were observed for Dyads 1, 2, and 3. In addition, strong effect sizes were computed for three dyads for this dependent variable. Mothers' stress levels with their children's behaviors as measured by the ECBI Problem scale also declined from clinically significant to sub-clinical for all dyads except for Dyad 4. Three demonstrations of a treatment effect were observed and three strong effect sizes were computed for the ECBI Problem scale after visual analysis. At follow-up, two mothers continued to report sub-clinical levels of behavior problems and stress levels. Visual permutation tests did not yield significant results for either scale. Hierarchical linear modeling results indicated significant improvements in the frequency of children's behavior problems after CDI and PDI. Overall, triangulation of data suggests PCIT was partially responsible for the improvement in children's behavior problems but not for mothers' levels of stress with the behaviors.

The presence of a treatment effect for children's behavior problems was expected, given results of related studies identified in the literature. In particular, all but one of the identified studies yielded significant and positive changes in the disruptive behaviors among young children diagnosed with ADHD who participated in PCIT with their

parents (Eisenstadt, 1993; Eyberg et al., 2001; Matos et al., 2006; Matos et al., 2009). The presence of a treatment effect for this dependent variable is corroborated by mothers' significantly enhanced skills in managing their children's behaviors through their acquisition of PDI skills. In this way, it is hypothesized that the child participants' disruptive behaviors that had been developed through maladaptive parent-child interactions were interrupted by mothers' use of clear and consistent limit setting (Patterson, 1982).

Hypotheses were formulated as to why significant changes in mothers' levels of stress regarding their children's behavior problems were not observed across participants as a result of PCIT. Mothers may have experienced stable or increased levels of stress due to children's demonstration of extinction bursts after their behavior problems were ignored. Specifically, after mothers initiated the extinction of undesired behaviors, the child participants may have increased the undesired behaviors to achieve the reinforcement to which they had been accustomed. Visual analysis suggests extinction bursts may have occurred several times throughout the intervention process. For example, Dyad 1 experienced an increase in behavior problems after two weeks of the mother's implementation of the CDI skills and planned ignoring of problem behaviors. Similarly, Dyad 3 experienced an increase in maternal stress related to behavior problems after only one week of practicing CDI skills and planned ignoring. The ECBI Intensity and Problem scores of Dyad 2 also increased after the intervention was introduced, and Dyad 4 maintained increasing levels of behavior problems and maternal stress until the last few weeks of PCIT.

Children's ADHD symptoms. Similar to findings for children's behavior

problems, children's ADHD symptoms as measured by the BASC-2-PMR reduced from clinically significant to sub-clinical levels from baseline to intervention. These results were corroborated by parents' reports of children's ADHD symptoms on the CBCL DSM-5-Oriented Scale, in which all children had borderline or clinically elevated levels of ADHD symptoms at baseline that declined to sub-clinical levels after PCIT was completed. At follow-up, two mothers continued to report their children maintained sub-clinical ADHD symptoms on the BASC-2 PMR and the CBCL. Thus, by the end of the intervention, the frequency of children's ADHD symptoms was no different from other male children their age in a standardized sample. Further, visual analysis indicated mean levels of BASC-2-PMR decreased from baseline to intervention by at least eight scale score points. In addition, moderate to strong nonparametric effect sizes were indicated for three dyads. Given the identification of expected extinction bursts among dyads, as well as changes in level between baseline and PDI, at least three demonstrations of a treatment effect were observed via visual analysis. Visual permutation tests were not statistically significant. Two statistical analyses yielded evidence of a treatment effect, as HLM results additionally indicated significant changes in BASC-2 PMR scores after CDI and PDI. Thus, PCIT is partially considered the cause of the reduction in ADHD symptoms from baseline to the end of the intervention.

In regards to the real time observations of children's ADHD symptoms using an observation tool created by the primary investigator, PCIT was not found to lead to significant positive changes in the frequency of children's verbal interference (VI), physical interference (PI), minor motor movement (MM), or gross motor movement (GM) behaviors. Visual analysis results suggest only one dyad had stable baseline levels

of these four dependent variables. A moderate PAND effect size was computed only for Dyad 2, and only one dyad demonstrated immediate effects for each of the four ADHD symptoms. Moreover, visual permutation and HLM results did not yield significant results indicating treatment effects.

The presence of a treatment effect for children's ADHD symptoms as measured by the BASC-2 PMR is expected, as all but one of the identified related studies yielded significant and positive changes in attention and hyperactivity symptoms among young children diagnosed with ADHD who completed PCIT with their parents (Eisenstadt, 1993; Eyberg et al., 2001; Matos et al., 2006; Matos et al., 2009). Potential extinction bursts also were expected, as a review of the literature suggests both genetic and environmental factors (e.g., family interaction patterns) sustain ADHD symptoms (Keown, 2012). Particularly, parents and children shape the behaviors of one another over time, and young children with challenging behaviors and self-regulation difficulties often incite negative responses from their parents (Sonuga-Barke et al., 2006). As such, after mothers in the current study began responding less to their children's ADHD symptoms, their children may have increased these behaviors in order to obtain the response that had previously been "shaped." For instance, Dyad 1 experienced an increase in BASC-2 PMR scores during the first week of CDI after a stable baseline was established. ADHD symptoms then declined steadily over time after this extinction burst. Similarly, Dyad 2 increased in ADHD symptoms after the first week of CDI and again after the first week of PDI.

Hypotheses have been considered in regards to the lack of evidence suggesting a treatment effect for children's ADHD symptoms as measured by the ADHD Symptom

Observation form. The observation tool was created by the primary investigator for the purpose of confirming parent report of ADHD symptoms via the BASC-2-PMR. The observation form was not standardized or studied in order to establish levels of validity or reliability. Further, low levels of inter-rater agreement were associated with this measure, possibly due to the level of training required to observe and record true symptoms of ADHD, as well as the visual and audio quality of the videos of parent-child interactions used to establish inter-rater agreement.

Research Question Two

Will parents report a positive attitude towards PCIT upon completion of the therapy?

Three of the four mothers recruited in the study completed the TAI upon graduating from PCIT. The mothers reported high levels of caregiver satisfaction with PCIT, with two mothers reporting TAI scores that were the highest that could be obtained on the measure. Specifically, mothers indicated they learned several or very many useful techniques of disciplining and teaching their children. All mothers reported their relationships with their children had very much improved since beginning the study. All mothers also reported believing their children's behavior problems and compliance had greatly improved as a result of the therapy. Two mothers reported feeling "much more confident" in their ability to discipline their children, while one mother expressed she felt "somewhat confident" in her disciplining abilities. All mothers reported they were very satisfied with the progress made in their children's general behaviors, and indicated they liked the intervention very much. All mothers believed PCIT very much helped other personal or family problems unrelated to their child. Finally, mothers felt PCIT was a

"good" or "very good" program in helping them improve their children's behaviors.

Research Question Three

What is the relationship between PCIT, changes in the dependent variables over time, and the consistency with which mothers and other caregivers use evidence-based parenting practices?

The predictor variable of other caregivers' use of inconsistent parenting practices was statistically significant for mothers' PDI skills, suggesting mothers whose caretaking partners used discipline practices that were more inconsistent with their own maintained less accurate PDI skills. HLM results also indicate the predictor variable of other caregivers' use of inconsistent discipline practices was statistically significant for the dependent variable of children's behavior problems as measured by the ECBI Intensity scale. These results suggest children with caregivers who implemented more inconsistent parenting practices exhibited more intense behavior problems. It is important to note that Dyad 4 experienced continued severity in the child's behavior problems and maternal stress levels until the ninth week of PCIT. Prior to the ninth week, the mother had continued to report that her caretaking partner refused to practice and apply the CDI and PDI discipline practices with their child. During the ninth week of intervention (i.e., the fourth session of PDI), the mother reported that the caretaking partner had commenced the use of consistent PDI skills within the home setting, and the family had hired a caretaker who also agreed to apply the same discipline practices. Visual analysis suggests that both ECBI Intensity and BASC-2 PMR scores declined at this point in the intervention when all three of the child's caretaking partners practiced the same discipline protocol. Maternal stress levels related to the behaviors, in contrast, began to decline

later during the intervention. In sum, ECBI Intensity and Problem scores and accuracy of PDI improved most among dyads who denied having caretaking partners who used inconsistent discipline practices, such as failing to ignore mild behavior problems or utilizing time-out inappropriately.

Research Question Four

What is the relationship between PCIT, changes in the dependent variables over time, and mothers' consistent practice of PCIT skills within the home setting?

The predictor variable of mothers' daily practice of PCIT skills at home was statistically significant for the dependent variable of reflections, suggesting mothers who practiced skills more frequently at home verbalized more reflections overall. One hypothesis for this finding is the natural and inherent frequency with which mothers engage in reflective or paraphrasing exchanges with their young children, as compared to other DPICS skills (Veneziano, 2005). For instance, visual analysis of reflections in the current study indicate mothers verbalized several reflections during each baseline observation prior to learning and practicing the CDI skills. As such, it is possible that the mothers who practiced PCIT skills more consistently at home obtained even further practice and strengthening of this skill that they were already regularly using.

Summary of Findings

After four mothers and their preschool-aged boys diagnosed with ADHD participated in PCIT, partial evidence of a treatment effect was found for three of eight parent-related dependent variables, including mothers' use of labeled praises, commands, and effective behavior management skills (i.e., PDI skills). Partial evidence of a treatment effect also was found for two of seven child-related dependent variables, as

children's behavior problems and ADHD symptoms rated by their mothers reduced from clinical to normal limits from pre- to post-treatment. Behavior problems and ADHD symptoms continued to improve for two children at a three-month follow-up. The partial treatment effect suggests the families' participation in PCIT was considered in part as the direct cause of the observed improvements in these variables. Changes in the remaining five parent-related variables and seven child-related variables were not statistically significant, including measures of mothers' positive parenting practices, verbalizations of behavior descriptions, reflections, questions, and criticism towards their children, maternal stress levels with behavior problems, and interference and motor symptoms.

