Effectiveness of Parent-Child Interaction Therapy for Behavioral Outcomes in Young Children Diagnosed with Autism Spectrum Disorder

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Effectiveness of Parent-Child Interaction Therapy for Behavioral Outcomes in Young Children Diagnosed with Autism Spectrum Disorder

by

Kimberly Knap

A thesis submitted in partial fulfillment of the requirements for the degree of Education Specialist in School Psychology Department of Educational and Psychological Studies College of Education University of South Florida

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Keywords: Parent involvement, challenging behavior, early childhood, evidence-based intervention

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Abstract

The present study examined the effectiveness of Parent-Child Interaction Therapy in improving the behavioral outcomes in young children with autism spectrum disorder. Using a non-concurrent multiple baseline design with four mother-child dyads, the study determined the impact of PCIT on the frequency and severity of young children’s challenging behaviors, mothers’ positive parenting practices, and mothers’ satisfaction with treatment. Outcome measures included the Eyberg Child Behavior Inventory, Child Behavior Checklist, Dyadic Parent-Child Interaction Coding System, and Therapy Attitude Inventory. Results from visual analysis and hierarchical linear modeling indicated a treatment effect for mothers’ use of labeled praises \( (b = 14.79, p = 0.01) \), reflections \( (b = 9.93, p < .0001) \), and behavior descriptions \( (b = 13.13, p = 0.01) \). Mothers conveyed high levels of satisfaction with PCIT and reported improvements in their relationship with their child, as well as in their child’s major behavior problems and compliance. Children’s challenging behaviors declined in frequency and severity; however, these decreases were not statistically significant. The findings of this study indicate that PCIT improves mothers’ parenting practices and is a highly satisfactory treatment for mothers of children with ASD. Future studies should incorporate measures specific to ASD symptoms and measures of challenging behaviors from multiple caregivers, such as teachers. Studies should also employ more rigorous statistical methods to determine the average length of treatment required to reduce challenging behaviors in children with ASD.
Chapter One:

Introduction

Statement of the Problem

Autism spectrum disorder (ASD) is a developmental disorder, which currently affects 1 in 68 children, with boys four times more likely to receive an ASD diagnosis than girls (APA, 2013; Center for Disease Control and Prevention [CDC], 2014). Children with ASD frequently experience comorbid disorders, such as an intellectual disability, anxiety disorders, sleep disorders, obsessive-compulsive disorders, and disruptive behavior disorders (i.e., attention-deficit/hyperactivity disorder [ADHD], oppositional defiant disorder [ODD], and conduct disorder [CD]; Brereton, Tonge, & Einfield, 2006).

Children with ASD vary in the specific symptoms they exhibit and the severity of these symptoms; however, all children with ASD exhibit problems in the domain of social functioning (Wilkinson, 2014). According to the DSM-V (APA, 2013), these problems include deficits in social-emotional reciprocity (e.g., abnormal social approach, inability to initiate, sustain, or respond to back-and-fourth conversation), deficits in nonverbal communicative behaviors (e.g., poor eye contact, lack of facial expressions), and deficits in developing, maintaining, and understanding relationships (e.g., lack of interest in peers, difficulty adjusting behavior to social context). These social functioning deficits are associated with problems such as high rates of externalizing behaviors, emotional distress, and difficulties in academics (Mazzone, Ruta, & Reale, 2012; Sikora, Vora, Coury, & Rosenberg, 2012; Wilkinson, 2014). Younger children with ASD tend to exhibit ADHD symptoms including, inattention, hyperactivity, and impulsivity.
Children with ASD may also exhibit ODD symptoms, such as hostility and defiance (Gadow, DeVincent, Pomeroy, & Azizian, 2004). Once these behavioral problems become part of the child and parents’ established routine, they are not likely to decrease without intervention (Horner et al., 2002). It is essential to intervene as early as possible because early intervention may reduce behavioral problems associated with ASD (Wilkinson, 2014).

Currently, there is not a cure for ASD but there are many treatments that target the core symptoms and comorbidities associated with ASD (Ospina et al., 2008; Wilkinson, 2014). Early comprehensive behavioral interventions have been shown to increase IQ, communication skills, educational placements, and adaptive skills, while also decreasing problem behaviors and other symptoms of ASD (Beauchaine & Hinshaw, 2013). Interventions derived from principles of applied behavior analysis (ABA) have the strongest research support for use with young children with ASD. Behaviorally based interventions that build upon a child’s interests, use a series of simple steps to teach tasks, engage a child’s attention, and regularly reinforce prosocial skills are effective for improving the functioning of children with ASD, especially when parents and teachers are involved (Horner et al., 2002).

Research indicates that interventions are more effective when there is a strong family involvement component included in the treatment package, as opposed to the specialist being solely responsible for delivering the intervention (Horner et al., 2002). Parents have great expertise regarding the strengths and needs of their child with ASD (Danya International & Organization for Autism Research, 2004; National Autism Center, 2009). They are able to provide important information relevant to assessment, diagnosis, and educational background. Additionally, they can provide assistance in planning and setting goals for their children. Furthermore, research indicates that parents can be effective interventionists of their child’s
treatment (Burrell & Borrego, 2013; Campbell & Kozloff, 2007). Parent training has a variety of positive outcomes for both the parent and the child with ASD (National Research Council, 2001). There are a few existing parent training programs that have benefited parents and their children with ASD (Beauchaine & Hinshaw, 2013; Childres, Agazzi, & Armstrong, 2011). However, the list of evidence-based treatments for ASD does not include any parent training programs (National Autism Center, 2009).

Parent-Child Interaction Therapy (PCIT) is an evidence-based intervention designed to treat disruptive behavior disorders in children between the ages of 2 and 7 (Eyberg, 1988). PCIT integrates aspects of behavioral theory, play therapy, and attachment theory in order to improve the parent-child relationship and increase parents’ proactive behavior management skills (Eyberg, 1988; Bagner & Eyberg, 2007). PCIT is traditionally used with typically developing children who exhibit significant disruptive behaviors. In the past, PCIT was not considered as a treatment for children with ASD because of its emphasis on social contingencies, which are not typically viewed as motivating for children with ASD. However, due to the high prevalence of disruptive behaviors associated with ASD, they are increasingly referred to PCIT clinics (Masse, McNeil, Wagner, & Chorney, 2007). As such, literature is emerging to support the use of PCIT for young children with ASD. A pilot trial of PCIT used for boys with high functioning ASD who exhibited significant behavioral problems demonstrated increases in parent reports of their child’s adaptability and decreases in parent reports of their child’s disruptive behaviors. This study demonstrated the feasibility of implementing PCIT with this population and that traditional PCIT measures were useful to assess the effectiveness of PCIT for this population (Solomon, Ono, Timmer, & Goodlin-Jones, 2008). Additionally, three case studies provide evidence for the

**Conceptual Framework of PCIT**

PCIT is based on the concepts of three major theories, which include parenting typology, attachment theory, and coercive theory. Baumrind’s (1967) research on the authoritative parenting style influenced the development of PCIT. According to this theory, children will exhibit poor outcomes if their parents do not meet their needs for nurturance and limit setting (Gallagher, 2003). Baumrind identified three parenting styles and a fourth was added based on research conducted by Maccoby and Martin (1983). These styles are characterized based on the level of parental responsiveness and demandingness. Authoritative parenting is characterized by high responsiveness and demandingness. The other three parenting styles include authoritarian (i.e., low responsiveness and highly demandingness), permissive (i.e., high responsiveness and low demandingness), and neglectful (i.e., low responsiveness and low demandingness). PCIT teaches parents how to effectively use authoritative parenting strategies through the use of time-out and effective limit setting techniques (Zisser & Eyberg, 2010). Ainsworth’s (1989) attachment theory stresses the importance of sensitive and warm parenting to establish stable attachment and child belief that their parent will attend to their needs. A secure attachment fosters social and emotional development (Ainsworth, 1989). PCIT incorporates principles of attachment theory through teaching parents how to positively interact with their child and foster a secure attachment. Furthermore, Patterson’s (1982) coercive theory posits that children develop disruptive behaviors due to maladaptive interactions with their parents. PCIT addresses these maladaptive interactions by providing parents with techniques for setting clear and consistent limits.
Purpose of the Current Study

PCIT is an evidence-based intervention for children with disruptive behaviors (Eyberg & McNeil, 2002). Given the significant disruptive behaviors exhibited by children with ASD, it has recently been considered as an intervention for this population. Currently, only four studies have examined the efficacy of PCIT for children with ASD. These studies have demonstrated that PCIT has resulted in improvements in the disruptive behaviors of children with ASD (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack, Bearss, Celano, & Sharp, 2014; Solomon et al., 2008). However, three of the studies are clinical case studies and the third only includes older males with ASD. The purpose of the present study was to examine the effectiveness of PCIT in improving behavioral outcomes of young children with ASD. Specifically, this study examined the frequency and severity of the challenging behaviors exhibited by young children with ASD. Additionally, the study examined changes in mothers’ parenting practices. Finally, mothers’ satisfaction with PCIT was studied. The following research questions were examined in this study:

Research Questions

1. Do mothers’ perceptions of child challenging behaviors change, and if so to what degree, from baseline to the end of PCIT treatment?

2. Do mothers’ parenting practices change, and if so to what degree, from baseline to the end of the first phase of PCIT treatment (i.e., Child Directed Interaction [CDI])?
   a. Do mothers who participate in PCIT demonstrate change in their labeled praise skills from baseline to the end of CDI?
   b. Do mothers who participate in PCIT demonstrate change in their reflection skills from baseline to the end of CDI?
c. Do mothers who participate in PCIT demonstrate change in their behavior description skills from baseline to the end of CDI?

3. How satisfied with PCIT are mothers (e.g., confidence in discipline skills, quality of parent-child interaction, child’s behavior, overall family adjustment) at the end of treatment?

**Hypotheses**

Regarding research question 1, it was hypothesized that mothers’ perceptions of child challenging behaviors would significantly decrease from baseline to the end of PCIT treatment phase. Furthermore, because PCIT places a great deal of emphasis on social contingencies, which are not typically viewed as motivating for children with ASD, it was hypothesized that the rate of change will occur gradually. This hypothesis was based on previous research suggesting that PCIT reduces parent perceptions of child challenging behaviors in children with oppositional behaviors (Bagner & Eyberg, 2007). Research also demonstrates that structured behaviorally-based interventions with strong family involvement improves the functioning of children with ASD (Horner et al., 2002).

Regarding research question 2, it was hypothesized that mothers’ parenting practices (i.e., labeled praise, reflection, and behavior description) would significantly increase from baseline to the end of CDI. Parents must reach mastery on these parenting practices prior to progressing to the PDI phase of treatment. This hypothesis was based on previous research suggesting that PCIT improves parenting practices (Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993; Eyberg, Boggs, & Algina, 1995).

Regarding research question 3, it was hypothesized that mothers have high levels of satisfaction with PCIT (as rated by the Therapy Attitude Inventory [TAI]; Eyberg, 1993). This
hypothesis was based on previous research suggesting that parents of children with oppositional behaviors are highly satisfied with PCIT (Bager & Eyberg, 2007; Eisenstadt et al., 1993).

**Significance of the Study**

ASD is a complex developmental disability, which is characterized by difficulties with social communication, and restrictive, repetitive, and stereotyped behavior patterns (DSM-V; APA, 2013). Over the past few years there has been an increase in the prevalence of children diagnosed with ASD (1 in 68 children; CDC, 2014). Children with ASD are at an increased risk for disruptive behavior disorders that warrant early intervention. Families of children with ASD are at high risk for emotional stress and economic burden associated with the costs of needed treatments (National Autism Center, 2009). Thus, it is imperative that evidence-based treatments are easily accessible and designed to involve caregivers so they may implement them in the child’s natural environment during everyday routines. Early intervention offers hope for families and their children (Wilkinson, 2014). Due to the increasing prevalence of ASD and its high comorbidity with disruptive behavior disorders, children with ASD are increasingly referred to PCIT (Masse et al., 2007). PCIT is an evidence-based parent-training program that focuses on improving parent-child relationships and teaching parents to manage disruptive behaviors (Eyberg, 1988). Preliminary case studies suggest that PCIT is an effective therapy for children with ASD and comorbid disruptive behavior disorders (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014; Solomon et al., 2008). PCIT may be beneficial for children with ASD because it is available in many communities, less time-consuming than other treatments, and parents are the agent of behavior change (Horner et al., 2002). The current study examined the effectiveness of PCIT for children with ASD by examining its effect on children’s challenging behaviors, mothers’ parenting behaviors, and mothers’ satisfaction with treatment.
Definition of Key Terms

**Autism spectrum disorder (ASD).** ASD is a complex developmental disorder characterized by impairments in reciprocal social communication and social interaction, and restricted, repetitive patterns of behavior, interests, or activities. These deficits are evident in early childhood and result in impairments of everyday functioning (APA, 2013). Children with ASD are at an increased risk for exhibiting challenging behaviors.

**Parent-child interaction therapy (PCIT).** PCIT (Eyberg, 1988) is a manualized parent training that integrates aspects of behavioral theory, play therapy, and attachment theory to decrease challenging behaviors and increase desired behaviors in an attempt to change maladaptive parent-child interactions and improve the quality of parent-child relationships.

**Challenging behaviors.** Children with ASD are at risk for developing challenging behaviors that interfere with their learning and development. For the purpose of this study, challenging behaviors are classified as behaviors that cause significant problems for the parent and/or child. Examples include repetitive and stereotypical behaviors (e.g., repetitive hand flapping, echolalia) and disruptive behaviors (e.g., tantrums, aggression, noncompliance).

**Parenting practices.** Parenting practices refer to the behaviors coded with the Dyadic Parent-Child Interaction Coding System (DPICS; Eyberg, Nelson, Duke, & Boggs, 2005). During PCIT, parents are assessed for their use of three specific parenting “Do” skills, including, labeled praises (e.g., “I like it when you play quietly!”), reflections (e.g., “Yes, that’s a yellow block.”), and behavior descriptions (e.g., “You’re putting a green block on top of the yellow block.”). Additionally, parents are monitored for “Don’t” skills including, questions (e.g., “What are you building?”), unlabeled praises (e.g., “Good job.”), and negative talk (e.g., “Stop doing that!”) during the session.
Chapter Two:

Literature Review

The following literature review will begin with an introduction, followed by a definition of ASD, prevalence and comorbidity information, and theories of autism. Next, this chapter will provide information regarding evidence-based treatments for young children with ASD, followed by a review of the benefits of parent involvement in therapy. The next section of the review will provide a detailed description of PCIT, as well as evidence for the effectiveness of PCIT. The chapter will conclude with a discussion of research on the use of PCIT with ASD and the purpose of the study.

Recent estimates suggest that ASD affects approximately one million individuals in the United States, and has an estimated cost to society of over $35-90 billion per year (Ganz, 2007; Drahota, & Brookman-Frazee, 2013). A defining feature of ASD is deficits in communication and social development, which places individuals with ASD at risk for developing problem behaviors. Once these problem behaviors are established, it is unlikely that they will disappear without intervention (Horner et al., 2002). Furthermore, the parent-child relationship may be negatively affected as well (Burell & Borrego, 2012). The most established interventions for young children with ASD incorporate aspects of behavioral theory and parent involvement (National Research Council, 2001). PCIT is an evidence-based intervention for managing a child’s behavior problems while also improving the parent-child relationship (Eyberg, 1988). PCIT incorporates aspects of behavioral theory while making the parent the agent of change in
the child’s behavior. Currently, little research exists regarding the impact of PCIT on young children with ASD, which was the focus of the present study.