The consistency with which other caretaking partners (e.g., fathers) practiced the same discipline procedures as the mothers in the study played a significant role in the changes observed in mothers' use of effective discipline practices and children's behavior problems. Similarly, mothers' consistent practice of skills within the home setting affected the frequency with which they used reflections during play interactions with their children. On the last day of treatment, the three mothers remaining in the study expressed high satisfaction with the process of PCIT and reported their relationships with their children and their children's compliance and behavior problems had improved as a result of the intervention.

Contributions to the Literature

The results of the current study complement those found by the few researchers who have examined the use of PCIT to reduce problem behaviors and ADHD symptoms among preschool-aged children (Eyberg et al., 2001). Though fewer in number compared to previously conducted studies, the child participants of the current study

experienced clinically significant ECBI and/or CBCL scores at baseline that reduced to normal limits after PCIT was completed, similar to results found by Funderburk et al. (1998) and Matos et al. (2006; 2009). In contrast, 10% of children in the study conducted by Eistenstadt et al. in 1993 still met criteria for ADHD after treatment. In regards to long-term maintenance of effects, most of the child participants in Eyberg et al.'s (2011) follow-up to Eisenstadt et al.'s (1993) study no longer met criteria for ADHD after a year. Meanwhile, similar to the current study, Matos et al. (2006; 2009) implemented a three-month follow-up session and found continued normal levels of behavior problems and ADHD symptoms among all participants.

Though results of the present study align closely with those evidenced in previous research, the current study added to the literature base in distinct ways. In particular, previous studies analyzed only pre-, mid-, and post-treatment repeated measures of dependent variables using one statistical analysis, and the designs of two of the studies did not include a randomized control group (Eistenstadt et al., 1993; Funderburk et al., 1998; Matos et al., 2006; 2009). Meanwhile, the current study administered weekly measures and analyzed data using statistical analyses alongside visual analysis and permutation. The two most recent studies implemented a culturally adapted version of the PCIT protocol and did not allow families the time needed to meet established criteria prior to advancing to subsequent therapy phases (Matos et al., 2006; 2009). As such, the current study may be the first recently conducted study to investigate the effects of PCIT on children's behavior problems and ADHD symptoms and parents' caregiving practices using multiple and repeated measures, comprehensive data analyses, and high treatment integrity and fidelity.

Limitations

The present study was associated with several limitations. Due to a small sample size, the study may not have obtained enough data to accurately detect treatment effects using multi-level modeling. Similarly, the inability to recruit five families for the study and the attrition of one mother-child dyad presented the risk of weakening the power needed to make accurate inferences about treatment effects. However, the random assignment of participants to conditions that included one invisible dyad may have helped reduce the Type 1 error rate and increase power (Ferron & Jones, 2006). Follow-up data were obtained from only two mother-child dyads, which significantly limited any implication that could be made about the long-term maintenance of changes in the dependent variables. Moreover, the small number of participants recruited via convenience sampling may have prevented the generalization of results. The homogeneous nature of the sample, however, may have increased the generalizability of results to similar populations.

The a priori selection of intervention start points may have prevented the study from establishing stable baselines. Baseline lengths were pre-established due to the limited availability of facilities needed to conduct PCIT with the recruited mother-child dyads. The study's results may not be comparable with results derived from group designs, and the direct measurement of behaviors were often subject to large increases and decreases, which may have inflated treatment effects. In addition, most results were based exclusively on mothers' reports. As other caretaking partners (e.g., fathers, nannies) and teachers often have varied experiences with and observations of children with disruptive behaviors, reports of children's behaviors and ADHD symptoms in

different contexts may have provided further information regarding the impact of PCIT.

An additional limitation of the study is the validity, appropriateness, and low levels of inter-rate reliability associated with the ADHD symptom observation form used in the study. The instrument may not have obtained accurate observations of children's ADHD symptoms, as only four target behaviors were observed (i.e., verbal and physical interference; minor and gross motor movements). In addition, observations of the target behaviors during play situations may have not reflected the degree to which children's ADHD symptoms are associated with functional impairment. For instance, children's minor motor movements (i.e., fidgeting) during play sessions with their parents are not typically considered indicative of symptom-related impairment.

An additional limitation of the study is the natural maturation of the children during their participation in PCIT (Gustafsson, Holmstrom, Besjakov, & Karlsson, 2010). In particular, events in children's lives and their natural process of maturation may have occurred concurrently with the intervention and could have caused any treatment effects identified. For instance, the child participants may have experienced reductions in their behavior problems due to being exposed to appropriate behaviors modeled by their teachers and peers attending their preschool organizations.

Ideas for Future Research

The results of this study point to several areas that warrant further research. The current study found partial evidence for the use of PCIT as a strategy to increase verbal positive reinforcement, improve the accuracy of evidence-based discipline practices, decrease verbal commands among mothers of preschool-aged children with ADHD, and reduce parent-reported children's behavior problems and ADHD symptoms. However,

this study did not find PCIT effective in improving other aspects of maternal parenting practices (e.g., change in criticism, reflections, etc.) and children's observed ADHD symptoms. As such, the study should be replicated with a larger sample of mothers and their preschool-aged children diagnosed with ADHD to increase statistical power and further examine the effectiveness of PCIT with the population under study. Future studies should allow for extended baseline sessions without the use of a priori start points in order to establish stable baselines and more accurately identify treatment effects. Similarly, treatment phases should be extended to verify that any extinction bursts have been resolved and ensure maintenance of children's changes in behavior and ADHD symptoms. Several follow-up sessions should be incorporated in such a study to more accurately assess maintenance of changes in dependent variables over time. Since only two dyads in the present study attended follow-up sessions, further incentives should be offered in future sessions to decrease attrition rate during follow-up.

Depending on recruitment methods and opportunities, future studies may include a sample of children diagnosed with ADHD with no comorbidity. Future studies also could utilize other methods to measure children's behavior problems and ADHD symptoms, such as reports from children's preschool teachers or other caretaking partners in the home. ADHD symptoms should be observed using methods and measures associated with higher levels of ecological and content validity than those used in the present study. For instance, live observations of ADHD symptoms could be conducted during the PDI phase instead of the CDI phase in order to better assess the extent to which symptoms affect children's functioning in domains that are more relevant to their academic, social, and emotional success (e.g., complying with adult authority figures, regulating emotions

of anger or disappointment). Comparable studies may also be able to investigate the relationship between caregivers' use of consistent parenting practices and children's severity of behavior problems and ADHD symptoms.

Implications for Practice

The findings of the current study indicate that PCIT could partially be an effective strategy to increase the frequency with which mothers positively reinforce their children via specific praise, allow their children to lead play interactions, and successfully manage their children's disruptive behaviors using evidence-based discipline practices. PCIT also may partially be an effective strategy to improve children's clinically significant behavior problems and symptoms of ADHD. By the end of the intervention, mothers reported their children's disruptive behaviors and ADHD symptoms were no different from typically developing children their age and gender. In addition, all mothers reported high levels of satisfaction, confidence, and improvement in regards to PCIT and their resulting knowledge of discipline skills, relationship with their children, and their children's behavior problems. These data, along with reduced ECBI Problem scores, suggest PCIT also was clinically significant in improving families' functioning, relationships, and stress levels.

The current study demonstrates the potential of PCIT as an early intervention to improve the functional outcomes of preschool-aged children with ADHD. According to the theories of change underlying the PCIT skills, the partial treatment effects of the study may suggest that the intervention under study strengthened parent-child attachments, increased positive interactions between mothers and their children, and equipped parents with evidence-based disciplinary practices to improve children's

compliance and behavior (Ainsworth, 1989; Patterson, 1982). These potential outcomes of the study have important implications for children's long-term outcomes, as stable parent-child attachments promote children's social, behavioral, and emotional development (Thompson, 2008).

In addition, a review of the literature suggests the intervention was partially successful in targeting environmental factors that contribute to ADHD symptoms (Sonuga-Barke et al., 2003). For instance, less maternal warmth and responsiveness have been shown to maintain ADHD symptoms, and higher levels of maternal sensitivity (e.g., increased positive regard) have the potential to reduce ADHD symptoms and prevent later negative outcomes among young children (DuPaul et al., 2001; Keown, 2012; Peris & Baker, 2000; Sonuga-Barke et al., 2005). The potentially positive impact of PCIT on children's ADHD symptoms is important because ADHD in early childhood is associated with adverse outcomes in children's cognitive, academic, social, and physical well-being (Bagwell et al., 2001; Barkley, 2003; Frazier et al., 2007). Moreover, severe ADHD symptoms during early childhood predicts the persistence of symptoms later in life (Sonuga-Barke et al., 2006).

The teaching and coaching strategies applied in PCIT to encourage parents' use of CDI and PDI skills consist of best practices in parent consultation that are endorsed by multiple parent training and interaction therapy protocols (Armstrong et al., 2006, Dishion et al., 2012; Eyberg, 1988). Practitioners' use of these strategies may help to increase the use of positive reinforcement, fewer commands, and effective behavior management practices among parents of young children with ADHD. As evident by the results of the current study, practitioners' use of these strategies also may improve

children's behavior problems and ADHD symptoms. These strategies may be employed by a variety of practitioners who work closely with children and parents (e.g., school psychologists, teachers, medical personnel) who may not have the facilities or level of training required to provide PCIT in their practice. For example, best practices in structuring consultation sessions with parents include using open-ended questions, creating an agenda for each session, modeling and role-playing the skills to be acquired, and encouraging parents' practice of skills at home (Dishion, Stormshak, & Kavanagh, 2012; Eyberg, 1988). While teaching and encouraging the use of positive reinforcement and effective discipline strategies among parents, research suggests it is important to provide parents with a rationale for skills in ways parents can relate, understand, and align with goals for their children's behavior (Armstrong, Lilly, & Agazzi, 2006; Dishion et al., 2012; Eyberg, 1988). Effective consultation with parents regarding the use of positive reinforcement may include providing specific examples of reinforcement, modeling, role-playing appropriate use of reinforcement strategies, showing video examples of parents using positive reinforcement with their children, and providing handouts with examples of positive reinforcement strategies (Armstrong et al., 2006, Dishion et al., 2012; Eyberg, 1988).

Best practices in encouraging parents to use effective discipline practices include describing each step of the time-out procedure using simple and nontechnical language, providing parents with a diagram of the time-out steps with specific examples of language that may be used for each step, showing video examples of parents using the time-out strategy effectively, and repeated modeling and role-play of steps (Armstrong et al., 2006, Dishion et al., 2012; Eyberg, 1988). Parents also could be provided with a

progress monitoring form to record their daily requests and children's frequency of compliance. The data obtained from progress monitoring could be reviewed and discussed during scheduled consultation sessions, as well as used to create or update goals related to children's compliance.

Finally, it is important to emphasize with parents the importance of consistency while applying discipline practices, particularly when multiple caretakers are involved in children's daily routines. To overcome the potential obstacle of inconsistent discipline practices used across settings, children's caretakers may be invited to consultation sessions to share their concerns and experiences, learn how to consistently employ effective discipline practices, and collaboratively create a behavior management routine with the caretaking team. During consultation sessions, practitioners may lead the caregiving team in an open discussion that addresses each team member's rationale for particular parenting practices, the advantages and disadvantages of particular practices, and how to negotiate while creating an evidence-based behavioral plan that supports the child (Koocher & La Greca, 2011). Parents could be provided with research regarding the increased likelihood of positive outcomes among children whose parents apply consistent parenting practices. Parents also may have opportunities to hear anonymous feedback from other parents who experienced positive outcomes once they aligned their parenting practices.

The parent consultation strategies described above may require few resources and lead to successful parent-child interaction changes in a short amount of time. It is important to note that mothers experienced a dramatic increase in the use of their labeled praises and a decrease in their verbalizations of commands after only one hour of

consultation with the therapist and six days of five-minute practice sessions within the home setting. This may imply that a one-time training and parents' routine practice within the home may be sufficient to implement positive changes in parent-child interactions. Meanwhile, mothers' competence in using the PDI skills was not evident until several weeks of modeling, direct coaching, and practice in clinical and home settings.

Finally, the evidence-based consultation strategies employed in PCIT to increase mothers' positive reinforcement and effective discipline, decrease unnecessary commands, and improve children's behavior problems and ADHD symptoms could be applied on a continuum of services that range in intensity. For example, the PCIT strategies could be used in the context of a Multi-Tiered System of Support (MTSS), an innovative system in which assessment data are continually evaluated to provide resources to improve children's learning and success (National Center on Response to Intervention, 2010). MTSS consists of three tiers. Tier 1 is comprised of high-quality services that are focused on prevention and provided to all children. Tier 2 refers to moderately intensive interventions implemented to small groups for whom Tier 1 services were not sufficient. Tier 3 interventions are more intense and implemented with individuals who continue to be at risk despite receiving Tier 1 and Tier 2 supports. In the context of PCIT, the evidence-based parent consultation strategies listed previously could be applied as a Tier 1 prevention strategy, in which all parents are encouraged to implement positive reinforcement and consistent discipline practices with their children at home. For example, school personnel may invite all parents of a preschool organization to a one-time workshop on the importance of positive parent-child

interactions and consistent discipline practices on children's academic, behavioral, and social development. The workshop also could teach parents how to use specific CDI skills (i.e., labeled praise, limited commands during play) and effective time-out procedures and provide parents with coaching, modeling, and role-play opportunities to reinforce learning of skills.

Further support in the form of Tier 2 and Tier 3 interventions may be provided to parents of children with documented diagnoses of ADHD who receive accommodations as part of Section 504 of the Rehabilitation Act of 1973 (U.S. Department of Education, 2010). These more intensive levels of support may be provided based on parent interest, consent, and documented need (e.g., clinically significant scores on the ECBI and/or BASC-2 PMR). In addition, efforts would need to be made to ensure children's medical and educational records remain confidential and protected to the extent of the law. For example, school personnel could provide Tier 2 supports by meeting with small groups of interested parents to review and practice select parent-child interaction and behavior management strategies more thoroughly. School personnel may provide Tier 3 supports by engaging parents in more frequent one-on-one consultation and/or coaching sessions or conducting home visits to help parents practice learned skills in more natural settings.

Conclusions

Research is needed to identify effective non-pharmaceutical interventions for the purpose of treating ADHD symptoms and problem behaviors among preschool children. If untreated, preschool students with ADHD may undergo more functional impairment later in life than children who are given treatment early in life (Lahey et al., 2004). Given the limitations associated with pharmacological treatments among this population, the

current study sought to determine whether PCIT could be used as a valid behavior modification treatment for young children with ADHD and their families. Results of the study indicated partial evidence that PCIT significantly increased mothers' use of positive reinforcement and reduced mothers' use of commands during child-led play interactions. Partial evidence also was found to support treatment effects in mothers' use of evidence-based discipline practices for the purpose of managing their children's disruptive behaviors. Findings of this study also partially supported the recommendation of PCIT as an effective intervention in improving children's behavior problems and ADHD symptoms. Further research is needed to identify safe and effective strategies aimed to improve the overall functioning of preschool-aged children with ADHD.

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Appendices

Appendix A: Recruitment Flyer

Does your preschooler have ADHD symptoms that are hard to manage?

A research team at the University of South Florida is conducting an experimental study to see if **Parent-Child Interaction Therapy can be used in lieu of medication to help reduce children's ADHD symptoms and problem behaviors.** PCIT is an evidence-based intervention that teaches parents how to manage their children's difficult behaviors. This experimental study is titled, "Parent-Child Interaction Therapy as a Non-Pharmaceutical Treatment for ADHD in Early Childhood" (USF IRB #: _____).

Participants will receive **$70 in compensation** for their time and effort.

If you choose to participate, you will be asked to:

1) Participate in PCIT one hour per week on Friday mornings in the Fall of 2013 and Spring of 2014
2) Practice skills learned in PCIT for five minutes per day at home
3) Complete surveys on your parenting practices, your children's ADHD symptoms and behaviors, and your attitude towards PCIT

See the back of this card for details on whether you qualify to participate in this study

If you are interested in participating or have questions about this study please contact **Kendall DeLoatche at 813-956-0512 or by e-mail at kjeffri1@health.usf.edu**

To qualify for this study:

1. **You must be a mother of a child aged 3-5 with ADHD-Predominantly Hyperactive/Impulsive or Combined Type**

2. **You must have access to transportation and medical insurance**

3. **Your child must not be on medication or receiving behavior therapy**

Appendix B: Sample PCIT Session Protocol

SECOND CDI COACHING SESSION
Expanded Outline

Before the session

1. Remove all toys from the playroom except for three treatment toys
2. Give the parents the ECBI while they are in the waiting room
3. Materials needed: ECBI, **"Parents are models for their children" handout**, Parent CDI Coding Sheet, DPICS Coding Sheet, CDI Homework Sheets, Parent-Child Interaction Summary Sheets (CDI; from CDI Coach 1), Progress Note, Integrity Checklist, ECBI Graph

---

Goals for this session

- Address the importance of homework
- Continue to shape parent(s)' use of CDI skills, with emphasis on avoiding questions
- Instill positive expectations for mastery
- If indicated, to discuss the issue of modeling.

Note: In each session, be alert for parent expressions of personal distress. These may occur during the initial homework discussion, or during discussion at the end of the session. In each session, it is important to spend a small amount of time (< 5 min) attending to parent personal stressors. Use facilitative listening skills to express concern.
For integrity check:
❑ Discussed or inquired **about issue unrelated to child behavior**

TREATMENT SESSION OUTLINE

❑ **1. Give parent Modeling Handout. Review briefly**, unless parent seems to be modeling inappropriate behavior that is relevant to the child's behavior problems. In that case, discuss in more detail the importance of teaching behavior through modeling, and help parent understand anger management techniques, if relevant.

❑ 2. Ask for homework sheets. **Review homework for about 10-15 minutes**
Issues *might* include:
- Frequency of parent's practice at home
- Comment parent wrote on homework sheet
- Follow-up on any homework problems discussed last session
- Changes parents have noticed in child's behavior during CDI
- How the child responds to the special time
- What CDI skill parent finds hardest to remember, and what tricks they have come up with to help

❑ **3. Discuss Not Asking Questions** (Unless parents have mastered this skill)

Being able to not ask questions is usually the hardest skill to master. In coaching today, we will focus most on avoiding questions. Many parents find it helpful if we just say over the bug, "Question," as soon as we hear a question, so they can turn it into a statement [give example . Do you think this would be helpful for you?"

[Almost all parents will agree this would be helpful. Before leaving, give examples and let them try it, until they are able to change questions to statements easily]

Coding and Coaching

[Therapists may wish to use a stopwatch to time coding and coaching segments]

With one parent in treatment

[Give parent bug-in-the-ear and go into observation room. Give CDI directions over bug]

"Ok, we're going to code CDI for the next 5 minutes. Try to use all the skills you've been practicing while you follow along with [child's name] in his/her game according to his/her rules."