**Autism Spectrum Disorder (ASD)**

**Definition.** Kanner (1943) first characterized autism as a group of behaviors, which included a lack of social reciprocity and awareness of emotions, deficits in communication, atypical use of language, and behaviors and interests that were repetitive. These characteristics are still currently used to describe ASD. Autism spectrum disorder (ASD) refers to a developmental disability characterized by impairment in social communication, verbal and non-verbal communication, and restrictive, repetitive, and stereotyped behavior patterns (DSM-V; APA, 2013). There are two domains of impairment included in the DSM-V diagnostic criteria for ASD (See Table I). The first domain is persistent deficits in social communication and social interaction across multiple contexts (e.g., lack of social or emotional reciprocity). The second domain is restricted repetitive patterns of behavior, interests, and activities, and an individual must meet at least two out of four of the criteria (e.g., inflexible adherence to specific routines or rituals). These two psychopathological domains receive separate levels of severity ranging from 1 to 3 (i.e., requiring support, requiring substantial support, requiring very substantial support). Symptoms must be present in the early developmental period, cause clinically significant impairment in important areas of current functioning, and are not better explained by intellectual disability (ID).

Symptoms of ASD are apparent within the first three years of a child’s life and children can be diagnosed as early as age 2 (APA, 2013; CDC, 2013). Diagnoses of ASD between ages 2 and 3 can be stable, reliable, and valid (Lord, 2006; Moore & Goodson, 2003). However, on average children do not receive a diagnosis until age 4 (CDC, 2013). Research indicates that the
gap between the potential age for an accurate diagnosis to be made and the actual age of children receiving an ASD diagnosis ranges from 2.7 to 3.7 years (Wilkinson, 2014).

Table 1

<table>
<thead>
<tr>
<th>Criteria for Autism Spectrum Disorder</th>
<th>Area of Impairment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of back and forth communication; to reduced sharing of interest, emotions, or affect; to failure to initiate or respond to social interactions.</td>
</tr>
<tr>
<td></td>
<td>2. Deficits in nonverbal communicative behaviors used for social interaction, ranging, for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to a total lack of facial expressions and nonverbal communication.</td>
</tr>
<tr>
<td></td>
<td>3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts; to difficulties in sharing imaginative play or in making friends; to absence of interest in peers.</td>
</tr>
<tr>
<td></td>
<td>Area 2: Restricted Interests and Repetitive Behaviors (at least 2 of the following)</td>
</tr>
<tr>
<td></td>
<td>1. Stereotyped or repetitive motor movements, use of objects, or speech.</td>
</tr>
<tr>
<td></td>
<td>2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior.</td>
</tr>
<tr>
<td></td>
<td>3. Highly restricted, fixated interests that are abnormal in intensity of focus.</td>
</tr>
<tr>
<td></td>
<td>4. Hyper- or hypoactivity to sensory input or unusual interest in sensory aspects of the environment.</td>
</tr>
</tbody>
</table>

Note. A total of 5 or more items from Areas 1 and 2 is required to receive an ASD diagnosis. Adapted from the DSM-V (APA, 2013).

Prevalence. Previously a rare disorder, ASD prevalence has progressively increased over the past decade. The CDC (2014) indicates that about 1 in 68 children are affected by ASD. This
estimate is based on data collected in 2010 by the Autism and Developmental Disabilities Monitoring (ADDM) Network on a sample of children who were 8 years old at the time. Compared with data for earlier years, this new estimate indicates an increase of 123% in the prevalence of ASD since 2002 (ADDM, 2010). In 2012, it was estimated that 1 in 88 children were affected by ASD (based on 2008 data), which was a significant increase from the 1 in 110 children estimated to be affected (based on 2006 data) in the 2009 estimates (ADDM, 2010). ASD is more common in males, with a ratio of 4.5:1 for males to females (ADDM, 2010).

The reason for the increasing prevalence in ASD diagnoses is unclear; however, there are a few potential factors that may be contributing. Some of these factors include changes in the diagnostic criteria, an increasing awareness of ASD, and improved diagnostic tools (ADDM, 2012; Wilkinson, 2014). Over the course of the years, many changes have been made in the diagnostic criteria for autism. In the first two publications of the Diagnostic and Statistical Manual of Mental Disorders (DSM), the term autism was only used in the classification section and was not considered a specific disorder (DSM-I; APA, 1952; DSM-II; APA, 1968). In the DSM-III, the term infantile autism was introduced and conceptualized as a distinct class of neurobehavioral disorders (APA, 1980). The DSM-III-R changed the name from infantile autism to autistic disorder and behavioral evidence was added into the diagnostic criteria. According to the DSM-III-R, in order to be diagnosed with autism, individuals must have at least eight out of sixteen symptoms, including at least two symptoms from category A (social interaction), one from B (communication and imaginative activity), and one from C (activities and interests). The first diagnostic category is qualitative impairment in reciprocal social interaction (e.g., no or abnormal seeking of comfort at times of distress). The second is qualitative impairment in verbal and nonverbal communication and in imaginative activity (e.g., marked abnormalities in the
production of speech, including volume, pitch, stress, rate, rhythm, and intonation). The third category is markedly restricted repertoire of activities and interests (e.g., unreasonable insistence on following routines in precise detail; APA, 1987). In the DSM-IV-TR, ASD fell under the umbrella term of pervasive developmental disorders (PDDs), along with four other related disorders (APA, 2000). These five disorders were autistic disorder (autism), childhood disintegrative disorders, Rett’s disorder, pervasive developmental disorder not otherwise specified (PDD-NOS), and Asperger’s disorder (syndrome). For autistic disorder, the diagnostic criteria included impairments in reciprocal social interaction, communication, and repetitive and restrictive patterns of activities, behaviors, and interests (APA, 2000; Wilkinson, 2014). Changes made from the DSM-IV-TR to the DSM-V included the removal of the four related disorders previously classified as PDDs to a unitary diagnosis of ASD. These separate diagnostic labels now fall under the umbrella term of ASD. The diagnostic criteria were also modified from three core impairments to two: social-communication deficits and repetitive behaviors and fixated interests (APA, 2013; Wilkinson, 2014). Additionally, individuals diagnosed with ASD receive a rating indicating the level of symptom severity ranging from 1 to 3 (i.e., requiring support, requiring substantial support, or requiring very substantial support).

Due to the changes in the diagnostic criteria over the years, there have been multiple pathways to an ASD diagnosis via different disorders. Furthermore, the changes associated with the DSM-IV-TR and DSM-V provided broader and more inclusive definitions of ASD, which could result in more people being diagnosed with ASD (CDC, 2013). King and Bearman (2009) examined the diagnostic changes and increasing prevalence of autism through retrospective case record examination of 7003 subjects born prior to 1987 who at some point received a diagnosis of autism. This allowed the researchers to examine the subjects from the beginning of diagnostic
changes to the DSM-IV occurring in 1994. The researchers conducted an empirical analysis and estimated associations using a form of logistic regression known as generalized estimation equations (GEE). Results suggested that 25% of the increasing prevalence was due to changes in diagnostic criteria for autism.

Autism awareness may also be a factor in the increasing prevalence of ASD. Over the years there has been an increasing awareness of autism. This inevitably leads to an increase in diagnosis as parents, professionals, and the general population become more aware of the disorder (Wilkinson, 2014). Parents are more aware of the symptoms associated with ASD and are able to seek assistance much sooner. Additionally, clinicians are receiving more training that allows them to provide an accurate diagnosis, as well as consultation to families (Wilkinson, 2014). Furthermore, the American Academy of Pediatrics (AAP) recommends that clinicians screen for ASD around two years of age. This may result in increases in prevalence because increased awareness of symptoms allows for an earlier and more accurate diagnosis.

A final factor to consider is the improvement of diagnostic tools. Few validated screening measures for identifying students with ASD existed until relatively recently (Lord & Corsello, 2005). The majority of the rating scales were developed to categorically determine the presence or absence of ASD because it was traditionally viewed as a “categorical” diagnosis. These categorically oriented measures failed to acknowledge the quantitative differences between children who exhibit similar core symptoms (Wilkinson, 2014). However, the view of ASD has changed from a categorical one to one that is more dimensional and takes into consideration the severity of symptoms (Constantino & Gruber, 2012). Recently, reliable and valid rating scales and screening tools have been developed that allow for quantification of the severity of
symptoms across the autism spectrum (Wilkinson, 2014). This may result in increases in prevalence because these tools allow for heterogeneity in individuals meeting criteria for ASD.

**Comorbidities.** Children with ASD often experience comorbid disorders. A recent study found that 83% of children with ASD had one or more additional diagnoses, including psychiatric problems (10%), neurological problems (16%), and about 4% had at least one potentially causal genetic or neurological diagnosis (Levy et al. 2010). Intellectual disability is the most common comorbid condition, with a comorbidity rate ranging between 40% (Baird et al., 2000) and 69% (Chakrabarti & Fombonne, 2001; Wilkinson, 2014). Mood disorders are also commonly comorbid with ASD. About 50% of children with ASD have comorbid ADHD (Van Steensel, Bogels, & Perin, 2011). Children with comorbid ASD and ADHD are increasingly likely to display aggression and receive a diagnosis of ODD (Steinmetz, Gadow, & DeVincent, 2009; Tonge, Brereton, & Einfeld, 1999). Additionally, nearly 40% have comorbid anxiety (Van Steensel et al., 2011) and approximately 25% have comorbid ODD (Brereton et al., 2006; Green, Gilchrist, Burton, & Cox, 2000). These high rates of comorbidity demonstrate the range of difficulties that may be experienced by children with ASD.

**Theories of autism.** There are three main cognitive theories of autism: theory of mind, theory of executive function, and weak central coherence theory. Theory of mind is based on a domain-specific deficit, which posits that there is a set of cognitive abilities specialized in handling different tasks. On the other hand, the theory of executive dysfunction and weak central coherence theory classify deficits as domain-general, emphasizing that regardless of the task, individuals rely on a general set of cognitive abilities (Hirschfeld & Gelman, 1994). Each of these theories will be discussed in more depth below.
Theory of mind. Theory of mind (ToM) is the ability to conceive the mental states of someone else (Wilkinson, 2014). ToM is associated with ASD based on the belief that individuals with ASD are not able to “impute mental states to themselves and others” (Premack & Woodruff, 1978, p. 515). More specifically, individuals with ASD struggle with considering other individual’s mental states, likely due to impairments in social communication associated with ASD (Baron-Cohen, Leslie, & Frith, 1985; Premack & Woodruff, 1978). Support for this theory comes from neurotypical research involving the unexpected transfer of false belief test, which is the most popular test of ToM (Rajendran & Mitchell, 2007). This task presents the participants with a series of events enacted by dolls then requires them to make a judgment, thus inferring the mental state of the doll. The story reveals that the doll believes the object is in a location different from its actual location. This requires the children to infer the mental state of the doll through consideration of what they believe the doll will do next. Results indicated that 80% of children with autism failed the task while 85% of the typical population passed, thus indicating a deficit in ToM for children with autism (Baron-Cohen et al., 1985). Baron-Cohen (1989) proposed that children with autism had a delay rather than a deficit in ToM. To test his hypothesis, he used a more difficult second-order false belief task (Baron-Cohen, 1989). Results indicated that 90% of typically developing children passed, 60% of children with Down syndrome passed, but none of the children with autism passed. Although some individuals with autism could pass a first-order theory of mind task, they were not able to pass a second-order theory of mind task, thus indicating that they did not possess a fully representational ToM (Baron-Cohen, 1989). However, Bowler (1992) challenged the ToM delay associated with autism and in a follow-up study found that 73% of young adults with Asperger syndrome passed the second-order false belief task. These results indicate that in contrast to younger and more
impaired autistic individuals, the older and higher functioning participants were able to achieve first and second levels of belief attribution. Therefore, deficits in ToM do not appear to be universal in individuals with autism.

To further advance research on this theory, advanced ToM tasks, such as the Strange Stories test (Happe, 1994) and the Eyes test (Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997), were developed to provide challenges that were more natural to individuals with autism (Rajendran & Mitchell, 2007). A significant body of research has supported that individuals with ASD have problems apprehending the mental state of someone else, particularly regarding their wants, beliefs, knowledge, and feelings (Wilkinson, 2014). Currently, fewer studies are examining the ToM hypothesis and research in this area is fading. This is likely due to the fact that the definition of this theory and its theoretical underpinnings have not been confirmed even after 20 years of research (Rajendran & Mitchell, 2007). For this reason, several additional theories have been proposed to explain the deficits experienced by those with ASD.

**Theory of executive dysfunction.** Executive function (EF) is typically explained as “the ability to maintain an appropriate problem-solving set for attainment of a future goal” (Ozonoff, Pennington, & Rogers, 1991, p. 1083). This theory was not based on neurotypical research, but rather evolved from research indicating that there were similarities between symptoms of autism and symptoms of specific brain injury. Similar symptomology between these populations included a desire for consistency, difficulty changing attention, a tendency to perseverate, and a deficiency in impulse control (Rajendran & Mitchell, 2007). EF deficits in individuals with autism have been noted in their abilities regarding planning, inhibition, and self-monitoring (Hill, 2004). A study examining individual differences in EF indicated that 96% of those in the autistic group, ranging from age 8 to 20, had a lower performance compared to the control group’s mean
(Ozonoff et al., 1991). However, a different study indicated that deficits in EF only occurred in 50% of the participants, ranging from ages 4 to 7 (Pellicano, Mayber, & Maley, 2006). One of the main challenges regarding EF research is that because EF tests typically measure multiple executive abilities, it is hard to design studies and tests measuring aspects of EF in isolation. As a result, it is difficult to determine the differences in abilities and deficits to account for the diverse profiles in this population (Pellicano et al., 2006). In addition, a problem with determining the prevalence of EF deficits in autism is that the majority of research focuses on group differences but does not report variations in the ability of individuals (Liss, et al., 2001). Although the theory of EF can explain multiple features of autism, not all individuals with autism exhibit EF deficits and those who do might have different EF profiles (Rajendran & Mitchell, 2007). The strengths of this theory are that it is the only one to acknowledge cognitive and motor characteristics (e.g., rocking, flapping hands) of autism and it considers many of the non-social aspects of autism (Rajendran & Mitchell, 2007).

**Weak central coherence theory.** The WCC theory is based on the belief that in order to process information, individuals do so by gathering an overall meaning or gist of the information they are presented with (Frith, 1989). Frith and Happe (1994) suggested that individuals with autism have a weak or absent drive for global coherence, which means that they process information by focusing on details and processing the parts, rather than taking the overall gist of the information (Rajendran & Mitchell, 2007). The lack of cognitive drive for global form is the reason individuals with autism have a WCC (Frith 1989; Frith 2003). This theory has been noted to pertain to the tendency of individuals with autism to concentrate on parts of objects, be sensitive to small shifts in their environment, have restricted interests, and demonstrate persistent behaviors (Hoy, Hatton, & Hare, 2004). Support for this theory comes from research examining
the visuospatial constructional ability of individuals with autism. Specifically, the research examines visuospatial constructional coherence, which is the ability to view an object or a picture as a set of parts and then replicate the original form. To examine this ability, researchers use the Embedded Figures Test (CEFT; Witkin, Oltman, Raskin, & Karp, 1971) and the Block Design Test (WASI; Wechsler, 1999), which both contain figures that can be segmented or divided into smaller elements. A study examining the relationship between visuospatial skills and the ability to attend to perceptual details revealed that the autistic participants with mild ID, ranging from ages 8 to 18, scored above average on the CEFT and outperformed the children with typical development (Shah & Firth, 1983). Shah and Firth (1993) conducted further research and found that participants with autism, ranging from ages 16 to 25, reproduced the block designs faster than typically developing and learning disabled controls. However, when the designs were pre-segmented, the control group and individuals with autism performed similarly. These results indicate that the pre-segmenting of the designs provided no benefit to the participants with autism because of their ability to perceptually segment the designs.