❑ **4a.** Code parent and child in CDI for 5 minutes (on DPICS Coding Forms)

❑ **5a. Coach parent with child for about 30 minutes**

- Praise reflections, as clinically indicated
- Give a lot of feedback regarding questions
- See coaching guidelines for this session at end of session outline

With two parents in treatment

[Give **father** bug-in-the-ear and go into observation room. CDI directions over bug]

"Ok, we're going to code CDI for the next 5 minutes. Try to use all the skills you've been practicing while you follow along with [child's name] in his/her game according to his/her rules."

❑ **4b. Code father** and child CDI for 5 minutes (on DPICS Coding Forms) while mother observes and codes (on parent coding form)

❑ **5b. Coach father** with child for about 15 minutes

- Praise reflections, as clinically indicated
- Give a lot of feedback regarding questions
- See coaching guidelines for this session at end of session outline

[Give **mother** bug-in-the-ear and go into observation room. CDI directions over bug]

"Ok, we're going to code CDI for the next 5 minutes. Try to use all the skills you've been practicing while you follow along with [child's name] in his/her game according to your rules."

❑ **6b. Code mother** for 5 minutes (on DPICS Coding Forms) while father observes and codes (on parent coding form)

❑ **7b. Coach mother** with child for about 10 minutes (Co-therapist fills in data from this session on summary sheets for each parent during this time)

- Praise reflections, as indicated
- Give extensive feedback on avoiding questions
- See coaching guidelines for this session at end of session outline

Note. It is possible that parents could meet mastery criteria for CDI in this session. If parents both meet CDI mastery criteria in this session, go to #9 in CDI Coach Session #3 Outline to continue.

CDI Mastery Criteria

During the 5-minute coding interval at the beginning of the session, parents must give 10 behavioral descriptions, 10 reflective statements, 10 labeled praises, and no more than 3 questions, commands, or criticisms. Parents must also ignore non-harmful inappropriate behavior.

With All Families

- ❑ **8. Review CDI Summary Sheets** with parents for about five minutes.
- ❑ **9.** During this review, **describe the mastery criteria for CDI,** noting which skills have been easiest for them to master and which have been most difficult.
- ❑ **10.** Give new homework sheets and **ask parents what skill they would like to focus on most during their home CDI practice.** In addition to the skill they choose, also encourage parents to focus on **labeled praises** during their home practice (Unless their labeled praise is already at criterion and another skill needs more emphasis).

Coaching Guidelines for 2nd CDI Coaching Session

Although in all CDI coaching sessions you will praise all skills as they occur, in this second coaching session the ***major emphasis in coaching is on decreasing questions and increasing reflections.***

1. Praise every reflection that parent gives during coaching
If parent is still not adequately reflecting when there is opportunity, tell parent, at least once, something like, *"He's saying some good things you could reflect. I want you to reflect the next thing he tells you."* (If necessary, help parent make a reflection by stating the reflection yourself, and having the parent repeat what you said. Praise parents when they reflect.)

2. After questions
Praise parent if they caught a question and changed it to statement on their own
Say "Question" after any question the parent doesn't recognize
Praise parent for making an appropriate statement after you say "Question," or give them an appropriate statement if they don't (e.g., "Say 'It is an apple'"), then praise parent if they imitate what you said ("Good changing the question").
If parent does *not* give questions, praise them at least once for not giving questions.

Appendix C: Demographic Questionnaire

Date: _____

Parent Information

Name:_____

Your Race/Ethnicity:

- o American Indian or Alaskan Native
- o Asian
- o Black or African American
- o Hispanic or Latino
- o Native Hawaiian or Pacific Islander
- o White
- o Multi-racial (please specify):_____
- o Other (please specify):_____

Your Age:_____

Your current marital status (circle one):

- o Single
- o In a steady relationship
- o Married
- o Separated
- o Divorced
- o Widowed

Highest Level of Completed Education (circle one):

- o High school or equivalent
- o Some college
- o Bachelor's degree
- o Master's Degree
- o Doctoral degree
- o Other (please specify):_____

Number of adult caregivers living in your home other than yourself: _____

Number of children living in your home: _____

Child Information

Child's Name:_____

Child's Date of Birth: _____ (month / day / year)

Child's Race/Ethnicity:

- o American Indian or Alaskan Native
- o Asian
- o Black or African American
- o Hispanic or Latino
- o Native Hawaiian or Pacific Islander
- o White
- o Multi-racial (please specify):_____
- o Other (please specify):_____

Appendix D: Dyadic Parent-Child Interaction Coding System

In-Session CDI Coding Sheet for Therapist

Date_____

Child's name _____ ❑Mother ❑Father ❑Other _____

TREATMENT SESSION (CHECK ONE)

O CDI Teach	O CDI Coach #1	O CDI Coach #2	O CDI Coach #3
O CDI Coach #4	O CDI Coach #5	O CDI Coach #6	O CDI Coach #
O PDI Teach	O PDI Coach #1	O PDI Coach #2	O PDI Coach #3
O PDI Coach #4	O PDI Coach #5	O PDI Coach #6	O PDI Coach # ___

[illegible]	[illegible]	[illegible]	[illegible]
NEUTRAL TALK			—
BEHAVIOR DESCRIPTION			10
REFLECTION			10
LABELED PRAISE			10
UNLABELED PRAISE			–

AVOID	TALLY CODES	TOTAL	MASTERY
QUESTION			0
COMMANDS			0
NEGATIVE TALK			0

POSITIVE	CHECK ONE		
IMITATE	SATISFACTORY	NEEDS PRACTICE	
USE ENTHUSIASM	SATISFACTORY	NEEDS PRACTICE	
IGNORE DISRUPTIVE BEHAVIOR	SATISFACTORY	NEEDS PRACTICE	NOT APPLICABLE
OTHER OBSERVATIONS			

Coding PDI in Session

Command DC or IC?	No Opp	Obey	***Dis-obey***	Praise LP or UP?	Chair Warn	Obey	Dis-obey	Praise LP or UP?	Time-out Chair	Time-out Room

Appendix E: ADHD Symptom Partial Interval Time Sampling Form

Participant ID: _____ Date: _____
Session: _____ Observer: _____

Behavior Codes & Definitions:
Verbal Interference (VI): interrupting mother while she is speaking
Physical Interference (PI): taking toys or items in mother's hands without asking first
Minor Motor Movements (MM): fidgeting or tapping hands or feet, squirming while sitting
Gross Motor Movements (GM): standing and leaving play interactions with mother, running around room, climbing furniture

Directions: Record behavior code if behavior occurs during **any part** of 15-sec. interval

Minute	15 Second Intervals			
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				

Notes:_____
_____
_____

Appendix F: Parenting Practices Interview

The Incredible Years Project

University of Washington Parenting Clinic (206) 543-6010

28396

Time 1 CID

Mom Dad/Other

Office Use Only

Parent Practices Interview

This section asks questions about different ways of disciplining children and teaching them right from wrong.

1. The following is a list of things that parents have told us they do when their children misbehave. In general, how often do you do each of the following things when your child misbehaves (that is, does something s/he is not supposed to do)?

	Never	Seldom	Sometimes	About half the time	Often	Very often	Always
a. Notice it but not do anything about it.	○	○	○	○	○	○	○
b. Raise your voice (scold or yell).	○	○	○	○	○	○	○
c. Get your child to correct the problem or make up for his/her mistake.	○	○	○	○	○	○	○
d. Threaten to punish him/her (but not really punish him/her).	○	○	○	○	○	○	○
e. Give him/her a time out.	○	○	○	○	○	○	○
f. Ground your child.	○	○	○	○	○	○	○
g. Take away privileges (like TV, playing with friends).	○	○	○	○	○	○	○
h. Give your child a spanking.	○	○	○	○	○	○	○
i. Slap or hit your child (but not spanking).	○	○	○	○	○	○	○
j. Give your child extra work chores.	○	○	○	○	○	○	○
k. Discuss the problem with child or ask questions.	○	○	○	○	○	○	○

2. If your child ***hit*** another child, how likely is it that you would discipline your child in the following ways?

	Not at all likely	Slightly likely	Somewhat likely	Moderately likely	Quite likely	Very likely	Extremely likely
a. Notice it but not do anything about it.	○	○	○	○	○	○	○
b. Raise your voice (scold or yell).	○	○	○	○	○	○	○
c. Get your child to correct the problem or make up for his/her mistake.	○	○	○	○	○	○	○
d. Threaten to punish him/her (but not really punish him/her).	○	○	○	○	○	○	○
e. Give him/her a time out.	○	○	○	○	○	○	○
f. Ground your child.	○	○	○	○	○	○	○
g. Take away privileges (like TV, playing with friends).	○	○	○	○	○	○	○
h. Give your child a spanking.	○	○	○	○	○	○	○
i. Slap or hit your child (but not spanking).	○	○	○	○	○	○	○
j. Give your child extra work chores.	○	○	○	○	○	○	○
k. Discuss the problem with child or ask questions.	○	○	○	○	○	○	○

3. If your child ***refused to do what you wanted him/her to do***, how likely is it that you would use each of the following discipline techniques?

a. Notice it but not do anything about it.	○	○	○	○	○	○	○
b. Raise your voice (scold or yell).	○	○	○	○	○	○	○
c. Get your child to correct the problem or make up for his/her mistake.	○	○	○	○	○	○	○
d. Threaten to punish him/her (but not really punish him/her).	○	○	○	○	○	○	○
e. Give him/her a time out.	○	○	○	○	○	○	○
f. Ground your child.	○	○	○	○	○	○	○
g. Take away privileges (like TV, playing with friends).	○	○	○	○	○	○	○
h. Give your child a spanking.	○	○	○	○	○	○	○
i. Slap or hit your child (but not spanking).	○	○	○	○	○	○	○
j. Give your child extra work chores.	○	○	○	○	○	○	○
k. Discuss the problem with child or ask questions.	○	○	○	○	○	○	○

4

4. How much do you agree or disagree with the following statements?

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. Sometimes it takes getting really angry with children in order to teach them a lesson.	○	○	○	○	○
b. Children learn best when they don't know what punishment to expect for misbehaving.	○	○	○	○	○
c. The best way to avoid a big problem is to discipline a child when the problem is still small.	○	○	○	○	○
d. It's okay to let children get away with small misbehaviors - it's beter to focus on serious misbehaviors.	○	○	○	○	○
e. Being consistent in discipline is more important than giving big punishments for misbehavior.	○	○	○	○	○

5. In general, how often do the following things happen?

	Never	Seldom	Sometimes	About half the time	Often	Very often	Always
a. If you ask your child to do something and s/he doesn't do it, how often do you give up trying to get him/her to do it?	○	○	○	○	○	○	○
b. If you warn your child that you will discipline him/her if s/he doesn't stop, how often do you actually discipline him/her if s/he keeps on misbehaving?	○	○	○	○	○	○	○
c. How often does your child get away with things that you feel s/he should have been disciplined for?	○	○	○	○	○	○	○
d. If you have decided to punish your child, how often do you change your mind based on your child's explanations, excuses or arguments?	○	○	○	○	○	○	○
e. How often do you show anger when you discipline your child?	○	○	○	○	○	○	○
f. How often do arguments with your child build up and you do or say things you don't mean to?	○	○	○	○	○	○	○
g. How often is your child successful in getting around the rules that you have set?	○	○	○	○	○	○	○
h. How often does the kind of punishment you give your child depend on your mood?	○	○	○	○	○	○	○

6. This is a list of things that parents might do when their child behaves well or does a good job at something. In general, how often do you do each of the following things when your child behaves well or does a good job?

	Never	Seldom	Sometimes	About half the time	Often	Very often	Always
a. Notice it but not do anything about it.	○	○	○	○	○	○	○
b. Praise or compliment your child.	○	○	○	○	○	○	○
c. Give your child a hug, kiss, pat, handshake or "high five."	○	○	○	○	○	○	○
d. Buy something for him/her (such as special food, a small toy) or give him/her money for good behavior.	○	○	○	○	○	○	○
e. Give him/her an extra privilege (such as cake, go to the movies, special activity for good behavior).	○	○	○	○	○	○	○
f. Give points or stars on a chart.	○	○	○	○	○	○	○
g. Not even notice.	○	○	○	○	○	○	○

7. In an AVERAGE week, how often do you praise or reward your child for doing a good job at home or school?

○ Less than once per week
○ About once per week
○ A few times per week, but not daily
○ About once a day
○ 2-5 times per day
○ 6-10 times per day
○ More than 10 times per day

8. Within the LAST 2 DAYS, how many times did you:

a. Praise or compliment your child for anything s/he did well?

○ Never
○ Once
○ Twice
○ 3 times
○ 4 or 5 times
○ 6 or 7 times
○ More than 7 times
○ Not with my child in the last 2 days

b. Give him/her something extra, like a small gift, privileges, or a special activity with you, for something s/he did well?

○ Never
○ Once
○ Twice
○ 3 times
○ 4 or 5 times
○ 6 or 7 times
○ More than 7 times
○ Not with my child in the last 2 days

Parent Practices Interview (Page 3)

CID

9. Please rate how much you agree or disagree with the following statements.

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
a. Giving children a reward for good behavior is bribery.	1	2	3	4	5	6	7
b. I shouldn't have to reward my children to get them to do things they are supposed to do.	1	2	3	4	5	6	7
c. I believe in using rewards to teach my child how to behave.	1	2	3	4	5	6	7
d. It is important to praise children when they do well.	1	2	3	4	5	6	7
e. I would like to praise my child more often than criticize him/her, but it is hard to find behaviors to praise.	1	2	3	4	5	6	7
f. If I give my child praise or rewards to encourage good behavior, s/he will demand rewards for everything.	1	2	3	4	5	6	7
g. If a child is having trouble doing something s/he is supposed to do (such as going to bed, picking up toys), it is a good idea to set up a reward or an extra privilege for doing it.	1	2	3	4	5	6	7

10. Please rate how much you agree with the following statements:

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
a. I have made clear rules or expectations for my child about chores.	1	2	3	4	5	6	7
b. I have made clear rules or expectations for my child about not fighting, stealing, lying, etc.	1	2	3	4	5	6	7
c. I have made clear rules or expectations for my child about going to bed and getting up on time.	1	2	3	4	5	6	7

11. Please rate how likely you are to do the following things.

	Not at all likely	Slightly likely	Somewhat likely	Moderately likely	Quite likely	Very likely	Extremely likely
a. When your child completes his/her chores, how likely are you to praise or reward your child?	1	2	3	4	5	6	7
b. When your child does NOT complete his/her chores, how likely are you to punish your child (such as taking away a privilege or grounding him/her)?	1	2	3	4	5	6	7
c. When your child fights, steals, or lies, how likely are you to punish your child?	1	2	3	4	5	6	7
d. When your child goes to bed or gets up on time, how likely are you to praise or reward your child?	1	2	3	4	5	6	7
e. When your child does NOT go to bed or get up on time, how likely are you to punish your child?	1	2	3	4	5	6	7

12. About *how many hours in the last 24 hours* did your child spend at home *without adult supervision,* if any?

○ None	○ 1/2 - 1 hour	○ 1 1/2 - 2 hours	○ 3 - 4 hours
○ Less than 1/2 hour	○ 1 - 1 1/2 hours	○ 2 - 3 hours	○ More than 4 hours

13. Within the LAST 2 DAYS, about how many total hours was your child involved in activities outside your home *without adult supervision,* if any?

○ None	○ 1/2 - 1 hour	○ 1 1/2 - 2 hours	○ 3 - 4 hours
○ Less than 1/2 hour	○ 1 - 1 1/2 hours	○ 2 - 3 hours	○ More than 4 hours

14. Please answer the following:

	None or almost none	About 25%	About 50%	About 75%	All or almost all
a. What percentage of the time do you know *where your child is* when s/he is away from your direct supervision?	1	2	3	4	5
b. What percentage of the time do you know exactly what your *child is doing* when s/he is away from you?	1	2	3	4	5
c. What percentage of your child's friends do you know well?	1	2	3	4	5

15. How much do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Strongly agree
a. It is very important for me to know where my child is when s/he is away from me.	1	2	3	4	5	6	7
b. Parents who check up on how their child behaves at friends' houses are too anxious about their child.	1	2	3	4	5	6	7
c. Giving children lots of free, unsupervised time helps them learn to be more responsible.	1	2	3	4	5	6	7
d. Children who are not supervised by an adult are more likely to develop behavior problems.	1	2	3	4	5	6	7

Appendix G: Therapy Attitude Inventory

Mother_____ Father_____

THERAPY ATTITUDE INVENTORY*

(Please circle the response for each question which best expresses how you honestly feel.)

I. Regarding techniques of disciplining, I feel I have learned

1. nothing	2. very little	3. a few new techniques	4. several useful techniques	5. very many useful techniques

II. Regarding techniques for teaching my child new skills, I feel I have learned

1. nothing	2. very little	3. a few new techniques	4. several useful techniques	5. very many useful techniques

III. Regarding the relationship between myself and my child, I feel we get along

1. much worse than before	2. somewhat worse than before	3. the same as before	4. somewhat better than before	5. very much better than before

IV. Regarding my confidence in my ability to discipline my child, I feel

1. much less confident	2. somewhat less confident	3. the same	4. somewhat more confident	5. much more confident

V. The major behavior problems that my child presented at home before the program started are at this time

1. considerably worse	2. somewhat worse	3. the same	4. somewhat improved	5. greatly improved

VI. I feel that my child's compliance to my commands or requests is at this time

1. considerably worse	2. somewhat worse	3. the same	4. somewhat improved	5. greatly improved

VII. Regarding the progress my child has made in his/her general behavior, I am

1. very dissatisfied	2. somewhat dissatisfied	3. neutral	4. somewhat satisfied	5. very satisfied

VIII. To what degree has the treatment program helped with other general personal or family problems not directly related to your child in the program

1. hindered much more than helped	2. hindered slightly	3. neither helped nor hindered	4. helped somewhat	5. helped very much

IX. I feel the type of program that was used to help me improve the behaviors of my child was

1. very poor	2. poor	3. adequate	4. good	5. very good

X. My general feeling about the program I participate in, is

1. I disliked it very much	2. I disliked it somewhat	3. I feel neutral	4. I liked it somewhat	5. I liked it very much

Appendix H: Sample Intervention Integrity Checklist

Integrity Checklist

Participant ID _____ **Session Title** _____ (e.g., CDI Teach)

As you view the tape, place a checkmark under the appropriate column.
List these totals in the appropriate blanks below the table.

ITEM NUMBER	✓	NA	X
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Appendix I: Parent Informed Consent Form

Informed Consent to Participate in Research

Information to Consider Before Taking Part in this Research Study

IRB Study # _____

You are being asked to take part in a research study. Research studies include only people who choose to take part. This document is called an informed consent form. Please read this information carefully and take your time making your decision. Ask the researcher or study staff to discuss this consent form with you, please ask her to explain any words or information you do not clearly understand. We encourage you to talk with your family and friends before you decide to take part in this research study. The nature of the study, risks, inconveniences, discomforts, and other important information about the study are listed below. Please tell the study staff if you are taking part in another research study. We are asking you to take part in a research study called: "Parent-Child Interaction Therapy as a Treatment for ADHD in Early Childhood: A Multiple Baseline Single-Case Design."