There is also research exploring the relationship between the three theories explaining ASD. Pellicano, Maybery, and Durkin (2005) conducted a correlational study with neurotypically developing 4 and 5 year olds that examined the relation between WCC, EF, and ToM theories. Results indicated that WCC was not associated with poor ToM, but EF was related to the visuospatial constructional ability construct of WCC. Pellicano et al. (2006) expanded this research and investigated the relation between WCC (visuospatial level), EF, and ToM in boys with autism between the ages of 4 and 7. Results indicated that on the Visual Motor Integration (VMI) task, which involves global processing demands, children with autism performed lower than typically developing children; however, on tasks where a bias in local
processing was favorable (Pattern Construction, Figure-Ground Tasks, the EFT), children with autism with IQs of 80 or higher outperformed typically developing children. However, after controlling for age, verbal ability, and non-verbal ability, the domains of ToM, CC, and EF appeared to be unrelated. These results provide evidence for a multiple-deficit account of autism, which proposes that autism is a complex form of cognitive disorders, characterized by the independent contributions of the ToM, WCC, and EF theoretical domains.

**Evidence-Based Interventions for Young Children with ASD**

As previously stated, children with ASD experience deficits in multiple areas of functioning and often comorbid disorders. Previously considered untreatable, now many individuals with ASD experience improved outcomes with early identification and intervention (National Research Council, 2001). Research regarding evidence-based interventions for individuals with ASD highlights that there is not a universal intervention that is effective for all children with ASD, which is why it is important to examine the interventions based on the needs of the individual (Simpson, 2005). However, while one intervention has not been identified, it is widely recognized that treatments based on a behavioral model have the most empirical validation for effectiveness (National Research Council, 2001). In particular, early intensive behavioral interventions beginning in the preschool years and that last for 2 to 4 years can significantly improve outcomes for children with ASD (Beauchaine & Hinshaw, 2013). The following sections will begin with a description of the theoretical backgrounds of EBTs, followed by a review of the empirical support for two different treatment classification systems. The section will conclude with a summary of the characteristics of EBTs for children with ASD.

**Applied behavior analysis.** Practices used for managing problem behaviors in children with ASD typically involve specific forms of applied behavior analysis (ABA), which is based
on behavioral principles. ABA is a science dedicated to understanding and improving behavior (Cooper, Heron, & Heward, 2006). This science includes a set of practices that form the basis for various behavioral treatments. ABA practices are based on behavioral teaching strategies, which include fundamental intervention practices such as, prompting, reinforcement, task analysis, chaining, and time delay (Hagopian, Crockett, van Stone, DeLeon, & Bowman, 2000; Odom et al., 2010). These ABA practices are applied in treatments to increase the occurrence of desired behaviors. All ABA-based treatments require a detailed assessment of environmental factors to determine how they interact with the individual’s behavior (Fernandes & Amato, 2013; Vismara & Rogers, 2010). This assessment consists of: (a) contextual factors such as the setting in which the behavior occurs, (b) motivational variables such as the individual’s desire to accomplish something, (c) antecedent events that precede the problem behavior, (d) skill deficits, and (e) consequences of the behavior. The information gathered from this assessment leads to the design, implementation, and evaluation of the interventions for changing the individual’s behavior (Vismara & Rogers, 2010). Many techniques are used in ABA and all of these techniques focus on the antecedents and consequences associated with a specific behavior and teaching replacement behaviors.

**Empirical support.** Rogers and Vismara (2008) evaluated the efficacy of comprehensive treatments for early ASD using the classification systems created by Chambless et al. (1998), Chambless et al. (1996), and Nathan and Gorman (2002). The criteria established by Chambless et al. (1998) and Chambless et al. (1996) states that a study is “well-established” if it involves the use of treatment manuals, clearly specified participant groups, and either (a) two independent group studies that show the treatment is better than the alternative, or (b) at least nine strong single-subject design studies involving a treatment comparison. A study classified as “probably
“Efficacious” requires clearly specified participant groups and one of the three following characteristics: (a) two studies with better outcomes compared to a non-treatment control group, (b) two strong group studies by the same investigator with superior outcomes compared to a comparison group, or (c) at least three strong single-subject design studies involving a treatment comparison. The Nathan and Gorman (2002) criteria classify studies by type based on their methodological rigor, however Rogers and Vismara (2008) only used studies classified Type 1, 2, or 3 and did not include studies classified as Type 4 (e.g., secondary analysis) or Type 5 (e.g., case reports). Type 1 studies are prospectively designed with randomized assignment to a control group, blind assessment, clear criteria for inclusion/exclusion, high quality diagnosis, sufficient sample sizes, distinctly described statistical methods, and include measures of fidelity. Type 2 studies include clinical trials with a comparison group, single-subject design, and provide useful information but may have noteworthy flaws in areas other than design. Type 3 studies have significant flaws in methodology and include uncontrolled studies involving pre-post designs and those using retrospective designs.

Based on the review conducted by Rogers and Vismara (2008), several programs and strategies based on ABA have empirical support for their use with young children with ASD. These include the Lovaas Model, Pivotal Response Training (PRT), and a combination of other techniques. In the following section each of these programs will be reviewed briefly. Rogers and Vismara (2008) classified the following reviews as either Type 1, Type 2, or Type 3 studies based on Nathan and Gorman’s (2002) criteria.

**Lovaas model.** The Lovaas Model of applied behavior analysis (Lovaas, 1987) is a highly structured comprehensive intervention program. The model is typically used for preschool age children with ASD and treatment typically begins with children between the ages of 2 and 8.
Typical teaching methods used in this treatment involve incidental teaching and discrete trial teaching. The treatment typically includes 35-40 hours a week of intensive one-to-one therapy for approximately two to three years (Lovaas, 1987). This method leads to generalization of skills when it is highly structured and used in a naturalistic setting (Ferraioli, Hughes, & Smith, 2005).

Several studies have examined the efficacy of the Lovaas model for early autism. In the first study and follow-up of the program, 28 children with autism and similar IQs were assigned (without randomization) to an intensive treatment group or a minimal treatment control group lasting for two or more years. The 19 children with autism and intellectual disability (except for 2 participants) in the treatment group received the Lovaas intervention on a one-to-one basis for approximately 40 hours a week over two or more years (Lovaas 1987; Lovaas, 1993). The 19 children in the control group received the treatment on a one-to-one basis for approximately ten hours a week (Lovaas, 1987). Results indicated that by ages 7 and 8, 9 out of the 19 children in the treatment group functioned in the average range, indicating “recovery” as measured by IQ on the WISC-R (Weschler, 1974) and were passing typical first grade curriculum. Only one child in the comparison group had the same outcome. Smith, Groen, and Wynn (2000) replicated Lovaas’ (1987) original study with several improvements in the methodology of the study. Twenty-eight participants diagnosed with autism or PDD-NOS and with IQs of 75 or below were recruited from referrals to the Lovaas clinic at UCLA. Due to new diagnostic criteria, half of the participants met the diagnostic criteria for PDD-NOS instead of autism, which highlights methodological issues common among research with this population (Rogers & Vismara, 2008). The researchers randomly assigned participants to the Lovaas intervention or to a parent-training group. Consistent with Lovaas’ (1987) study, results indicated that the treatment group
performed better than the parent-training group on measures of intelligence, academic achievement, language, and visual-spatial ability. However, at post-treatment, the treatment group continued to demonstrate IQs below 70, which contrasted to Lovaas’ (1987) reports of “recovery” (Rogers & Vismara, 2008). Due to the rigorous design methodology used in this study, Rogers and Vismara (2008) classified it as a Type 1 study using Nathan and Gorman’s (2002) criteria. A second independent partial replication of the Lovaas treatment was conducted to examine outcomes and predictors of outcomes for the treatment (Sallows & Graupner, 2005). The researchers randomly assigned 23 children, ranging between the ages of 35 and 37 months, diagnosed with autism and having IQs below 80 to a clinic-directed or parent-directed group. Participants in the parent-directed group received a less intense format of the experimental treatment approach. Treatment included Lovaas (1987) original approaches but also incorporated other methods from ABA (e.g., pivotal response training), emphasis on social play and frequent social play breaks, picture system/augmentative language intervention, use of favorite activities, and inclusive preschool class enrollment. Given the additional methods, it is difficult to determine the extent to which the intervention replicated the Lovaas procedures or implemented a new approach combining various ABA techniques (Rogers & Vismara, 2008). The treatment group as a whole functioned below average in all areas post-treatment. However, 11 of the participants across both groups had IQs higher than 85 post-treatment, demonstrating “recovery” by improving in IQ scores, for those participants. Although this study did not demonstrate significant improvements for the Lovaas replication compared to the parent-delivered group, it did demonstrate recovery for almost half of the participants with autism whom received varying intensities of the Lovaas replication. Due to the pre-post approach in analyses, Rogers and Vismara (2008) classified this study as a Type 3.
The review conducted by Rogers and Vismara (2008) evaluated the efficacy of multiple comprehensive treatments for early ASD. According to their review, the Lovaas treatment is classified as “probably efficacious.” This classification is based on the criteria developed by Chambless and colleagues (Chambless et al., 1998; Chambless et al., 1996).

*Pivotal response training.* Pivotal response training (PRT; Koegel, O’Dell, & Koegel, 1987) is a naturalistic and loosely structured intervention that relies on teaching practices instead of explicit teaching content (Rogers & Vismara, 2008). The model is typically used for preschool and elementary age students. Pivotal response training occurs in the child’s natural environment with specialist support in the early stages that is faded as the child shows improvement. Children are taught the tools and behaviors associated with social and academic learning. The motivational procedures include task variation, direct natural reinforcers, child choice, and interspersing maintenance and acquisition tasks. This approach takes the focus off of deficit areas while redirecting attention to four “pivotal” areas of functioning in children, including: motivation, child self-initiation, self-management, and responsiveness to several cues (Minjarez, Williams, Mercier, & Hardan, 2010). By targeting these four pivotal areas, it is believed that improvements will occur in other areas such as sociability, communication, and academic and behavior skills (Handleman & Harris, 2001). The National Autism Center (2009) recognizes PRT as an evidence-based intervention for children with ASD.

Koegel, Koegel, Shoshan, and McNerney (1999) developed interventions using PRT procedures two hours a week at a clinic and daily by parents in the home setting. The researchers’ goal was for the 10 3-year-old children with autism to initiate interactions. The self-management and motivational components used in phase one aimed to teach self-help, recreational, communication, social, and academic skills. The results of this phase indicated that
participants exhibiting more spontaneous self-initiations prior to treatment were the ones with the most response to the intervention. In phase two, participants were taught various initiations used to obtain attention, ask for assistance, and find someone with whom to play. Results indicated that participants who initially responded poorly to the intervention could be taught numerous self-initiations and attain scores similar to phase one participants. Follow up data collected two years after the initial intake indicated outcomes similar to “recovery.” Several of the children (ages 8 to 10 years) were rated in the normal range for pragmatics of communication, displayed high rates of social initiations, and appropriate adaptive behavior, as measured by the Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1984). Additionally, these children no longer had diagnoses of autism and were not receiving disability services. Based on the methodology of this design, Rogers and Vismara (2008) classified this study as a Type 3.

Sherer and Schreibman (2005) continued this line of research in their study that examined interactions between PRT and characteristics of children with autism. The researchers obtained pretreatment behavioral assessment data on six participants and evaluated the differences between the three strongest and weakest responders to PRT. These profiles were used to predict treatment response to PRT for a new cohort of participants. All participants received 90 minutes of one-on-one PRT four to five times a week. The three participants in the responders group had a mean age of 3 years, 3 months and received PRT for six months. The three participants in the non-responders group had a mean age of 4 years, 2 months and received PRT for five weeks. Results indicated that the non-responders did not make any gains in this treatment but did so in other treatments. Participants fitting the responder profile showed improvements in functional play, stereotypic behaviors, language, social skills, and less avoidance behaviors, which generalized to other environments. These results support the researchers’ hypothesis that certain
responder profiles improved on various outcome variables as a result of the PRT treatment. Specifically, the participants in the responder group were characterized as higher functioning as observed by moderate-to-high interest in toys and high rates of verbal stimulatory behavior (i.e., nonsensical utterances, repetitive sounds), low-to-moderate rates of nonverbal self-stimulatory behavior, and tolerance for close proximity to another individual. Based on the methodology of this study, Rogers and Vismara (2008) classified it as a Type 2 study.

Other treatments. Additionally, several interventions involving a combination of strategies including teaching joint attention skills and action routines, and integration of behavioral management into regular routines have been investigated. This integration of techniques into regular routines is similar to the naturalistic setting approach used in PRT (Koegel et al., 1987). Drew et al. (2002) conducted a study examining the effects of a home-based parent training developmental intervention, where parents received training in the pragmatics of social communication and behavior management. Twenty-four toddlers ($M$ age = 24 months old) were randomly assigned to either the treatment parent-training group or a control group receiving standard community services. A speech pathologist met with the parents every six weeks for three hours to review progress, train, and set goals. Parents implemented the treatment techniques for 30-60 minutes each day. After one year of treatment, parent report measures indicated that children in the treatment group were significantly more likely to develop speech and comprehension skills as compared to those in the control group. However, there were no significant group differences on symptom severity, parent reported stress, non-verbal IQ, or words/gestures produced at follow-up. Rogers and Vismara (2008) classified this intervention as “possibly efficacious” using Chambless and Hollon’s (1998) criteria due to its use of a treatment
and control group. It is considered a Type 2 study using Nathan and Gorman’s (2002) criteria due to the lack of fidelity measures, blind assessors, and treatment manuals.

In summary, typical characteristics of evidence-based interventions for young children with ASD include a comprehensive curriculum and intensive treatment delivery of approximately 25 hours per week with a minimum of five days a week. Additionally, individual bouts of these interventions typically last for relatively brief time periods (e.g., 15-20 minute intervals). These interventions typically include parental involvement, planned opportunities for teaching, sensitivity to the child’s development, and a well-trained staff (Beauchaine & Hinshaw, 2013; Simpson, 2005). Treatments based on ABA techniques are the ones with the most empirical validation for children with ASD and are thus the most widely used approach for this population (Hill, 2014; National Autism Center, 2009; National Research Council, 2001). Multiple research studies have established that ABA therapy is associated with improvements in communication (Cohen, Amerine-Dickens, & Smith, 2006; Sallows & Graupner, 2005), play, social skills (McConnell, 2002), and problem behavior management (Horner et al., 2002) for children with ASD. Additionally, studies have found that young children with ASD who participate in a high-quality ABA program show significant improvements in learning, reasoning, communication, and adaptability (Fernandes, & Amato, 2013).

**Benefits of Parent Involvement in Therapy**

It is widely recognized that treatments based on a behavioral model have the most empirical validation for effectiveness with individuals with ASD (National Research Council, 2001). In addition, all comprehensive programs for young children with ASD incorporate parent involvement in treatment implementation to some extent (McConachie & Diggle, 2007; National Research Council, 2001). The following section will describe the philosophy regarding parent
involvement in behavior training and will examine the outcome for behavioral parent training. The section will conclude with an examination of the research regarding the use of behavioral parent training with behavioral disorders.

**Philosophy.** Rather than providing the treatment directly to the child, research has indicated that it is beneficial for therapists to teach parents how to provide the treatment. Behavioral interventions have better outcomes for children with ASD when parents and teachers implement the interventions compared to when implemented by clinicians (Burrell & Borrego, 2012; Horner et al., 2002; National Research Council, 2001). Training parents to be providers of the treatment is associated with generalization and improved positive treatment outcomes as well as maintenance of treatment effects (Burrell & Borrego, 2012; Lovaas, Koegel, & Simmons, 1973). Parent involvement in intervention implementation for children with ASD has been advocated for about three decades (McConachie & Diggle, 2007). It is believed that parents of children with ASD should be used as change agents in therapy and without their involvement it is unlikely that gains will be maintained (Lovass et al., 1973; Vismara & Rogers, 2010).

Behavioral parent training (BPT) is one method of parent involvement that teaches parents how to use behavior modification techniques that are based on social learning principles (Chronis, Chacko, Fabiano, Wymbs, & Pelham, 2004). Through BPT, parents learn how to identify and manipulate antecedents and consequences of their child’s behavior; target and monitor problematic behaviors; use praise, positive attention, and tangibles to reward prosocial behavior; and use planned ignoring to decrease undesired behaviors (Chronis et al., 2004). Training parents allows them to become actively involved in the interventions that their child is receiving and also increases the parents’ feelings of competence and control while decreasing their stress (McConachie & Diggle, 2007; Sofronoff & Farbotko, 2002). Research regarding
parent training indicates that it can improve the social communication skills of children with ASD (McConachie & Diggle, 2007). Additionally, parent training in ABA techniques is associated with production of positive language and changes in behavior, improved child nonverbal and verbal communication, behavior management, play skills, joint attention, imitation, and social responsiveness (McConachie & Diggle, 2007; Vismara & Rogers, 2010). Training parents as ‘co-therapists’ also allows for the generalization of the skills in other settings such as the home and increases the amount of intervention that the child receives (Burrell & Borrego, 2012; McConachie & Diggle, 2007). Generalization of skills is particularly important for children with ASD because they struggle with spontaneously demonstrating the skills they learned across various settings and situations (Burrell & Borrego, 2012).

Children with ASD are at an increased risk for disruptive behavior disorders. There is considerable evidence supporting the use of BPTs with young children with disruptive behavior disorders and developmental disabilities. Behavioral parent trainings are most commonly used with children who have ADHD (Pelham, Wheeler, & Chronis, 1998) or with children who exhibit disruptive behavior typically associated with ODD and CD (Brereton et al., 2006; Eyberg, Nelson, Boggs, 2008). In fact, parent training used with these populations has been associated with positive changes in parental perceptions and objective measures of child behavior problems (Barlow et al., 2002, 2005; Eyberg et al., 2008). Therefore, the use of parent training in specific skills may also bring positive changes for children with ASD (McConachie & Diggle, 2007). Given the positive outcomes associated with the use of BPT with externalizing behavior disorders, researchers have examined its effectiveness for children with ASD.
Parent-Child Interaction Therapy (PCIT)

PCIT is an evidence-based, manualized BPT intervention that integrates aspects of behavioral theory, play therapy, and attachment theory in order to improve the parent-child relationship. PCIT aims to improve children’s prosocial behaviors and enhance parents’ proactive behavior management skills (Eyberg, 1988). PCIT shares similarities with treatments developed for children with ASD such as an application of ABA principles, emphasis on a positive parent-child relationship, and using toys with which the child is familiar (Burrell & Boreggo, 2012).

Although PCIT is considered a BPT, it differs from other BPT programs because it involves both the parent and child in the treatment and uses in-vivo coaching. In-vivo coaching is conducted using a “bug-in-the-ear” technology. This is beneficial because it allows the therapist to monitor the parent and child through a one-way mirror and provide immediate verbal feedback to the parent throughout the session (See Appendix I for an example diagram of the PCIT setting). The advantages of this approach include therapist support, guidance, and immediate feedback during the parent-child interaction (Burrell & Borrego, 2012). The in-vivo approach allows the parent to become the agent of change, which is associated with continuing and positive outcomes for children (Horner et al., 2002).

**Purpose and goals.** The purpose of PCIT is to enhance the parent and child’s relationship and improve a child’s ability to comply with commands. The main goals of PCIT are to improve the quality of the parent-child relationship, decrease problem behaviors and increase prosocial behaviors in the child, increase parenting skills, and decrease parents’ stress (Eyberg, 1988; National Child Traumatic Stress Network, 2004). In-vivo coaching occurs throughout two phases of PCIT: child-directed interaction (CDI) and parent-directed interaction (PDI). CDI
focuses on building a warm and responsive relationship between the parents and their child. During PDI, the parents deliver commands and discipline strategies to decrease the child’s problem behaviors and increase his or her compliance (Eyberg, 1988). Additionally, PCIT emphasizes the importance of fidelity through the use of weekly fidelity checklists (Eyberg, 1988).

**Theoretical background.** PCIT integrates aspects of attachment theory, behavioral theory, and social learning theory in order to improve the parent-child relationship. Based on Baumrind’s (1996) developmental theory of parenting, PCIT specifically draws on aspects of attachment and social learning principles in order to teach authoritative parenting. Authoritative parenting is characterized by nurturance, communication, and using firm control. Compared to other types of parenting styles, authoritative parenting is associated with fewer behavior problems (Zisser & Eyberg, 2010). Attachment theory highlights the importance of sensitive and warm parenting to establish stable attachment and children’s belief that their parent(s) will attend to their needs. A secure attachment parent-child relationship fosters social and emotional development (Ainsworth, 1989). Stable attachment also allows the child to feel secure in the parent-child relationship (Coie, Watt, West, & Hawkins, 1993). Patterson’s (1982) coercion theory states that problem behaviors develop as a result of maladaptive parent-child interactions. The cycle exists because negative parent and child behaviors are being reinforced, thus creating maladaptive behaviors. PCIT is highly structured and built upon behavioral principles (Solomon et al., 2008). PCIT utilizes behavioral principles to increase appropriate behavior (i.e., reinforcement, shaping) and to decrease problem behaviors (i.e., punishment, overcorrection).

**Structure of PCIT.** PCIT sessions occur once a week and last for about 1 hour. Each phase (i.e., CDI and PDI) begins with a teach session involving only the parents. During the
teach session, parents are taught key components of treatment through the use of modeling and role play. At the end of each teach session, parents receive handouts summarizing the basic techniques for CDI and PDI. Following the teach sessions are coaching sessions. During the coaching sessions, parents interact with their child while they receive in-vivo coaching by the therapist (Querido, Bearss, & Eyberg, 2002). The structure of PCIT is founded on Hanf’s (1969) two-stage parenting model, which focuses on operant behavioral principles. The CDI phase of PCIT is based upon attachment theory and it focuses on building a stable parent-child relationship (Ainsworth, 1989). CDI incorporates techniques such as social attention and nondirective play therapy with the parent as the therapist. During CDI, parents are coached to follow the child’s lead during play while using planned ignoring and labeled praise. During this phase, the therapist teaches and coaches parents on the use of positive parenting skills referred to as the PRIDE skills: Praising the child, Reflecting the child’s statements, Imitating the child’s play, Describing the child’s behavior, and using Enthusiasm during play (Querido et al., 2002). Positive behavior management is facilitated throughout this phase through differential reinforcement of the child’s behavior, which is done by directing the PRIDE skills to the child’s appropriate play and ignoring undesired behaviors. Parents are encouraged to practice these CDI skills at home by spending 5 minutes a day engaging in special play with their child (Querido et al., 2002). Once the parents have mastered the CDI skills, they move on to the PDI phase.

Parent directed interaction (PDI) is based on aspects of social learning theory and focuses on teaching children to comply with parental commands. During this phase, mildly inappropriate behavior is ignored while severely inappropriate behavior is punished rather than ignored with a time-out scenario. The focus of PDI is to teach parents how to provide effective commands and specific consequences for compliance and noncompliance (Querido et al., 2002). Parents are
instructed and coached using a step-by-step time-out method that focuses on consistency, predictability, and follow-through. The two-stage time-out procedure starts with a warning and may advance to a time-out chair and possibly a time-out room. PCIT is based on a mastery model and therefore, parents progress through treatment as they master key skills taught during CDI and PDI. These skills are observed and coded during each session and parents receive immediate feedback regarding the development of their skills (Eyberg & Funderburk, 2011). During CDI, parents must demonstrate the ability to give 10 labeled praises, 10 reflections, and 10 behavior descriptions in a 5-minute observation period. During PDI, parents must demonstrate 75% mastery at giving effective commands and following up with the correct consequence. Families are considered for discharge when parents rate their child’s behavior in a sub-clinical range on the Eyberg Child Behavior Checklist (ECBI; Eyberg & Pincus, 1999) and they demonstrate mastery of the PDI skills.

The majority of families complete PCIT; however, with any treatment there is a risk for attrition to occur. Approximately 28-50% of families involved in parent training terminate treatment early (Kazdin, Mazurick, & Siegel, 1994; Prinz & Miller, 1994). Gallagher (2003) conducted a review examining PCIT outcome literature and found that the average rate of attrition for families receiving PCIT is 12.33% with a range of 0-53%. An additional study conducted by Werba, Eyberg, Boggs, and Algina (2006) examined success and attrition outcomes of PCIT and found that 33% of families receiving PCIT dropped out of treatment. Additionally, this research showed that assignment to a wait-list condition and maternal age were the strongest predictors of treatment completion (Werba, Eyberg, Boggs, & Algina, 2006). This research demonstrates that the attrition rate of families receiving PCIT is comparable to other empirically supported treatments (Goldfine, Wagner, Branstetter, & McNeil, 2008).
Evidence for Effectiveness of PCIT

PCIT was originally designed for children who exhibited behavior problems, such as those associated with ODD. Oppositional Defiance Disorder is characterized by repetitive patterns of defiant, disobedient, and negative behavior towards authority figures. Diagnosis of ODD is based on the occurrence of at least four of the following eight behaviors: loss of temper, arguing with adults, defying the request of adults, annoying other individuals, blaming, being easily annoyed by other individuals, being angry and resentful, and being spiteful and vindictive (DSM-V; APA, 2013). Many of the studies examining the effectiveness of PCIT have been conducted with young children who are diagnosed with ODD. Findings from numerous studies demonstrate increases in positive parent-child interactions and significant improvements in the child’s behavior, compared to those in a wait-listed (control) group (Eisenstadt et al., 1993; Hood & Eyberg, 2003; Schuhmann et al., 1998).

Researchers have also investigated the usefulness of PCIT in decreasing behavioral problems in other populations including: children with ADHD, ID, and CD (Bagner & Eyberg, 2007; Eisenstadt et al., 1993). PCIT has been successful in managing problem behaviors in children with ADHD (Eisenstadt et al., 1993). ADHD is characterized by deficits in behavioral inhibition, sustained attention, resistance to distraction, and regulation of activity level (APA, 2013). Approximately 70% of children with ODD who are referred to PCIT have comorbid ADHD (Querido et al., 2002). Matos, Bauermeister, and Bernal (2009) conducted a pilot study including 32 families that examined the efficacy of PCIT for Puerto Rican preschool children with ADHD and behavior problems. The results of this study indicated that PCIT resulted in a decrease in hyperactivity-impulsivity, inattention, and oppositional defiant and aggressive
behaviors as rated by the child’s mother. Furthermore, there was a decrease in parent stress and an improvement in parenting practices.

Bagner and Eyberg (2007) conducted a study examining the use of PCIT for reducing disruptive behaviors in children with comorbid ODD and ID. The participants included 30 female primary caregivers and their children, ranging from ages 3 to 6. The results of the study indicated that the mothers had more positive interactions with their children and that the children were more compliant following the treatment. Additionally, mothers reported that fewer disruptive behaviors were occurring in the home and that their stress level regarding their child’s disruptive behaviors had decreased following treatment. This study contributes to the literature because it is one of few that examine the effectiveness of PCIT in children with ID. The findings of this study also contribute to research indicating that comorbidity may not reduce an evidence-based interventions efficacy (Bagner & Eyberg, 2007).

Conduct disorder, the more severe counterpart of ODD, is characterized by behaviors such as aggression toward people or animals, property destruction, deceit or theft, and serious rule violations. An essential feature of CD is persistent and reoccurring patterns of behaviors that violate others rights or violates other key age-appropriate societal norms or rules (APA, 2013). One PCIT study revealed that 20% of the children that were referred received a diagnosis of CD (Schuhmann et al., 1998). Studies examining the effectiveness of PCIT for CD have demonstrated clinically and statistically significant improvements in child behavior (Eisenstadt et al., 1993; Eyberg et al., 1995). These studies have demonstrated improvements in parents’ interaction style as well as generalization of behaviors for parents and children (Schuhmann et al., 1998). Furthermore, children with CD typically fall within the normal range of conduct problem behavior following the completion of PCIT (Eisenstadt et al., 1993).
In sum, PCIT is a manualized treatment that has been successful in improving outcomes for children with a variety of presenting diagnoses, who need therapy to decrease challenging behaviors and to also improve the parent-child relationship. Research has illustrated the efficacy of PCIT used with children of various populations, including those with ODD, CD, ADHD, and ID. Given that some of the challenging behaviors in children with these disorders may be similar in youth with ASD, it is also possible that PCIT could be used with this population. In the following section, evidence for the use of PCIT with children with ASD will be addressed.

**PCIT for Children with ASD**

In the past, PCIT has not been used with children with ASD because many assumed that the treatment would not work for these children due to the heavy focus it places on social contingencies (Masse, 2010). Due to the high prevalence of comorbid disruptive behavior disorders associated with ASD, PCIT is being evaluated as a treatment for children with ASD to determine its efficacy in decreasing problem behaviors and increasing prosocial behaviors, as well as attention span (Agazzi et al., 2013). Furthermore, research suggests that parents of children with ASD want a treatment that focuses on their child’s externalizing behaviors, such as non-compliance and aggression before treating the other behaviors associated with ASD (Masse, 2010). Approximately 80% of individuals diagnosed with ASD also experience comorbid disruptive disorders (de Bruin, Ferdinand, Meester, de Nijis, & Verheij, 2007). Children with ASD are often characterized as being noncompliant, inattentive, and aggressive. Only four published studies have examined the effectiveness of PCIT in reducing behavior problems associated with ASD symptoms among youth. In the following section, these four studies will be reviewed.
Solomon et al. (2008) conducted the first study examining the use of PCIT for individuals with ASD. The researchers recruited a sample of 19 males between ages 5 and 12 with clinically significant behavioral problems who met the following inclusion criteria (a) met the DSM-IV-TR criteria for autistic disorder, autism syndrome, or PDD-NOS; (b) ASD or autism according to the Autism Diagnostic Observation Schedule-Generic (ADOS-G; Lord et al., 2000); and (c) autistic disorder according to the Autism Diagnostic Interview-Revised (ADI-R; Lord et al., 1994). Using a wait-list control group design, pairs were formed by matching subjects of the same age, level of behavioral symptoms, and cognitive ability. In each pair, one subject was randomly assigned to receive the 12 sessions of PCIT. Results indicated that child problem behaviors as measured by the Problems scale of the ECBI (Eyberg & Pincus, 1999) were no longer considered clinically significant following PCIT. However, there was not a significant decrease in the intensity of these behaviors, as measured by the Intensity scale of the ECBI. Results also indicated that child functioning, as measured by the Behavior Assessment System for Children (BASC; Reynolds & Kamphaus, 1992) improved for the treatment group and parents rated their children as more “typical” on the Atypicality Scale. Related to parent perceptions of child behaviors, results indicated that shared positive affect (SPA) more than doubled from baseline to mid-point and parent positive affect significantly increased for the treatment group. Limitations included reliance on solely parent report measures, a small sample size that limited the statistical power of analyses, and the lack of a formal measure of treatment fidelity. It would have been beneficial for the researchers to include a control group for the SPA measure because they did not include the participants from the initial control group. This study demonstrated that older aged children with ASD show some improvements with PCIT and that traditional PCIT measures adequately evaluate the effectiveness of PCIT for this population.
Armstrong and Kimonis (2012) conducted a case study to examine the effectiveness of PCIT for a 5-year-old boy who met the DSM-IV-TR criteria for Asperger’s, ODD, ADHD, and OCD and exhibited associated behavior problems. Assessment conducted prior to the treatment indicated severe symptoms of ASD, as evaluated through the use of the Gillian Asperger’s Disorder Scale (GADS; Gilliam, 2001). Over the course of the 16 treatment sessions, the DPICS (Eyberg et al., 2005) and ECBI (Eyberg & Pincus, 1999) were used weekly to monitor progress. The child’s mother and teacher completed pre-intervention measures 2 weeks prior to treatment and post-intervention measures at the last session and 3 months post-treatment. The child’s mother and teacher rated aspects of the child’s behavior using the Child Behavior Checklist (CBCL/TRF; Achenbach, 1991). At pre-treatment the child’s T-scores indicated clinically significant risk for behavioral health problems, including: anxiety, affective problems, oppositional defiance, and pervasive developmental problems. Additionally, the child was in the borderline clinical range for attention deficit/hyperactivity problems. At follow-up, all scores except attention deficit/hyperactivity problems were rated in the normal range. In order to assess the intensity of disruptive behaviors and the raters’ perceptions of problematic behavior the mother completed the ECBI weekly and teacher completed the Sutter-Eyberg Student Behavior Inventory-Revised (SESBI; Eyberg & Pincus, 1999) at the start of treatment, post-treatment, and at follow-up. At pre-treatment, the child’s Intensity and Problem scores were significant on both the ECBI and SESBI. These scores declined at post-treatment and were no longer significant at follow-up. The decline in these ratings, as well as DPICS and parent interview data provides support for the effectiveness of PCIT in improving the parent-child relationship and treating a young child exhibiting behavioral problems associated with Asperger’s and comorbid ODD, ADHD, and OCD.
Agazzi et al. (2013) conducted a case study that examined the efficacy of 15 weeks of PCIT for a 7-year-old boy with ASD and associated behavioral problems. The child received an ASD diagnosis, as well as other comorbid disorders such as, ODD, primary insomnia, stereotypic movement disorder, and intellectual disability. Assessment conducted prior to the treatment indicated severe symptoms of ASD, as evaluated by parent ratings on the Child Autism Rating Scale-Second Edition (CARS-2; Schopler, Van Bourgondien, Wellman, & Love, 2010).