The person who is in charge of this research study is Kendall Jeffries DeLoatche, M.A**.** This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. The Primary Investigator is being guided in this research by Dr. Kathy Bradley-Klug.

The research will be conducted at the University of South Florida.

Purpose of the study

The purpose of this study is to:

- Determine if an evidence-based intervention, called Parent-Child Interaction Therapy (PCIT), is an effective alternative to medication for preschool-aged children diagnosed with ADHD. Parent-Child Interaction Therapy (PCIT; Eyberg, 1988) is an evidence-based intervention that teaches parents how to manage their children's behavior problems.

- The study will measure the impact of PCIT on the frequency and severity of children's problem behaviors and ADHD symptoms. The study will also assess changes in caregivers' parenting practices and satisfaction with PCIT.

- The Primary Investigator, who is a doctoral candidate in School Psychology at the University of South Florida, is conducting this study for a dissertation.

Should you take part in this study?

Before you decide:

- Read this form and find out what the study is about.
- You may have questions this form does not answer. You do not have to guess at things you don't understand. If you have questions ask the person in charge of the study or study staff as you go along. Ask them to explain things in a way you can understand.
- Take your time to think about it.

This form tells you about this research study. This form explains:

- Why this study is being done.
- What will happen during this study and what you will need to do.
- Whether there is any chance of receiving benefit from being in this study.
- The risks involved in this study.
- How the information collected about you during this study will be used and with whom it may be shared.

Taking part in this research study is up to you. If you choose to be in the study, then you should sign this informed consent form. If you do not want to take part in this study, you should not sign this form.

Why is this research being done?

- The purpose of this study is to determine if Parent-Child Interaction Therapy (PCIT) may improve symptoms and problem behaviors of young children with ADHD.

- We need to learn more about how to treat ADHD symptoms among preschool children without stimulant medication. If untreated, preschool children with ADHD may be at greater risk of later functional problems than children with ADHD who receive treatment early in life (Lahey et al., 2004). Though stimulant medication is an effective treatment for school-aged children with ADHD, medication is associated with fewer beneficial effects and more adverse side effects among preschool children (Kollins et al., 2006). Common adverse side effects include emotional problems, sleep disturbances, and restricted growth. Moreover, stimulant medication is not recommended for children under the age of six (U.S. Food and Drug Administration, 2005).

- Parents' use of behavior management strategies with their children has been shown to be a safe and effective way to improve young children's ADHD symptoms (Fabiano et al., 2009). Parent-Child Interaction Therapy (PCIT;

Eyberg, 1988) is an evidence-based intervention that teaches parents how to manage their children's behavior problems. Previous studies show that PCIT can improve children's hyperactivity and difficult behaviors, alleviate parent stress, and increase parents' behavior management skills (Matos et al., 2006; 2009). Parents who participated in these studies also reported they were very satisfied with PCIT.

Why are you being asked to take part?

- We are asking you to take part in this study because your child is displaying high levels of ADHD symptoms and behavior problems that may benefit from treatment. Four additional children and their mothers will also be asked to participate in this study.

What will happen during this study?

A multiple baseline design will be used in this study. This means that the five children and mothers who choose to participate in this study will be randomly assigned to participate in three, four, five, six, or seven baseline observations before starting PCIT. The baseline observations will be done so we can compare parents' behavior management skills and children's ADHD symptoms and behaviors before and after PCIT.

If you choose to participate in this study, you will be asked to spend up to about 33 weeks in this study. The length of time you spend in the study will depend on the number of baseline observations you are randomly assigned to. PCIT will then take approximately 14 weeks to complete depending on attendance and practice of skills at home.

The therapy will be held for one hour per week at USF Children's Medical Services in the Fall of 2013 and Spring of 2014. You will also be asked to practice the skills learned through PCIT for five minutes per day. Three months after PCIT ends, you will be asked to meet with the researcher one last time. The number of times you will need to come to Children's Medical Services will range from 18 to 22 visits.

The following paragraphs will describe what will happen before, during, and after you complete PCIT:

- Before PCIT starts, you will be asked to participate in three to seven baseline observations so we can compare your behavior management skills and your children's ADHD symptoms and behaviors before and after the intervention. These observations will be held at Children's Medical Services. You will also be asked to complete a demographic questionnaire and four brief rating scales measuring your current parenting practices and your children's ADHD symptoms, problem behaviors, and any other existing clinical problems. The rating scales will take approximately 30 minutes to complete.
- At each PCIT study visit, you will be asked to complete three brief rating scales so we can track your progress in the intervention. The rating scales will take you to 15 minutes to complete. Most study visits will take about one hour. Some study

visits may be longer. For example, the completion of this informed consent form may make the first session longer than expected. Also, some behavior management strategies (i.e., time-out procedure) may take longer than expected depending on how long it takes for your child to comply with your directions.

- On the last day of PCIT, you will be asked to complete the same four rating scales we will give you to complete before PCIT starts. You will also complete a questionnaire measuring your attitude and satisfaction levels associated with PCIT.
- A follow-up session will be scheduled three months after you finish PCIT. During this follow-up session, you will complete the four rating scales and your behavior management skills will be observed one final time.
- We plan to videotape all baseline and PCIT observations. Only authorized research personnel of the study will have access to the videotapes, which will be kept in a locked cabinet kept by the Primary Investigator. The videotapes will be destroyed five years after the end of the study.

Total Number of Participants

10 individuals will take part in this study at USF (i.e., 5 mothers and 5 children)

Alternatives

You do not have to participate in this research study.

Benefits

If you choose to participate in this study, you and your child may obtain the benefits shown in the literature to be associated with PCIT. These benefits include improved parent-child relationships, significantly reduced child behavior problems and hyperactivity, reduced parent stress, caregivers' improved parenting skills, and caregivers' increased confidence in using behavior management practices (Matos et al., 2006; 2009).

Risks or Discomfort

The following risks may occur:

- Your increased stress levels due to the extra time needed to participate in the study.
- Your children may not enjoy participating in the intervention; however, children typically enjoy receiving quality one-on-one attention from their parents.
- The intervention may not lead to a decrease in your children's ADHD symptoms and behavior problems.

Compensation

You will be paid *$70* if you complete all the scheduled study visits. You will be paid $10 after baseline observations are completed, $15 half way through PCIT, $20 after you complete PCIT, and $25 after the three-month follow up session.

Cost

Participants will incur travel costs for scheduled intervention sessions. Travel costs will not be reimbursed. You or your insurance company will be expected to pay the costs for Parent-Child Interaction Therapy as provided by the Division of Pediatric Neurobehavioral Health located within the Children's Medical Services building at the University of South Florida.

Privacy and Confidentiality

We will keep your study records private and confidential. Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are:

- The research team, including the Principal Investigator and all other research staff**.**
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, staff in the USF Office of Research and Innovation, USF Division of Research Integrity and Compliance, and other USF offices who oversee this research.

We may publish what we learn from this study. If we do, we will not include your name. We will not publish anything that would let people know who you are.

Voluntary Participation / Withdrawal

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study. You are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.

New information about the study

During the course of this study, we may find more information that could be important to you. This includes information that, once learned, might cause you to change your mind about being in the study. We will notify you as soon as possible if such information becomes available.

What if you get sick or hurt while you are in the study?

If you need emergency care:

- Go to your nearest hospital or emergency room right away or call 911 for help. It is important that you tell the doctors at the hospital or emergency room that you

are participating in a research study. If possible, take a copy of this informed consent form with you when you go. USF does not have an emergency room or provide emergency care.

If you do NOT need emergency care:

- Go to your regular doctor. It is important that you tell your regular doctor that you are participating in a research study. If possible, take a copy of this informed consent form with you when you go.
- The USF Medical Clinics may not be able to give the kind of help your needs.

Will I be compensated for research related injuries?

If you believe you have been harmed because of something that is done during the study, you should call Kendall Jeffries DeLoatche at (813) 956-0512 immediately. The University of South Florida will not pay for the cost of any care or treatment that might be necessary because you get hurt or sick while taking part in this study. The cost of such care or treatment will be your responsibility. In addition, the University of South Florida will not pay for any wages you may lose if harmed by this study. The University of South Florida is considered a state agency and therefore cannot usually be sued. However, if it can be shown that the researcher, or other USF employee, is negligent in doing his or her job in a way that harms you during the study, you may be able to sue. The money that you might recover from the State of Florida is limited in amount.

You can also call the USF Self Insurance Programs (SIP) at 1-813-974-8008 if you think:

- Someone from the study did something wrong that caused you harm, or did not do something they should have done.
- Ask the SIP to look into what happened.

What happens if you decide not to take part in this study?

You should only take part in this study if you want to volunteer. You should not feel that there is any pressure to take part in the study to please the primary investigator or the research staff. If you decide not to take part in the study you will not be in trouble or lose any rights you normally have. You will still have the same health care benefits and get your regular treatments from your regular doctor.

You can decide after signing this informed consent document that you no longer want to take part in this study for any reason at any time. If you decide you want to stop taking part in the study, tell the study staff as soon as you can.

- We will tell you how to stop safely. We will tell you if there are any dangers if you stop suddenly.
- If you decide to stop, you can continue getting care from your regular doctor.

Even if you want you to stay in the study, there may be reasons we will need to withdraw you from the study. You may be taken out of this study if we find out it is not safe for you to stay in the study or if you are not coming for the study visits when scheduled. We will let you know the reason for withdrawing you from this study.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call Kendall Jeffries DeLoatche at 813-956-0512.