The ECBI was completed before, during, after, and at 3 months post treatment in order to examine the efficacy of the treatment (Agazzi et al., 2013). At the start of treatment, the child’s parents qualitatively reported extremely disruptive behaviors. However, both parents rated his behavior as only slightly elevated for Intensity scale (e.g., mother’s rating: $T$-score = 60, father’s rating: $T$-score = 65) and in the normal range on the Problems scale (e.g., mother’s rating: $T$-score = 55, father’s rating: $T$-score = 51). Over the course of treatment, the parents’ ratings on the Intensity and Problem scales of the ECBI scales decreased, except for the final three sessions. The therapists hypothesized that the increase during the last three sessions may have occurred due to holiday stress and the stress of implementing a new sleep routine with the child. At follow-up, the father reported lower ratings but the mother’s ratings increased for the Intensity (e.g., mother’s rating: $T$-score = 61, father’s rating: $T$-score = 42) and Problem scales (e.g., mother’s rating: $T$-score = 56, father’s rating: $T$-score = 45). The DPICS was used to examine the parents’ use of positive parenting strategies, which the parents reached mastery on. Although ECBI scores increased for the last three sessions, throughout the course of treatment decreases occurred in aggression, behavioral outbursts, and repetitive motor behaviors. These overall decreases combined with parent interview data suggest that PCIT effectively decreased the behavior problems in a child with ASD. This case study report also noted that the therapists were
required to be flexible and creative during the treatment while still maintaining fidelity. For example, the therapists spent extra time with the family before, during, and after the sessions in order to build rapport with the family. The therapists also worked with the parents to bring in toys that interested the child because the toys provided at PCIT did not interest him.

Additionally, although the child’s behaviors improved in the home they did not generalize to the school environment. The authors recommended that clinicians try to involve school personnel so that appropriate behavioral expectations for appropriate behaviors extend across settings, but as described in this case study they were unsuccessful at engaging school staff.

Most recently, Lesack and colleagues (2014) conducted a case study examining the effectiveness of PCIT with adaptations for a 5-year old male diagnosed with ASD. The child received an ASD diagnosis through clinical interview and behavioral observations conducted according to the DSM-V diagnostic criteria (APA, 2013). Clinical observations revealed that the child had significant expressive and receptive language delays. He was referred to PCIT due to parent reports of problem behavior such as noncompliance, self-injury, aggression, and dangerous behaviors (e.g., playing with light bulbs, elopement, climbing on appliances and counters). Due to the child’s level of expressive communication, adaptations were made to how reflections were used in CDI. The adaptations to CDI procedures included the following: (a) only reflect vocalizations with apparent and appropriate communicative intent followed by the word(s) associated with action(s) or item(s) (e.g. “’Ah’, you said ‘block’”), and (b) ignore stereotypic vocalizations. Also, due to the child’s receptive language delays, multiple adaptations were made to the PDI procedures. To increase the child’s understanding of commands, the following modifications were made: (a) say the child’s name as a prompting cue before giving a command, (b) introduce target commands with 3-step prompting (i.e., verbal, model, physical),
(c) use a gesture cue for commands (e.g., pointing), and (d) target commands must be complied with three consecutive times prior to introducing time-out. Additionally, the adaptations to the time-out procedures during PDI included the following: (a) time-out procedure reduced from 3 minutes and 5 quiet seconds to 1 minute and 2 quiet seconds; (b) time-out use was limited and used exclusively on two commands identified as safety concerns by the mother, as well as for aggression and/or intense disruptions; and (c) instead of the time-out room, a holding chair was used as the backup time-out procedure. Over the course of 22 sessions, the DPICS and the ECBI were used to monitor progress. At pre-treatment, the ECBI scores were in the clinically significant range ($T$–score = 68) and increased by the second CDI session ($T$–score = 71). This temporary increase prior to a decrease in problematic behavior, known as an “extinction burst,” is common in PCIT. Over the course of treatment, ECBI scores decreased to the subclinical range ($T$–score = 53). The decline in ECBI scores, DPICS data indicating mastery of positive parenting skills, and increased compliance demonstrated at home and observed in the clinical setting demonstrate the successful implementation of an adapted format of PCIT for a child with ASD and severe developmental delays. These findings reflect the success of various adaptations to the format of PCIT for children with ASD and provide support for the expansion of PCIT to children diagnosed with ASD and severe developmental delays.

The four studies reviewed in this section provide preliminary evidence for the effectiveness of PCIT for children with ASD. These studies contribute to the research in multiple ways but are not without limitations. The three case studies provided in-depth information regarding specific considerations for implementing PCIT with children with ASD. Specifically, the studies indicated that clinicians should maintain fidelity but allow some flexibility and/or incorporate adaptations in treatment because of the unique complicating factors and behavioral
problems associated with young children with ASD. Additionally these studies also indicated the importance of building rapport and working closely with families (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014). Limitations of the existing literature include a lack of studies with rigorous design. Only one study exists with a wait-list control design and random assignment design but it included older children with ASD (Solomon et al., 2008).

**Purpose of the Current Study**

Early intervention may provide children with ASD with more adaptive abilities for interacting with their environment and has the potential to make development more typical, therefore reducing the expression of ASD symptoms (Beauchaine & Hinshaw, 2013). Comprehensive interventions that incorporate behavioral training and parent involvement have been successful for children with ASD (Drew et al., 2002; Koegel et al., 1999; Lovaas, 1987, 1993; Solomon, Goodlin-Jones, & Anders, 2004). PCIT has been effective with many populations and uses many of the behavioral aspects of successful therapies used for children with ASD. Although small in number, studies evaluating the effectiveness of PCIT for children with ASD have revealed positive results including increases in child compliance and positive parenting behaviors and decreases in child problem behaviors (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014; Solomon et al., 2008). The present study sought to address some of the limitations of the previous case studies in terms of experimental design to evaluate the effectiveness of PCIT in young children diagnosed with ASD. The results of this study contribute to the early intervention literature for young children with ASD and their families.
Chapter Three:

Research Methods

This chapter describes the research methods used in the current study. This chapter will discuss the participants, setting, study measures, intervention fidelity, and research design. Next, the procedures and data analysis are reviewed. The chapter concludes with a discussion of ethical considerations.

Participants

Five participants were referred to the University of South Florida Pediatrics Child Development Clinic at Children’s Medical Services, where PCIT was delivered. In order to participate in this study, children met the following criteria: (a) between the ages of 2 and 7 years, (b) had a diagnosis of autism according to the Autism Spectrum Rating Scale (ASRS; Goldstein & Naglieri, 2009) or the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, DiLavore, & Risi, 2002), and (c) had clinical scores ($T$-scores ≥ 60) on the Externalizing Scale of the Child Behavior Checklist (CBCL; Achenbach, 1991) and the Eyberg Child Behavior Checklist (ECBI; Eyberg & Pincus, 1999). Participating mothers met the following criteria: (a) elevated stress scores ($T$-scores ≥ 90) on the Parenting Stress Index-4th edition (PSI-4; Abidin, 2013), (b) fluent in English, (c) had transportation, and (d) had health insurance for their children to cover the cost of treatment or were willing to pay a cash fee of $35.00 a session if uninsured. Participants already receiving ABA treatment were not included in the present study. The data used in the current study were part of a separate study examining the effect of PCIT on decreasing maternal reported stress and symptoms of anxiety and depression led by Dr. Heather
Agazzi. The present study utilized data from each child-mother dyad that participated in the separate study. Demographic information for the four dyads that participated in the intervention is provided in Table 2.

**Participant attrition.** Five mother-child dyads were initially recruited and data were gathered on all dyads through the baseline phase. The sample size was obtained in accordance with What Works Clearinghouse (WWC) criteria for single subject designs, which requires a minimum of three demonstrations of an experimental effect at three different time points (Kratochwill et al., 2010). The purpose of obtaining at least five dyads was to safeguard the integrity of the design if attrition occurred, which it did. All five dyads attended a teach session following their second baseline session. One participant dropped out of the study after the second baseline session. Due to the fact that this dyad dropped out of the study prior to starting the intervention, their data was analyzed using only descriptive statistics. This dyad reported that they dropped out for personal reasons that were unrelated to treatment. Another dyad dropped out of the study two weeks into the second phase of the intervention. Due to the fact that this dyad made it to the second phase of the study, their data were still analyzed using visual analysis and HLM. This dyad reported that they dropped out due to stress in the home environment; therefore this was also unrelated to PCIT.

**Setting.** In the study conducted by Dr. Agazzi, PCIT was delivered at the Child Development Clinic at the University of South Florida in the Children’s Medical Services (CMS) building. The clinic provides a variety of services for children between the ages of birth to 12 years, including: (a) behavioral and developmental screenings and evaluations; (b) neurocognitive and psychoeducational evaluations; and (c) behavioral consultation, intervention, and treatment. Common referrals to the clinic include concerns regarding noncompliance,
aggression and/or destruction, ASD, inattention and/or hyperactivity and impulsivity, disruptive behavior, and academic difficulties. In general, families referred to PCIT pay for services through their health insurance. For the purposes of the study, if their health insurance did not cover the cost of treatment they could pay a fee of $35.00 per session. There are some limitations associated with the clinical setting in which the study took place. These limitations are discussed in detail in chapter five.

Table 2

<table>
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<tr>
<th>Participating Mother and Child Demographic Information</th>
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<td>Variable</td>
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Measures

**Eyberg Child Behavior Inventory (ECBI).** The ECBI (Eyberg & Pincus, 1999) is a 36-item parent rating scale of disruptive behavior, used for children between the ages of 2 and 16 years. The ECBI includes two scales, the Intensity and Problem scale. The Intensity scale measures the frequency of problem behaviors using a 7-point Likert scale from 1 (i.e., never) to 7 (i.e., always). The scores from the Intensity scale are used to evaluate improvement in treatment. The Problem scale examines parents’ tolerance and distress level associated with the problem behaviors using a yes-or-no format. Both of the scales are sensitive to changes that can occur during therapy, which makes it an appropriate measure for monitoring treatment effects (Eyberg & Robinson, 1983). Example items include, “Has temper tantrums,” and “Refuses to obey until threatened with punishment.”

The ECBI was restandardized using a sample of 798 children from ages 2 to 16 (Eyberg & Pincus, 1999). The Problem and Intensity scales of the ECBI have high internal consistency with coefficients of .95 and .93. Both scales produce test-retest reliability coefficients of .80 and .85 over 12 weeks and .75 and .75 over 10 months, respectively (Funderburk, Eyberg, Rich, & Behar, 2003). Construct validity has been established for the ECBI and it has high correlations with the Externalizing scale of the CBCL. Specifically the correlations are .85 for the Problem scale and .86 for the Intensity scale (Boggs, Eyberg, & Reynolds, 1990). Additionally, evidence for discriminant validity is illustrated by the significant differences between the correlations with the Internalizing and Externalizing scales of the CBCL (Boggs et al., 1990).

**Dyadic Parent-Child Interaction Coding System (DPICS).** The DPICS (Eyberg & Robinson, 1983) is a structured behavioral coding system used to measure the quality of parent-child interaction and evaluate parenting skills as well as child behavior (Eyberg, Nelson, Duke,
& Boggs, 2005). It is used when making decisions about progression during PCIT. The observation focuses on both parent and child behaviors. Specifically, it measures parent behaviors such as the frequency of labeled and unlabeled praise (e.g., “I like it when you sit quietly.” vs. “Good job!”), which are statements that express positive evaluation towards the child, behavior descriptions (describing the child’s actions), reflections (rephrasing the child’s verbalizations), direct and indirect commands (e.g., “Sit down” vs. “Would you like to sit down?”), and critical statements (i.e., statements which express disapproval towards the child). The DPICS also measures child compliance and non-compliance during the PDI phase.

The DPICs was standardized using a sample of 22 families (Eyberg & Robinson, 1983). Bessmer, Brestan, and Eyberg (2005) examined three types of validity using videotape coding with a sample of 30 non-referred mother-child dyads and 30 referred mother-child dyads. The DPICs has high convergent validity, as evidenced by the results indicating that seven DPICS composite scores accounted for significant variance in the ECBI Intensity Scale, PSI, PSI Child Domain scores, PSI Parent Domain scores, and Parental Locus of Control scores. Additionally, discriminative validity of this measure was evidenced by results indicating that six of the DPICS composite scores significantly discriminated between referred and non-referred families (Bessmer et al., 2005). Finally, inter-rater reliability estimates range from .69 to .99 (Bessmer et al., 2005). Schuhmann et al. (1998) examined treatment sensitivity by comparing the parent-child interactions of a sample of 64 families who were placed in either an immediate treatment or wait-list group. Parents in the immediate treatment group had a significantly higher praise ratio (i.e., praise to total parent statements), more behavior descriptions, and gave less critical statements compared to those in the wait-list group.
Therapy Attitude Inventory (TAI). The TAI (Eyberg, 1993) was developed as a tool to measure parent satisfaction with the process and outcome of therapy. This measure was developed for use with treatments involving parent training. It specifically assesses satisfaction with the type of treatment program, parenting skills learned, and changes in the child’s behavior (Brestan, Jacobs, Rayfield, & Eyberg, 1999). The TAI is a 10-item scale used to measure parent satisfaction with the therapy and their satisfaction with their child’s behavior following therapy. The items are rated on a 5-point scale ranging from 1 (i.e., dissatisfaction with treatment) to 5 (i.e., maximum satisfaction with treatment).

A study involving 62 mothers was conducted in order to examine the validity and reliability of the TAI (Brestan et al., 1999). The TAI has a high internal consistency of .91. Over the course of 4 months, test-retest reliability was .85. Evidence for moderate convergent validity is established through correlations between the TAI and the ECBI. Specifically, high levels of parent satisfaction measured by the TAI correlated negatively with ratings of child behavior problems (Brestan et al. 1999).

Child Behavior Checklist (CBCL) 1.5-5. The CBCL 1.5-5 (Achenbach & Rescorla, 2000) is used for children ages 18 months to 5 years. The CBCL is a standardized assessment system used to rate parents’ perceptions of the behavioral, emotional, and social behaviors of their child. The checklist includes 100 questions and seven syndrome scales: Emotionally Reactive, Anxious/Depressed, Somatic Complaints, Withdrawn, Sleep Problems, Attention Problems and Aggressive Behavior. Additionally, the checklist includes Internalizing Problems, Externalizing Problems, Total Problems, and six DSM-oriented scales. Items are rated on a 3-point Likert scale as not true (0), somewhat or sometimes true (1), or very or often true (2). Rating of the items is based on the child’s behavior now or within the past 2 months. Similar
questions are grouped and scores are summed to get a score for that particular syndrome. Additionally, a Total Problems score is obtained for all of the questions.

The Total Problems scale has a high test-retest reliability of .90 and an average reliability of .85 across all scales. The Externalizing scale, which was used in the present study to compare changes from pre- to post-treatment, has a high test-retest reliability of .87 (Achenbach & Rescorla, 2000). Inter-rater agreement between parents on the CBCL is .61. All items except for two discriminated significantly between referred and non-referred children, providing evidence for criterion-related validity. Construct validity was demonstrated by the correlation of .58 between the CBCL Total Problems score and the Behavior Checklist (BCL; Richman, Stevenson, & Graham, 1982).

Child Behavior Checklist (CBCL) 6-18. The CBCL (Achenbach & Rescorla, 2000) school-age checklist is used for children aged 6 to 18 years. The checklist includes 120 questions and eight syndrome scales: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking behavior, and Aggressive Behavior. The checklist also includes Internalizing, Externalizing, and Total Problems scales, as well as six DSM-oriented scales. Items are rated on a 3-point Likert scale as not true (0), somewhat or sometimes true (1), or very or often true (2). Similar questions are grouped and scores are summed for each particular syndrome. A total score is obtained for all of the questions.

The CBCL school age measure has high internal consistency of .95 and a test-retest value of .90 (Achenbach & Rescorla, 2000). The Externalizing scale, which was used in the present study to compare changes from pre- to post-treatment, has a high test-retest value of .92. Interrater reliability between parents averaged at .59. Items significantly discriminated between
referred and non-referred children. Correlations of the CBCL with the Conners (1997) Parent Rating Scale Revised (CPRS-R) were high, ranging from .71-.85.

**Intervention Fidelity**

In order to ensure that the treatment was implemented consistently and with fidelity, weekly adherence/fidelity checks were conducted using the checklist provided in the PCIT manual. The checklist was used to obtain the degree of integrity for each session (Eyberg & Funderburk, 2011). A second observer completed the DPICS every week in order to obtain a measure of inter-rater reliability. Additionally, all sessions were videotaped in order to further examine the fidelity.

**Research Design**

This study utilized a non-concurrent multiple baseline single case design to examine the effectiveness of PCIT for behavioral outcomes of young children with ASD. This design included the collection of baseline (i.e., pre-intervention) data followed by the implementation of a treatment phase with multiple participants at “staggered” times based on their enrollment time, which was done as they expressed interest and went through screening. The staggering of treatment phases allows for the identification of changes in the dependent variable as a result of PCIT and not due to factors such as history or maturation. Additionally, this type of design was chosen because of its ability to detect treatment effects while also adhering to ethical standards. The study did not include a withdrawal phase (i.e., ABAB design) because withdrawing an intervention that has helped the child could put the child at risk and it is difficult to remove an intervention that involves teaching skills. It should be noted that the B phase of this intervention varied in length because it is determined by competency.
**Procedures**

The following section will describe the recruitment process and screening procedures. Next, the assessment schedule will be reviewed. Finally, the various treatment stages of the study will be described in detail.

**Recruitment.** Mother-child dyads were recruited via referral to the USF Pediatrics Child Development Clinic at Children’s Medical Services (CMS) at the University of South Florida. Healthcare professionals who serve in the Tampa Bay area were the source of these referrals. Mother-child dyads were also recruited through advertisements provided to other local agencies.

**Screening.** Mothers who were interested in participating in the study were instructed to contact Dr. Agazzi by phone to schedule a face-to-face or phone screening session. During the first screening session, mothers were asked questions to determine if they met the inclusion criteria for the study, including the following: (a) fluent in English, (b) had transportation, and (c) had health insurance or were willing to pay a cash fee of $35.00 per session if uninsured. Furthermore, mothers were asked if their child met the inclusion criteria for the study, including: (a) between the ages of 2 and 7 years, (b) diagnosed with autism using the ASRS or the ADOS (provided a copy of the report). If mothers met the screening criteria, they were given a packet of rating scales and had the option to complete them at home or at the clinic. The rating scales administered were used to determine if the mother and child met additional inclusion criteria, including: (a) mothers had elevated stress scores ($T$-scores $\geq 90$) on the PSI-4, (b) and children had clinical scores ($T$-scores $\geq 60$) on the Externalizing Scale of the CBCL and the ECBI. Mother-child dyads that met these criteria signed consent and permission forms (see Appendices A and B), and filled out a demographic form (see Appendix C). During the screening session the primary investigator scheduled at least two pre-treatment sessions and intervention sessions with
the mother. For three of the dyads, the length of baseline included two pre-treatment sessions, which is based on the research guidelines associated with PCIT. For the last enrolled dyad the length of baseline included four pre-treatment sessions.

**Assessment schedule.** Data collection occurred prior to the start of the intervention, during the screening session (see Table 3). It also occurred during the baseline phase, throughout the intervention phase, and on the last day of the intervention (i.e., post-treatment). Mothers completed the ECBI on a weekly basis from the first screening session until the end of treatment. The CBCL was administered at the screening session and on the last day of the intervention. The DPICS was used weekly beginning at baseline and throughout all CDI sessions in order to record mother-child interactions. The TAI was administered on the last day of treatment to determine mothers’ satisfaction with PCIT.

Table 3

*Study Measures Timeline*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measure</th>
<th>Screening</th>
<th>Baseline</th>
<th>Treatment</th>
<th>Post-Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic Data</td>
<td>Demographic Questionnaire</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Disruptive Behaviors</td>
<td>ECBI</td>
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<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CBCL</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parenting Practices</td>
<td>DPICS</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment Satisfaction</td>
<td>TAI</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>PCIT Implementation Integrity</td>
<td>PCIT Fidelity Checklist</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Measures administered during baseline and treatment were administered weekly throughout these phases. ECBI = Eyberg Child Behavior Inventory; DPICS = Dyadic Parent-Child Interaction Coding System; TAI = Treatment Attitude Inventory; CBCL = Child Behavior Checklist.
**Baseline sessions.** After mother-child dyads were recruited and completed a screening session, they began baseline sessions. The first four mother-child dyads enrolled in the study completed two baseline observation sessions, per the research guidelines associated with PCIT. The fifth dyad completed four baseline observation sessions, in accordance with WWC guidelines (Kratochwill et al., 2010). This dyad completed two baseline observation sessions at the clinic and two additional sessions in their home environment. During the baseline sessions the DPICS was used to code parent-child interactions. Mothers also completed the ECBI during baseline sessions.

**Intervention.** PCIT is a manualized intervention and therapists followed this manual throughout the study. The sessions occurred weekly and lasted approximately one hour. There are two phases of PCIT and both began with a teach session. During the teach session, the therapist discussed and demonstrated the skills for each phase. After the teach session, the therapist coached the parent weekly until they reached mastery, which took between three and five sessions for the CDI phase and between seven and nine sessions for the PDI phase in the present study. Each dyad was in the intervention for a total of 12 weeks plus baseline sessions. The first phase of PCIT, Child-Directed Interaction (CDI), began immediately following the second baseline observation. During the teach session mothers met with the therapist to review the skills and procedures with the therapist. During this session, the therapist reviewed the skills and procedures with the mother, modeled the skills and procedures, and engaged in a role-play. Mothers also filled out the ECBI at the time of the teach session. When the mother reached mastery, as demonstrated by the use of 10 behavior descriptions, 10 labeled praises, and 10 reflections during a 5-minute coding session at the start of each session using the DPICS, the CDI phase ended. Similarly, the PDI phase continued until it was mastered, which was
demonstrated by 75% accuracy on direct commands and the use of follow-through sequence during a 5-minute coding session. The ECBI and DPICS were conducted on a weekly basis during all treatment sessions. Post-treatment measures included the ECBI, CBCL and TAI, which were all administered at the end of the last treatment session.

**Data Analysis**

Various data analysis techniques were used to analyze the data from the dependent measures (i.e., ECBI, CBCL, DPICS, TAI) involved in the present study. Specifically, the analyses involved two complementary procedures. First, the data obtained from the repeated measures (i.e., ECBI, DPICS) were visually analyzed. Next, multi-level modeling was used to determine the effect size for individual participants and across participants. Measures that were not repeated on a weekly basis (i.e., CBCL, TAI) were analyzed using descriptive statistics.

**Visual analysis.** In single-case design, visual analysis is traditionally used to determine the following: (a) whether there is evidence of a relation between the independent and dependent variable(s) and (b) what the strength or magnitude of that relation is (Kratochwill, 2010). There are four steps and six variables involved in visual analysis. The first step involves documentation of a predictable baseline data pattern. During the second step, the data are examined within each phase of the study in order to assess whether the data have adequate consistency to demonstrate predictable patterns. Next, data are compared to determine whether PCIT was associated with any changes in the dependent variables. The final step involves combining all of the information from the different phases to determine if there are at least three demonstrations of an effect at different time points (Kratochwill, 2010).

In order to assess the effects, six variables were examined individually and collectively, including: level (i.e., mean), trend (i.e., slope), variability (i.e., range and standard deviation), immediacy of effect, overlap, and consistency of patterns across comparable phases. An evaluation of
the observed and projected patterns was performed during the various phases of the intervention (Kratochwill, 2010). Data patterns that demonstrate rapid or immediate effect, small proportions of overlapping data, and high consistency are desired in order to demonstrate a convincing treatment effect as well as causal relation (Kratochwill, 2010). There is a possibility that the data may demonstrate a significant change at the start of treatment. Specifically, the child’s problem behavior might get worse before it improves. This temporary increase prior to a decrease is known as extinction burst. In the present study, an extinction burst was likely to occur around the time of the first or second CDI session because this is when parents began using planned ignoring for undesired behaviors.

In order to determine overlap of data across phases, the Non-Overlap of all Pairs (NAP; Parker & Vannest, 2009) and the Tau-U (Parker, Vannest, Davis, & Sauber, 2011), which are both nonparametric effect sizes, were obtained for each participant. NAP was chosen due to its support from established statistics and superior precision power (Parker & Vannest, 2009; Parker, Vannest, & Davis, 2014). Additionally, NAP does not require the removal of minimum data points, which is required with earlier techniques. Effect sizes are computed by computing the percentage of data that improve from baseline to post-treatment. A limitation to NAP is that it is insensitive to data trend, which is why Tau-U was also used. Effect sizes were calculated by obtaining the percent of non-overlapping minus overlapping data.

**Multi-level modeling.** Hierarchical linear modeling (HLM) was used to examine the effects of PCIT across all of the participants. Modeling of the data makes it possible to obtain estimates of effects that occur as a result of the intervention. HLM allows for data to be examined for individual dyads as well as to examine effects across the parent-child dyads using Bayes estimates (Ferron, Farmer, & Owens, 2010), the Kenward-Roger method for estimating degrees of freedom, and confidence intervals. Effect estimates were attained at time points corresponding with the end of treatment for the ECBI and with the end of the first phase of treatment (i.e., CDI) for the DPICS. Typical HLM includes one or
more regression equations where each level is utilized as predictors in describing specific coefficients of the equation of the level (Noortgate & Onghena, 2003). A Level-1 model was used to analyze the dependent variable data separately for each of the participants. A Level-2 model was used to examine variation across participants. The model used allows for a change in level at intervention, no baseline trend, but a trend during the intervention phase of the study. Data analysis was done using the SAS software program.

**Descriptive statistics.** The CBCL was administered at screening and post-treatment in order to gain an additional measure of challenging behaviors. The TAI was administered post-treatment to examine mothers’ satisfaction with the process and outcomes of PCIT. Data obtained from these measures were examined using descriptive statistics (i.e., means, standard deviations, range).

**Attrition analyses.** Although the majority of those enrolled in PCIT do not drop out of treatment, there was a possibility for attrition to occur, which it did (Gallagher, 2003). In the present study, five participants were enrolled in an attempt to safeguard the integrity of the study if case attrition occurred. Guidelines for attrition data analyses were set based on the time of dropout. These guidelines aligned with the possibility of dyads dropping out at three different time points, including: (a) pre-intervention (i.e., baseline), (b) during CDI, and (c) during PDI. If a dyad dropped out prior to the start of the intervention, their data was not included in any of the analyses. If a dyad dropped out during the CDI phase, data was analyzed using descriptive statistics and visual analysis. Furthermore, if a dyad dropped out during the PDI phase, data was analyzed using descriptive statistics, visual analysis, and HLM.

**Ethical Considerations**

This study was submitted to the University of South Florida Division of Research Integrity and Compliance Institutional Review Board (IRB) for approval prior to data collection.
Additionally, parental consent was obtained from the mother of the child prior to the start of the study. The researcher assigned pseudonyms for each child in the study in an effort to protect the identity of the participants. The data is kept confidential at CMS in a password-protected computer and hard copies are locked in a cabinet.
Chapter Four:

Results

This chapter includes a description of intervention integrity data, analyses of PCIT multiple baseline data for the four mother-child dyads, and a discussion of data gathered on treatment satisfaction. The chapter will begin with a review of intervention integrity data. Next, visual analyses are described, followed by a description of the HLM results. Finally, data obtained from pre- and post-intervention measures (i.e., CBCL, TAI) will be discussed.

Intervention Integrity

Integrity of the intervention was examined by evaluating PCIT integrity measures. The PI for the larger study and her intern completed weekly PCIT treatment integrity checklists separately. Each checklist included items to be completed during the PCIT session. Each item on the checklist had columns for the rater to record either a Yes (i.e., checkmark), No (X), or Non-applicable (NA) for the completion of that item. The columns were then added for a total number of completions, non-completions, and non-applicable items. Additionally, the checklist also included: (a) blanks for the rater and integrity checker to record comments about the session, (b) a formula for computing the integrity of the session, and (c) the length of session. Graduate students reviewed 20% of the integrity measures and reported inter-rater reliability between the PI and intern. It is important to note that measures of integrity were missing for three sessions out of the total of 51 sessions because they were misplaced. The average treatment integrity ranged from 92% to 100% for all sessions. The overall average treatment integrity was 99.84
with a standard deviation of 1.11, indicating that the treatment was implemented with high levels of integrity.

All sessions were videotaped for the purpose of obtaining inter-rater agreement for the DPICS. A primary investigator and her intern coded each session using the DPICS in order to obtain a measure of inter-rater agreement. Inter-rater agreement for CDI skills was calculated by dividing the primary investigator’s frequency count of CDI skills by the intern’s frequency count to compute a percentage of agreement. Inter-rater agreement for the CDI skills ranged from 64% to 93%. The overall average inter-rater agreement for CDI skills was 78.79% with a standard deviation of 8.00.

**Visual Analysis**

In single-case design, visual analysis is traditionally used following a four-step process to determine the following: (a) whether there is evidence of a relation between the independent and dependent variable(s) and (b) what the strength or magnitude of that relation is (Kratochwill, 2010). In order to assess the effect PCIT had on child challenging behaviors and positive parenting practices, results were visually analyzed using a modified version of the four-step process recommended by WWC (Kratochwill et al., 2010). Due to the need to provide services in a timely manner, the minimum number of baseline points for the present study was two for Dyads 1, 2, and 3, which limits the establishment of stable baseline patterns. However, four baseline observations were obtained for Dyad 4. Using the four step process, treatment effects were identified when the data patterns of the dependent variables demonstrated predictable (i.e., stable) baselines, level changes across baseline and treatment phases in the direction of the expected change, and small proportions of overlapping data. Furthermore, three demonstrations of an effect across participants were required in order to determine that PCIT was the cause of
changes in the dependent variables. Due to the limited number of baseline points for Dyad 1, 2, and 3, trends and stability of baseline patterns were not examined. However, past research suggests that the behaviors presented by children with ASD are assumed to be relatively stable and thus it was assumed that baseline patterns would have reached stability in the present study with additional baseline sessions (Campbell & Ewing, 1990; Gallagher, 2003).