If you have questions about your rights, general questions, complaints, or issues as a person taking part in this study, call the USF IRB at (813) 974-5638.

If you have questions about your rights as a person taking part in this research study you may contact the Florida Department of Health Institutional Review Board (DOH IRB) at (866) 433-2775 (toll free in Florida) or 850-245-4585.

Consent to Take Part in Research and Authorization for the Collection, Use and Disclosure of Health Information

It is up to you to decide whether you want to take part in this study. If you want to take part, please read the statements below and sign the form if the statements are true. I freely give my consent to take part in this study and authorize that my health information as agreed above, be collected/disclosed in this study. I understand that by signing this form I am agreeing to take part in research. I have received a copy of this form to take with me.

_____ _____

Signature of Person Taking Part in Study Date

_____

Printed Name of Person Taking Part in Study

Statement of Person Obtaining Informed Consent and Research Authorization

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/ she understands:

- What the study is about;
- What procedures/interventions will be used;
- What the potential benefits might be; and
- What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. This subject

does not have a medical/psychological problem that would compromise comprehension and therefore makes it hard to understand what is being explained and can, therefore, give legally effective informed consent. This subject is not under any type of anesthesia or analgesic that may cloud their judgment or make it hard to understand what is being explained and, therefore, can be considered competent to give informed consent.

_____ _____

Signature of Person Obtaining Informed Consent Date

_____

Printed Name of Person Obtaining Informed Consent

Appendix J: Parent Permission Form

Parental Permission to Participate in Research Involving Minimal Risk

Information for parents to consider before allowing their child to take part in this research study

IRB Study #Pro14253

The following information is being presented to help you and your child decide whether or not your child wishes to be a part of a research study. Please read this information carefully. If you have any questions or if you do not understand the information, we encourage you to ask the researchers.
We are asking you to allow your child to take part in a research study called:
"Parent-Child Interaction Therapy as a Treatment for ADHD in Early Childhood: A Multiple Baseline Single-Case Design."

The person who is in charge of this research study is Kendall Jeffries DeLoatche. This person is called the Principal Investigator. However, other research staff may be involved and can act on behalf of the person in charge. She is being guided in this research by Dr. Kathy Bradley-Klug.

The research will be conducted at Children's Medical Services at the University of South Florida.

Why is this research being done?

- The purpose of this study is to determine if Parent-Child Interaction Therapy (PCIT) may improve symptoms and problem behaviors of young children with ADHD.

We need to learn more about how to treat ADHD symptoms among preschool children without stimulant medication. Therefore, we are offering this study to children who are not taking any stimulant medication. If your child is taking stimulant medication then he is not eligible for this study. PCIT is an evidence-based intervention that teaches parents how to manage their children's behavior problems. Previous studies show that PCIT is

safe and effective and can improve children's hyperactivity and difficult behaviors, alleviate parent stress, and increase parents' behavior management skills.

Why is your child being asked to take part?

We are asking your child to take part in this research study because your child is displaying high levels of ADHD symptoms and behavior problems that may benefit from treatment.

Should your child take part in this study?

This informed consent form tells you about this research study. You can decide if you want your child to take part in it. This form explains:

- Why this study is being done.
- What will happen during this study and what your child will need to do.
- Whether there is any chance your child might experience potential benefits from being in the study.
- The risks of having problems because your child is in this study.

Before you decide:

- Read this form.
- Have a friend or family member read it.
- Talk about this study with the person in charge of the study or the person explaining the study. You can have someone with you when you talk about the study.
- Talk it over with someone you trust.
- Find out what the study is about.
- You may have questions this form does not answer. You do not have to guess at things you don't understand. If you have questions, ask the person in charge of the study or study staff as you go along. Ask them to explain things in a way you can understand.
- Take your time to think about it.

The decision to provide permission to allow your child to participate in the research study is up to you. If you choose to let your child be in the study, then you should sign this form. If you do not want your child to take part in this study, you should not sign the form.

What will happen during this study?

If you choose to let your child participate in this study, you will be asked to complete questionnaires about your child and your child will be asked to complete tests of intellectual functioning as part of a screening process. This study visit will take about 40 minutes. If the information collected during this screening process suggests that your child has behavioral problems that would benefit from PCIT therapy, then you and your child will be offered the PCIT intervention.

The next part of the study is called the baseline, and the researcher will observe how you and your child interact with each other. The researcher will be taking notes during this time, and you will be asked to complete questionnaires about your current parenting practices and your children's ADHD symptoms, problem behaviors, and any other existing clinical problems. The five children and mothers who are able to participate in this study will be randomly assigned (assigned by chance) to participate in three, four, five, six, or seven baseline observations before starting PCIT. Each baseline study visit will last 40 minutes. The baseline observations will be done so we can compare parents' behavior management skills and children's ADHD symptoms and behaviors before and after PCIT.

After completing the baseline observations, you and your child will spend approximately 1 hour each week for 14 weeks learning the PCIT intervention. At each PCIT study visit, you will be asked to complete questionnaires. You will also be asked to practice the skills learned through PCIT for five minutes per day. PCIT may take longer than 14 weeks to complete depending on attendance and practice of skills at home.

Three months after you finish PCIT, you and your child will be asked to return for a follow-up study visit. During this follow-up visit, you will complete questionnaires and your and your child will be observed one final time. This visit is expected to last 60 minutes.

The therapy will be held at USF Children's Medical Services located at at 13101 N. Bruce B. Downs Blvd., Tampa, FL 33612. The number of times you will need to come to Children's Medical Services will range from 18 to 22 visits. The number of times you will need to come to Children's Medical Services will range from approximately 18 to 22 visits. This includes baseline observations, PCIT treatment sessions, and the follow-up session. The maximum number of PCIT treatment sessions you may receive to meet treatment goals is 20 sessions. After 20 treatment sessions, treatment will be discontinued but you will be asked to complete a final follow-up session three months after the last treatment session.

We plan to videotape all baseline and PCIT observations. Only authorized research personnel of the study will have access to the videotapes, which will be kept in a locked cabinet kept by the Primary Investigator. The videotapes will be destroyed five years after the end of the study.

How many other people will take part?

About 10 individuals will take part in this study at USF.

What other choices do you have if you decide not to let your child to take part?

If you decide not to let your child take part in this study, that is okay. Instead of being in this research study your child can choose not to participate.

Will your child be compensated for taking part in this study?

You and your child will be paid $10 after the first baseline study visit, $15 half way through PCIT, $20 after you complete PCIT, and $25 after the three-month follow up session for a total amount of up to $70.

What will it cost you to let your child take part in this study?

You will be responsible for paying your own travel costs to the study location. Travel costs will not be reimbursed.

You or your insurance company will be expected to pay the costs for Parent-Child Interaction Therapy as provided by the Division of Pediatric Neurobehavioral Health located within the Children's Medical Services building at the University of South Florida. The Division accepts most insurance and private pay options. At the time of your visits, you may be required to pay any co-payments that your health plan requires. If you have not met your Deductible, you may have to pay some or all of the costs that your plan will not pay for because the Deductible has not been met. USF follows standard medical industry policies in regards to these payments, so your payment at the time of service will be very similar to what you have paid to see other (non-USF) physicians. If you do not have insurance, you will have the option of paying out of pocket. Each PCIT session provided at Children's Medical Services costs $298.00. The total cost of the intervention will depend on the number of PCIT sessions you attend.

What are the potential benefits to your child if you let him / her take part in this study?

Previous research suggests that the benefits of PCIT include improved parent-child relationships, significantly reduced child behavior problems and hyperactivity, reduced parent stress, caregivers' improved parenting skills, and caregivers' increased confidence in using behavior management practices.

However, we do not know if this study will help you, your child, or other children with ADHD - that is why we are doing this study. By volunteering you are helping us learn more about ADHD. We will learn more about what does or does not help individuals with this condition. What we learn may help others in the future.

What are the risks if your child takes part in this study?

The following risks may occur:

- Your increased stress levels due to the extra time needed to participate in the study.
- Your children may not enjoy participating in the intervention; however, children typically enjoy receiving quality one-on-one attention from their parents.
- The intervention may not lead to a decrease in your children's ADHD symptoms and behavior problems.

If your child experiences any of these risks or discomfort, please call the PI, Kendall

Jeffries DeLoatche, at 813-956-0512.

Your Rights:

You can refuse to sign this form. If you do not sign this form your child will not be able to take part in this research study and therefore not be able to receive the research related interventions. However, your child's health care outside of this study and benefits will not change.

How Do I Withdraw Permission to Use My Child's Information?

You can revoke this form at any time by sending a letter clearly stating that you wish to withdraw your authorization to use of your child's health information in the research. If you revoke your permission:

- You child will no longer be a participant in this research study;
- We will stop collecting new information about your child;
- We will use the information collected prior to the revocation of your authorization. This information may already have been used or shared with other, or we may need it to complete and protect the validity of the research; and
- Staff may need to follow-up with your child if there is a medical reason to do so.

To revoke this form, please write to:

Principal Investigator
For IRB Study # Pro14253
13101 N. Bruce B. Downs Blvd.
Tampa, FL 33612

While we are conducting the research study, we cannot let you see or copy the research information we have about your child. After the research is completed, you have a right to see the information about your child, as allowed by USF policies.

Authorization to Use and Disclose Protected Health Information

Who will see your child's health information?

In this research study, we use and share your child's health information to the extent authorized (permitted) by you. We know that this information is private. The federal privacy regulations of the Health Insurance Portability & Accountability Act (HIPAA) protect your child's identifiable health information. If you authorize us to use your child's information we will protect it as required by the law.