In order to assess the treatment effects, six variables were examined individually and collectively, including: level (i.e., mean), trend (i.e., slope), variability (i.e., range and standard deviation), immediacy of effect, overlap, and consistency of patterns across comparable phases. Visual analysis for dyads with two baseline observations did not include the examination of baseline trends. In the following section, the results for each dependent variable are discussed and accompanied by graphical representations. Descriptive statistics are provided in tables.

**Eyberg Child Behavior Inventory (ECBI).**

*Intensity scale.* A graphical representation demonstrating mothers’ ratings of the intensity of their child’s behaviors during baseline and treatment phases is presented in Figure 1. During the baseline phase, Dyad 4 had a positive baseline trend in the opposite direction of expected behavior change. Baseline stability analyses indicated that at least 85% of baseline observation points fell within a 15% range of the average of all baseline points (Neuman and McCormick, 1995). All dyads demonstrated negative trends in the direction of expected behavior change in the intervention phase. All dyads mean levels of ECBI Intensity scores decreased from the baseline to intervention phase (see Table 4). Dyads 3 and 4 showed variability in the intervention phase. Examination of intervention phase levels indicates that all dyads declined in ECBI Intensity levels over the course of the study; however, only Dyad 3’s ratings were in the sub-clinical level (T-scores ≤ 60) at the end of the intervention. At the first week of the
intervention, Dyads 2, 3, and 4 showed decreases in the intensity of behavior problems. The difference in level across phases for Dyad 3 suggests that the effects of the intervention occurred immediately. At the start of the intervention, Dyad 1 showed an increase in their ECBI Intensity score before a decrease suggesting the occurrence of an extinction burst.

Figure 1. Multiple Baseline Results for ECBI Intensity T-Scores
Analyses of data overlap between the baseline and intervention phases were examined for each participant (see Table 5). Results from these analyses suggest that Dyads 2, 3, and 4 demonstrated moderate to strong nonparametric effect sizes. Overall, results indicate that Dyads 2 and 3 showed the most significant decreases in their ratings on the ECBI Intensity scale over the course of the intervention. Furthermore, there was a noticeable decrease in scores for Dyad 4 over the course of the intervention. Although their last data point increased, this dyad reported that it was a result of complicating factors in their current home situation.

Table 4

<table>
<thead>
<tr>
<th></th>
<th>Baseline Phase</th>
<th>Intervention Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
</tr>
<tr>
<td>Dyad 1</td>
<td>65.00 (3.00)</td>
<td>62.00-68.00</td>
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<tr>
<td>Dyad 2</td>
<td>78.00 (1.00)</td>
<td>77.00-79.00</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>73.00 (2.00)</td>
<td>71.00-75.00</td>
</tr>
<tr>
<td>Dyad 4</td>
<td>83.00 (4.06)</td>
<td>76.00-86.00</td>
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</tbody>
</table>

Table 5

<table>
<thead>
<tr>
<th></th>
<th>Dyad 1</th>
<th>Dyad 2</th>
<th>Dyad 3</th>
<th>Dyad 4</th>
</tr>
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<td>NAP</td>
<td>65.38%</td>
<td>100%</td>
<td>100%</td>
<td>82.14%</td>
</tr>
<tr>
<td>Tau-U</td>
<td>0.31</td>
<td>1.00</td>
<td>1.00</td>
<td>0.64</td>
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</table>

Note. NAP = non-overlap of all pairs; Tau-U = non-overlap with baseline trend control.

**Problem scale.** A graphical representation demonstrating mothers’ ratings of the degree of problems associated with their child’s behaviors during baseline and treatment phases is presented in Figure 2. During the baseline phase, Dyad 4 had a slightly negative baseline trend in the direction of expected behavior change. Baseline stability analyses for Dyad 4 indicated that at least 85% of baseline observation points fell within a 15% range of the average of all baseline points (Neuman and McCormick, 1995). During the intervention phase, Dyads 2 and 3 had negative trends in the direction of expected behavior change; however, Dyads 1 and 4
demonstrated positive trends in the opposite direction of expected behavioral change. Dyads 2 and 3 declined in mean levels of ECBI Problem scores in the intervention phase (see Table 6).

*Figure 2. Multiple Baseline Results for ECBI Problem T-Scores*
Dyad 3 demonstrated significant variability in the intervention phase. A comparison of baseline and intervention phase levels signifies that Dyads 2 and 3 decreased in ECBI Problem levels over the course of the study. However, only Dyads 1 and 3 had ratings in the sub-clinical level ($T$-scores $\leq 60$) at the end of the intervention. Dyads 2 and 4 declined in their ratings of behavior problems at the first week of the intervention. At the start of the intervention, Dyads 1 and 3 showed an increase in their ECBI Problem score prior to a decrease, suggesting that extinction burst occurred.

Analyses of data overlap between the baseline and intervention phases were examined for each participant (see Table 7). Results from these analyses suggest that Dyads 2 and 3 demonstrated moderate to strong nonparametric effect sizes. Overall, results indicate that Dyad 3 showed the most significant decreases in their ratings on the ECBI Problem scale over the course of the intervention. Furthermore, there was a noticeable decrease in scores for Dyad 2 over the course of the intervention.

Table 6

<table>
<thead>
<tr>
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<th>Baseline Phase</th>
<th>Intervention Phase</th>
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<tbody>
<tr>
<td>Dyad 1</td>
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<td>58.38 (2.62)</td>
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<td>Dyad 2</td>
<td>81.00 (1.00)</td>
<td>76.71 (4.23)</td>
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<tr>
<td>Dyad 3</td>
<td>79.00 (2.00)</td>
<td>60.45 (9.20)</td>
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<tr>
<td>Dyad 4</td>
<td>82.50 (0.87)</td>
<td>82.86 (2.29)</td>
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Table 7

<table>
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<td>Tau-U</td>
<td>0.12</td>
<td>0.73</td>
<td>0.86</td>
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</table>

*Note.* NAP = non-overlap of all pairs; Tau-U = non-overlap with baseline trend control.
Dyadic Parent-Child Interaction Coding System (DPICS).

*Labeled praises.* A graphical representation demonstrating the frequency of mothers’ use of Labeled Praises during baseline and treatment phases is presented in Figure 3. During the baseline phase, Dyad 4 had a positive baseline trend in the direction of expected change. During the treatment phase, all dyads demonstrated positive trends in the direction of expected behavior change. Dyad 1 maintained a mean level of at least ten Labeled Praises during the entire treatment phase (see Table 8). Mean levels of Labeled Praises for Dyads 2, 3, and 4 ranged from 7.00 to 8.33. Dyads 1, 2, and 4 demonstrated low levels of variability during the treatment phase. Dyad 3 had a higher degree of variability in the treatment phase. A comparison of the use of Labeled Praises across baseline and intervention phases indicates that all dyads improved in DPICS Labeled Praises levels over the course of the intervention. At the start of the intervention phase, all dyads increased in their use of Labeled Praises and continued to increase over the course of the intervention. Furthermore, Dyad 1 showed a significantly noticeable increase at the first week of the intervention, suggesting that they experienced a more immediate effect at the start of the intervention.

Analyses of data overlap between the baseline and intervention phases were examined for each participant (see Table 9). Results from these analyses suggest that all dyads demonstrated strong nonparametric effect sizes (i.e., 100% or 1.00). Overall, results indicate that all dyads noticeably increased in their frequency of Labeled Praises over the course of the intervention. It is important to note that the most significant increase occurred for Dyad 1, as their improvement occurred immediately at the first week of the intervention phase. This dyad also maintained criteria (i.e., ten labeled praises) throughout the intervention.
Figure 3. Multiple Baseline Results for DPICS: Labeled Praises
Table 8

Descriptive Statistics for Dyadic Parent-Child Interaction Coding System: Labeled Praises

<table>
<thead>
<tr>
<th></th>
<th>Baseline Phase</th>
<th>Intervention Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
</tr>
<tr>
<td>Dyad 1</td>
<td>0.00 (0.00)</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>0.00 (0.00)</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>0.00 (0.00)</td>
<td>0.00-0.00</td>
</tr>
<tr>
<td>Dyad 4</td>
<td>0.75 (0.83)</td>
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</table>

Table 9

Non-Overlap Statistics for Dyadic Parent-Child Interaction Coding System: Labeled Praises

<table>
<thead>
<tr>
<th></th>
<th>Dyad 1</th>
<th>Dyad 2</th>
<th>Dyad 3</th>
<th>Dyad 4</th>
</tr>
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<tbody>
<tr>
<td>NAP</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Tau-U</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Note. NAP = non-overlap of all pairs; Tau-U = non-overlap with baseline trend control.

Reflections. A graphical representation demonstrating the frequency of mothers’ use of Reflections during baseline and treatment phases is presented in Figure 4. During the baseline phase, Dyad 4 had a slightly positive baseline trend in the direction of expected change. During the treatment phase, Dyads 1, 2, and 3 demonstrated positive trends in the direction of expected behavior change. Dyad 1 demonstrated a reversal in trend during the third week of the intervention. Dyad 4 demonstrated a neutral trend. Mean levels of Reflections during the treatment phase ranged from 7.00 to 9.33. Dyads 1 and 3 demonstrated moderate levels of variability during the treatment phase. A comparison of the use of Reflections across baseline and intervention phases indicates that all dyads improved in DPICS Reflections levels over the course of the study (see Table 10). Furthermore, Dyads 2, 3, and 4 showed a significantly noticeable increase in their use of Reflections at the first week of the intervention, suggesting that they experienced a more immediate effect at the start of the intervention. Dyad 1 showed improvement in their use of Reflections at the second week of the intervention.
Figure 4. Multiple Baseline Results for DPICS: Reflections
Analyses of data overlap between the baseline and intervention phases were examined for each participant (see Table 11). Results from these analyses suggest that all dyads demonstrated moderate to strong nonparametric effect sizes. Overall, results indicate that Dyads 2, 3, and 4 significantly increased in their frequency of Reflections over the course of the intervention. It is important to note that Dyad 1 was not required to reach mastery for this skill because the child was non-verbal, which limited his mother’s ability to reflect appropriate vocalizations.

Table 10

<p>| Descriptive Statistics for Dyadic Parent-Child Interaction Coding System: Reflections |
|---------------------------------|---------------------------------|</p>
<table>
<thead>
<tr>
<th>Dyad 1</th>
<th>Baseline Phase</th>
<th>Mean (SD)</th>
<th>Range</th>
<th>Intervention Phase</th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5.00 (5.00)</td>
<td>0.00-10.00</td>
<td>8.00 (7.87)</td>
<td>1.00-19.00</td>
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</tr>
<tr>
<td>Dyad 2</td>
<td></td>
<td>0.50 (0.50)</td>
<td>0.00-1.00</td>
<td>8.80 (3.97)</td>
<td>2.00-13.00</td>
<td></td>
</tr>
<tr>
<td>Dyad 3</td>
<td></td>
<td>2.00 (1.00)</td>
<td>1.00-3.00</td>
<td>7.00 (3.53)</td>
<td>3.00-11.00</td>
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<tr>
<td>Dyad 4</td>
<td></td>
<td>1.75 (1.48)</td>
<td>0.00-4.00</td>
<td>9.33 (0.94)</td>
<td>8.00-10.00</td>
<td></td>
</tr>
</tbody>
</table>

Table 11

| Non-Overlap Statistics for Dyadic Parent-Child Interaction Coding System: Reflections |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Dyad 1  | Dyad 2  | Dyad 3  | Dyad 4  |
| NAP     | 66.67% | 100%     | 87.50% | 100%  |
| Tau-U   | 0.33   | 1.00     | 0.88   | 1.00  |

Note. NAP = non-overlap of all pairs; Tau-U = non-overlap with baseline trend control.

Behavior descriptions. A graphical representation demonstrating the frequency of mothers’ use of Behavior Descriptions during baseline and treatment phases is presented in Figure 5. During the baseline phase, Dyad 4 had a positive baseline trend in the direction of expected change. During the treatment phase, Dyads 1, 3 and 4 demonstrated positive trends in the direction of expected behavior change. Dyad 2 demonstrated a slightly negative trend in the opposite direction of expected behavior change. Dyads 1, 2, and 3 maintained mean levels of at least 10 Behavior Descriptions during the entire treatment phase (see Table 12). Dyads demonstrated low levels of variability during the treatment phase.
Figure 5. Multiple Baseline Results for DPICS: Behavior Descriptions
A comparison across baseline and intervention phases indicates that all dyads improved in Behavior Descriptions levels over the course of the study. Furthermore, Dyads 1, 2, and 3 showed a significantly noticeable increase in their use of Behavior Descriptions at the first week of the intervention, suggesting that they experienced a more immediate effect at the start of the intervention. Dyad 4 showed improvement in their use of Behavior Descriptions at the second week of the intervention.

Analyses of data overlap between the baseline and intervention phases were examined for each participant (see Table 13). Results from these analyses suggest that all dyads demonstrated strong nonparametric effect sizes. Overall, results indicate that Dyads 1, 3, and 4 showed the most significant increases in their frequency of Behavior Descriptions over the course of the intervention. Additionally, Dyad 2 showed a noticeable improvement in their use of Behavior Descriptions; however, their improvements were more variable during the intervention phase so their effect was not as significant as the effects demonstrated by the other dyads.

Table 12

*Descriptive Statistics for Dyadic Parent-Child Interaction Coding System: Behavior Descriptions*

<table>
<thead>
<tr>
<th></th>
<th>Baseline Phase</th>
<th>Intervention Phase</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
<td>Mean (SD)</td>
<td>Range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyad 1</td>
<td>0.00 (0.00)</td>
<td>0.00-0.00</td>
<td>11.67 (2.87)</td>
<td>8.00-15.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyad 2</td>
<td>0.00 (0.00)</td>
<td>0.00-0.00</td>
<td>11.20 (2.32)</td>
<td>7.00-14.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyad 3</td>
<td>0.00 (0.00)</td>
<td>0.00-0.00</td>
<td>14.5 (5.59)</td>
<td>9.00-23.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dyad 4</td>
<td>0.50 (0.50)</td>
<td>0.00-1.00</td>
<td>6.33 (3.86)</td>
<td>1.00-10.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 13

*Non-Overlap Statistics for Dyadic Parent-Child Interaction Coding System: Behavior Descriptions*

<table>
<thead>
<tr>
<th></th>
<th>Dyad 1</th>
<th>Dyad 2</th>
<th>Dyad 3</th>
<th>Dyad 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAP</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>91.67%</td>
</tr>
<tr>
<td>Tau-U</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.83</td>
</tr>
</tbody>
</table>

*Note.* NAP = non-overlap of all pairs; Tau-U = non-overlap with baseline trend control.
Multi-Level Modeling

Hierarchical linear modeling (HLM) was used to estimate average effect sizes and individual effect sizes across the four mother-child dyads. The model used assumed the following: (a) a trend in the intervention phase, (b) a change in level between baseline and intervention phases, and (c) first-order autocorrelation. Due to differential timelines for data collection methods on the repeated measures used in the present treatment, treatment effects were observed at different time points for each dependent variable. Specifically, treatment effects were observed at the end of treatment for child challenging behaviors (i.e., ECBI) at the end of CDI for positive parenting practices (i.e., DPICS). In the following section, the results of the dependent variables child challenging behaviors and parenting practices are discussed and followed by tables of fixed effects and Empirical Bayes (EB) estimates.

Eyberg Child Behavior Inventory (ECBI).