This research is conducted at the University of South Florida (USF). By signing this form, you are permitting USF to use personal health information collected about your child for research purposes within the USF health care system. You are also allowing USF to share your child's personal health information with individuals or organizations other than USF who are also involved in the research and listed below.

Who will disclose (share), receive, and/or use your child's information?

To conduct this research, USF and the people and organizations may use or share your child's information. They may only use and share your child's information:

- With the people and organizations on this list;
- With you or your personal representative; and
- As allowed by law.

In addition to the people and organizations listed below in the Privacy and Confidentiality section of this document, the following groups of people may also be able to see information about your child and may use the information to conduct the research:

- The medical staff that takes care of your child and those who are part of this research study;
- Each research site for this study. This includes the research and medical staff at each site and USF;

Who else can use and share this information?

Anyone listed above may use consultants in this research and for the purpose of this study, may share your child's information with them. If you have questions about who they are, you should ask the study team. Individuals who receive your child's health information for this research study may not be required by the HIPAA Privacy Rule to protect it and may share your child's information with others without your permission. They can only do so if permitted by the laws governing them. For example, the study sponsor may share your child's information with others. If the sponsor or others share your child's information, your child's information may no longer be protected under the HIPAA Privacy Rule.

How will my information be used?

By signing this form, you are giving your permission to use and/or share your child's health information as described in this document for any and all study/research related purposes. Your authorization to use your child's health information will not expire unless you revoke it in writing.

As part of this research, USF may collect, use, and share the following information:

- Your whole research record
- All of your future medical and other health records held by USF. This includes, but is not limited to, mental health and/or genetic information.

You can list any particular information that you do not want us to use or share in the space below. If you list nothing here, we can use and share all of the information listed above for this research but for nothing else.

For the Research Participant (you) to complete:

☐ I am asking USF and the researchers not to include, use, or share the following health information in this research (if blank, then no information will be excluded):

_____

Your Rights:

You can refuse to sign this form. If you do not sign this form your child will not be able to take part in this research study and therefore not be able to receive the research related

interventions. However, your child's health care outside of this study and benefits will not change.

How Do I Withdraw Permission to Use My Child's Information?

You can revoke this form at any time by sending a letter clearly stating that you wish to withdraw your authorization to use of your child's health information in the research. If you revoke your permission:

- Your child will no longer be a participant in this research study;
- We will stop collecting new information about your child;
- We will use the information collected prior to the revocation of your authorization. This information may already have been used or shared with other, or we may need it to complete and protect the validity of the research; and
- Staff may need to follow-up with you if there is a medical reason to do so.

To revoke this form, please write to:

Principal Investigator
For IRB Study # Pro14253
13101 N. Bruce B. Downs Blvd.
Tampa, FL 33612

While we are conducting the research study, we cannot let you see or copy the research information we have about you. After the research is completed, you have a right to see the information about you, as allowed by USF policies.

Privacy and Confidentiality

We will keep your child's study records private and confidential. Certain people may need to see your child's study records. By law, anyone who looks at your child's records must keep them completely confidential. The only people who will be allowed to see these records are:

- The research team, including the Principal Investigator and all other research staff**.**
- The USF Institutional Review Board (IRB) and its related staff who have oversight responsibilities for this study, staff in the USF Office of Research and Innovation, USF Division of Research Integrity and Compliance, and other USF offices who oversee this research.

We may publish what we learn from this study. If we do, we will not include your child's name. We will not publish anything that would let people know who your child is.

What happens if you decide not to let your child take part in this study?

You should only let your child take part in this study if both of you want to. You or child should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

If you decide not to let your child take part:

- Your child will not be in trouble or lose any rights he/she would normally have.
- You child will still get the same services he/she would normally have.
- Your child can still get their regular services from your regular therapist.

You can decide after signing this informed consent form that you no longer want your child to take part in this study. We will keep you informed of any new developments which might affect your willingness to allow your child to continue to participate in the study. However, you can decide you want your child to stop taking part in the study for any reason at any time. If you decide you want your child to stop taking part in the study, tell the study staff as soon as you can.

- We will tell you how to stop safely. We will tell you if there are any dangers if your child stops suddenly.
- If you decide to stop, your child can continue receiving his regular services from your regular therapist.

Even if you want your child to stay in the study, there may be reasons we will need to withdraw him/her from the study. Your child may be taken out of this study if we find out it is not safe for your child to stay in the study or if your child is not coming for the study visits when scheduled. We will let you know the reason for withdrawing your child's participation in this study.

You can get the answers to your questions, concerns, or complaints.

If you have any questions, concerns or complaints about this study, call Kendall Jeffries DeLoatche at 813-956-0512.

If you have questions about your rights, general questions, complaints, or issues as a person taking part in this study, call the USF IRB at (813) 974-5638.

If you have questions about your rights as a person taking part in this research study you may contact the Florida Department of Health Institutional Review Board (DOH IRB) at (866) 433-2775 (toll free in Florida) or 850-245-4585.

Consent for My Child to Participate in this Research Study

It is up to you to decide whether you want your child to take part in this study. If you want your child to take part, please read the statements below and sign the form if the statements are true.

I freely give my consent to let my child take part in this study and authorize that my child's health information as agreed above, be collected/disclosed in this study. I understand that by signing this form I am agreeing to let my child take part in research. I have received a copy of this form to take with me.

_____ _____

Signature of Parent of Child Taking Part in Study Date

_____
Printed Name of Parent of Child Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the parent of the child taking part in the study what he or she can expect from their child's participation. I hereby certify that when this person signs this form, to the best of my knowledge, he/ she understands:

- What the study is about;
- What procedures/interventions/investigational drugs or devices will be used;
- What the potential benefits might be; and
- What the known risks might be.

I can confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in the appropriate language. Additionally, this subject reads well enough to understand this document or, if not, this person is able to hear and understand when the form is read to him or her. The parent signing this form does not have a medical/psychological problem that would compromise comprehension and therefore makes it hard to understand what is being explained and can, therefore, give legally effective informed consent. The parent signing this form is not under any type of anesthesia or analgesic that may cloud their judgment or make it hard to understand what is being explained and, therefore, can be considered competent to give permission to allow their child to participate in this research study.

_____
_____
Signature of Person Obtaining Informed Consent Date

_____

Appendix K: Phone Screening Script

Thank you for responding to our request for study participants. The purpose of these questions is to determine if you and your child meet the criteria to be included in the study. This information is not being recorded.

1. **How old is your child?** *(Child must be 3-5 years of age)*
2. **Does this child live with you?** *(Child must live with mother)*
3. **Are you his or her parent or legal guardian?** *(if respondent says, "No," the interviewer will thank them for their time and indicate that only a parent or legal guardian can consent to the child's participation in the study).*
4. **Does your child have a current diagnosis of ADHD-Predominantly Hyperactive/Impulsive or ADHD-Combined?** *(Child must have an established diagnosis; however, the Vanderbilt ADHD Parent Rating Scale will be used to confirm diagnosis. Children must not have diagnosis of ADHD-Predominantly Inattentive)*
5. **Does your child have Autism Spectrum Disorder (ASD)?** *(Child must not have either disorder)*
6. **Does your child have a diagnosis of any other disorder, such as Oppositional Defiant Disorder?** *(Can have ODD, but prefer only ADHD diagnosis)*
7. **Does your child have severe sensory or neurological difficulties?** *(Child must not have sensory or neurological difficulties)*
8. **Is your child currently prescribed medication?** *(Child must not receive medication)*
9. **Is your child receiving any form of therapy to address ADHD symptoms or behavior concerns?** *(Child must not receive therapy)*
10. **Do you have access to transportation?** *(Participants must have access to transportation to and from intervention site)*
11. **Do you have medical insurance?** *(Participants must have medical insurance)*
12. **Do you have any severe physical impairments such as deafness, blindness, or loss of limbs?** *(Mother must not have any severe physical impairments)*

IF THE RESPONDENT DOES NOT MEET CRITERIA FOR **ALL** OF THE THIRTEEN CONDITIONS LISTED ABOVE, SAY THE FOLLOWING:
Thank you for your time. Unfortunately your child is not eligible for participation in this study.

IF THE RESPONDENT MEETS CRITERIA FOR **ALL** OF THE THIRTEEN REQUIREMENTS LISTED ABOVE, SAY THE FOLLOWING:
Thank you for your time today. You and your child are eligible to participate in a final screening session. During the session you will complete two brief rating scales and your child will complete a measure of cognitive ability to ensure you and your child meet criteria for the study. What day and what time would you prefer to participate in the screening session? Would you prefer to meet at the intervention site or in your home? What is your preferred method for us to reach you?
Preferred day/time: _____
Preferred meeting location: _____
Contact Information: _____

Appendix L: Institutional Review Board Approval Form

USF
UNIVERSITY OF
SOUTH FLORIDA

RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX (813) 974-7091

12/17/2013

Kendall DeLoatche, MA
Psychological and Social Foundations
4202 E. Fowler Avenue, EDU105
Tampa, FL 33620

RE: Full Board Approval for Initial Review
IRB#: Pro00014253
Title: Parent-Child Interaction Therapy as a Treatment for ADHD in Early Childhood: A Multiple Baseline Single-Case Design

Study Approval Period: 12/13/2013 to 12/13/2014

Dear Ms. DeLoatche:

On 12/13/2013, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents outlined below.

Approved Item(s):
Protocol Document(s):
Parent-Child Interaction Therapy as a Treatment for ADHD in Early Childhood: A Multiple Baseline Single-Case Design

Consent/Assent Document(s)*:
Parent Informed Consent Form.pdf
Parent Permission Form.pdf

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).

This research involving children as participants was approved under 45 CFR 46.404: Research not involving greater than minimal risk.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John Schinka, Ph.D., Chairperson
USF Institutional Review Board