Intensity scale. The average treatment effect at the end of treatment \( b = -12.46, p = 0.07 \) was negative but not statistically significant (see Table 14). This indicates that there is no confidence that the intervention caused an effect on mothers’ ratings of the intensity of their child’s challenging behaviors. The average change in slope from baseline to treatment (-0.73) was negative but not statistically significant. Some variance was found in treatment effect (72.75) and change in slope (0.12) but these estimates were not statistically significant. Autocorrelation was not statistically significant at the end of treatment (-0.14). Empirical Bayes (EB) estimates for individuals’ deviation from the average treatment effect are presented in Table 15. None of the individuals had effects that differed significantly from the average treatment effect.
Table 14

**Fixed Effects for Eyberg Child Behavior Inventory: Intensity Scale**

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Coefficient</th>
<th>SE</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average baseline level</td>
<td>74.90</td>
<td>3.86</td>
<td>62.74</td>
<td>87.06</td>
</tr>
<tr>
<td>Average treatment effect</td>
<td>-12.46</td>
<td>4.44</td>
<td>-26.56</td>
<td>1.65</td>
</tr>
<tr>
<td>Average change in slope</td>
<td>-0.73</td>
<td>0.29</td>
<td>-1.41</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

*Note.* CI = confidence interval, LL = lower limit, UL = upper limit.

*Covariance parameter estimates of the variance components were 55.67 for baseline level, 73.75 for change in level, 0.12 for change in slope, -0.14 for autocorrelation, and 10.19 for level-1 variance.

* = $p < .05$, ** = $p < .03$, *** = $p < .01$

Table 15

**Empirical Bayes (EB) Eyberg Child Behavior Inventory: Intensity Scale**

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Baseline Level</th>
<th>Treatment Effect</th>
<th>Change in Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 1</td>
<td>66.06</td>
<td>-5.31</td>
<td>-0.38</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>77.60</td>
<td>-9.72</td>
<td>-0.46</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>72.82</td>
<td>-2.03</td>
<td>-0.63</td>
</tr>
<tr>
<td>Dyad 4</td>
<td>83.11</td>
<td>-6.44</td>
<td>-0.70</td>
</tr>
</tbody>
</table>

* = $p < .05$, ** = $p < .03$, *** = $p < .01$

*Problem scale.* The average treatment effect at the end of treatment ($b = -8.27, p = 0.08$) was negative but not statistically significant (see Table 16). This indicates that there is no confidence that the intervention caused an effect on mothers’ ratings of the degree of problems associated with their child’s behaviors. The average change in slope from baseline to treatment (-0.78) was negative but not statistically significant. No variance was found between dyads in treatment effect or changes in slope. Autocorrelation was statistically significant at the end of treatment ($b = -0.64, p = 0.0002$). Empirical Bayes (EB) estimates for individuals’ deviation from the average treatment effect are presented in Table 17. None of the individuals had effects that differed significantly from the average treatment effect.
Table 16

**Fixed Effects for Eyberg Child Behavior Inventory: Problem Scale**

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Coefficient</th>
<th>SE</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average baseline level</td>
<td>73.45***</td>
<td>6.34</td>
<td>55.37</td>
<td>91.54</td>
</tr>
<tr>
<td>Average treatment effect</td>
<td>-8.27</td>
<td>4.09</td>
<td>-17.97</td>
<td>1.44</td>
</tr>
<tr>
<td>Average change in slope</td>
<td>-0.78</td>
<td>0.41</td>
<td>-1.71</td>
<td>0.14</td>
</tr>
</tbody>
</table>

*Note.* CI = confidence interval, LL = lower limit, UL = upper limit.

*a* Covariance parameter estimates of the variance components were 133.10 for baseline level, 0.00 for change in level, 0.00 for change in slope, -0.64 for autocorrelation, and 44.06 for level-1 variance.

* = p < .05, ** = p < .03, *** = p < .01

Table 17

**Empirical Bayes (EB) Estimates for Eyberg Child Behavior Inventory: Problem Scale**

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Baseline Level</th>
<th>Treatment Effect</th>
<th>Change in Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60.95</td>
<td>-8.27</td>
<td>-0.78</td>
</tr>
<tr>
<td>2</td>
<td>79.20</td>
<td>-8.27</td>
<td>-0.78</td>
</tr>
<tr>
<td>3</td>
<td>68.03</td>
<td>-8.27</td>
<td>-0.78</td>
</tr>
<tr>
<td>4</td>
<td>85.63</td>
<td>-8.27</td>
<td>-0.78</td>
</tr>
</tbody>
</table>

* = p < .05, ** = p < .03, *** = p < .01

**Dyadic Parent-Child Interaction Coding System (DPICS).**

**Labeled praises.** The average treatment effect at the end of CDI ($b = 14.79, p = 0.01$) was positive and statistically significant at the .05 level (see Table 18). This indicates the presence of an effect on the frequency of mothers’ use of Labeled Praises caused by the intervention. There is 95% confidence that the average treatment effect is within 7.37 and 22.21. The average change in slope ($b = 4.37, p = 0.0246$) was positive and statistically significant at the .05 level. Some variance was found in treatment effect (21.20) and changes in slope (3.92) but these estimates were not statistically significant. Autocorrelation was not statistically significant at the end of CDI (-0.10). Empirical Bayes (EB) estimates for individuals’ deviation from the average treatment effect are presented in Table 19. None of the individuals had effects that differed significantly from the average treatment effect.
Table 18

**Fixed Effects for Dyadic Parent-Child Interaction Coding System: Labeled Praises**

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Coefficient</th>
<th>SE</th>
<th>LL</th>
<th>UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average baseline level</td>
<td>0.32*</td>
<td>0.32</td>
<td>-0.52</td>
<td>1.16</td>
</tr>
<tr>
<td>Average treatment effect</td>
<td>14.79**</td>
<td>2.37</td>
<td>7.37</td>
<td>22.21</td>
</tr>
<tr>
<td>Average change in slope</td>
<td>4.37**</td>
<td>1.05</td>
<td>1.06</td>
<td>7.69</td>
</tr>
</tbody>
</table>

*Note.* CI = confidence interval, LL = lower limit, UL = upper limit.

*a* Covariance parameter estimates of the variance components were 0.00 for baseline level, 21.20 for change in level, 3.92 for change in slope, -0.10 for autocorrelation, and 1.22 for level-1 variance.

* = \( p < .05 \), ** = \( p < .03 \), *** = \( p < .01 \)

Table 19

**Empirical Bayes Estimates for Dyadic Parent-Child Interaction Coding System: Labeled Praises**

<table>
<thead>
<tr>
<th>Participants</th>
<th>Baseline Level</th>
<th>Shift in Level</th>
<th>Slope in Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 1</td>
<td>0.32</td>
<td>12.64</td>
<td>1.58</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>0.32</td>
<td>9.00</td>
<td>-0.96</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>0.32</td>
<td>20.37</td>
<td>4.35</td>
</tr>
<tr>
<td>Dyad 4</td>
<td>0.32</td>
<td>10.52</td>
<td>4.21</td>
</tr>
</tbody>
</table>

* = \( p < .05 \), ** = \( p < .03 \), *** = \( p < .01 \)

**Reflections.** The average treatment effect at the end of CDI (\( b = 9.93, p < .0001 \)) was positive and statistically significant at the .05 level (see Table 20). This indicates the presence of an effect on the frequency of mothers’ use of Reflections caused by the intervention. There is 95% confidence that the average treatment effect is within 7.37 and 12.49. The average change in slope (2.49) was positive but not statistically significant. Some variance was found in treatment effect (0.75) and changes in slope (0.09) but these estimates were not statistically significant. Autocorrelation was statistically significant at the end of CDI (\( b = -0.81, p < .0001 \)). Empirical Bayes (EB) estimates for individuals’ deviation from the average treatment effect are presented in Table 21. None of the individuals had effects that differed significantly from the average treatment effect.
Table 20

Fixed Effects for Dyadic Parent-Child Interaction Coding System: Reflections

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Coefficient</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average baseline level</td>
<td>2.44**</td>
<td>0.61</td>
<td>0.76 – 4.12</td>
</tr>
<tr>
<td>Average treatment effect</td>
<td>9.93***</td>
<td>1.04</td>
<td>7.37 – 12.49</td>
</tr>
<tr>
<td>Average change in slope</td>
<td>2.49</td>
<td>0.61</td>
<td>-3.11 – 8.09</td>
</tr>
</tbody>
</table>

Note. CI = confidence interval, LL = lower limit, UL = upper limit.

* = p < .05, ** = p < .03, *** = p < .01

* Covariance parameter estimates of the variance components were 0.20 for baseline level, 0.75 for change in level, 0.09 for change in slope, -0.81 for autocorrelation, and 13.78 for level-1 variance.

Table 21

Empirical Bayes Estimates (EB) for Dyadic Parent-Child Interaction Coding System: Reflections

<table>
<thead>
<tr>
<th>Dyad</th>
<th>Baseline Level</th>
<th>Shift in Level</th>
<th>Slope in Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 1</td>
<td>2.78</td>
<td>10.05</td>
<td>2.42</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>2.42</td>
<td>10.67</td>
<td>2.40</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>2.26</td>
<td>9.26</td>
<td>2.67</td>
</tr>
<tr>
<td>Dyad 4</td>
<td>2.99</td>
<td>9.74</td>
<td>2.47</td>
</tr>
</tbody>
</table>

* = p < .05, ** = p < .03, *** = p < .01

Behavior descriptions. The average treatment effect at the end of CDI ($b = 13.13$, $p = 0.01$) was positive and statistically significant at the .05 level (see Table 22). This indicates the presence of an effect on the frequency of mothers’ use of Behavior Descriptions caused by the intervention. There is 95% confidence that the average treatment effect is within 4.78 and 21.48. The average change in slope (2.24) was positive but not statistically significant. Some variance was found in treatment effect (26.99) and change in slope (7.04) but these estimates were not statistically significant. Autocorrelation was not statistically significant at the end of CDI (-0.36). Empirical Bayes (EB) estimates for individuals’ deviation from the average treatment effect are presented in Table 23. None of the individuals had effects that differed significantly from the average treatment effect.
Table 22

**Fixed Effects for Dyadic Parent-Child Interaction Coding System: Behavior Descriptions**

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>SE</th>
<th>df</th>
<th>t</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average baseline level</td>
<td>0.27</td>
<td>0.44</td>
<td>5.89</td>
<td>0.62</td>
<td>-0.81 to 1.36</td>
</tr>
<tr>
<td>Average treatment effect</td>
<td>13.13***</td>
<td>2.71</td>
<td>3.19</td>
<td>4.84</td>
<td>4.78 to 21.48</td>
</tr>
<tr>
<td>Average change in slope</td>
<td>2.30</td>
<td>1.41</td>
<td>3.22</td>
<td>1.62</td>
<td>-2.04 to 6.63</td>
</tr>
</tbody>
</table>

*Note. CI = confidence interval, LL = lower limit, UL = upper limit.*

*Covariance parameter estimates of the variance components for average were 0.00 for baseline level, 26.99 for change in level, 7.04 for change in slope, -0.36 for autocorrelation, and 3.30 for level-1 variance.

*= p < .05, ** = p < .03, *** = p < .01

Table 23


<table>
<thead>
<tr>
<th>Dyad</th>
<th>Baseline Level</th>
<th>Treatment Effect</th>
<th>Change in Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 1</td>
<td>0.27</td>
<td>12.64</td>
<td>1.58</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>0.27</td>
<td>9.00</td>
<td>-0.96</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>0.27</td>
<td>20.37</td>
<td>4.35</td>
</tr>
<tr>
<td>Dyad 4</td>
<td>0.27</td>
<td>10.52</td>
<td>4.21</td>
</tr>
</tbody>
</table>

*= p < .05, ** = p < .03, *** = p < .01

**Pre- and Post-Intervention Data**

**Child Behavior Checklist (CBCL).** At screening (i.e., pre-intervention), all child participants had clinically elevated (*T*-scores ≥ 70) levels of externalizing behaviors as measured by the externalizing scale of the CBCL (see Figure 6). The scores at screening ranged from 73 to 77, with a mean of 75.33 and standard deviation of 1.70. After the completion of PCIT, these scores declined to sub-clinical levels (*T*-scores ≤ 60) for Dyad 1 and Dyad 3 but remained clinically elevated for Dyad 2. Specifically, post-intervention CBCL scores ranged from 62 to 72, with a mean of 66 and standard deviation of 4.32.
Figure 6. CBCL Externalizing Scale T-Scores at Screening and Post-Intervention

Therapy Attitude Inventory (TAI). Mothers’ satisfaction with the process and outcome of therapy was examined using the TAI (Eyberg, 1993). Specifically, mothers’ satisfaction with the type of treatment program, parenting skills learned, and changes in their child’s behavior were assessed. The TAI includes ten items rated on a 5-point scale ranging from 1 (i.e., dissatisfaction with treatment) to 5 (i.e., maximum satisfaction with treatment). Total scores fall between 10 and 50, with higher scores indicating high levels of satisfaction with the treatment. Dyads 1, 2, and 3 completed the TAI on the last day of treatment. Mothers’ Total score ratings ranged from 45 to 46, with a mean of 45.33 and a standard deviation of 0.47, which indicates that mothers were highly satisfied with this intervention overall. In regards to techniques of disciplining their child, two mothers indicated that they “learned very many useful techniques” (i.e., 5) and one mother indicated she “learned several useful techniques” (i.e., 4). Additionally, in regards to teaching their child new skills two mothers indicated they “learned several useful techniques” (i.e., 4) and one mother indicated that she “learned very many useful techniques” (i.e., 5). Two mothers reported their relationship with their child was “somewhat better than before” (i.e., 4) and one mother indicated it was “very much better than before” (i.e., 5). In regards to confidence in their ability to discipline their child, two mothers felt “much more
confident” (i.e., 5) and one mother felt “somewhat more confident” (i.e., 4). Two mothers rated their child’s major behavior problems and compliance as “greatly improved” (i.e., 5) from prior to PCIT until now and one mother felt it had “somewhat improved” (i.e., 4). In regards to progress made in their child’s general behavior, two mothers were “somewhat satisfied” (i.e., 4) and one mother was “neutral” (i.e., 3). When asked the degree that PCIT helped with other family or personal problems not related to their child, two mothers felt it “helped somewhat” (i.e., 4) and one mother felt it “neither helped nor hindered” (i.e., 3). Additionally, two mothers felt that the intervention used to improve their child’s behaviors was “very good “ (i.e., 5) and one mother rated it as “good” (i.e., 4). In regards to mothers’ overall feelings towards PCIT, all mothers reported that they “liked it very much” (i.e., 5).
Chapter Five:

Discussion

Children with ASD experience social functioning deficits that are associated with problems such as high rates of externalizing behaviors (Mazzone, Ruta, & Reale, 2012). It is essential for these children to receive early intervention because it has the potential to reduce behavioral problems associated with ASD (Wilkinson, 2014). Research indicates that interventions for children with ASD are more effective when they include a strong family involvement component (McConachie & Diggle, 2007). However, the list of evidence-based treatments for ASD does not include any parent training programs (National Autism Center, 2009). PCIT is an evidence-based intervention with a strong family component that can be implemented with children with ASD in order to address their high rates of disruptive behaviors.

The purpose of the current study was to extend the limited number of previous studies, which are mostly case studies, through the use of a more rigorous research design. Through the use of a non-concurrent multiple baseline design, the present study examined the impact of ASD on multiple outcomes including: (a) the frequency and severity of challenging behaviors exhibited by young children with ASD, (b) mothers’ parenting practices, and (c) mothers’ attitudes towards the therapy. This chapter provides a discussion of the results for each research question, presents the contributions of this research to the current literature base, and provides practice implications. Finally, the chapter concludes with a review of the limitations to the present study and future research directions.
The analyses indicated little to no effect on mothers’ ratings of their child’s challenging behaviors (i.e., ECBI). Results indicated there was evidence of an increase in mean verbalizations for mothers’ use of positive parenting skills (i.e., labeled praises, reflections, behavior descriptions). Furthermore, results indicated that mothers were highly satisfied with the intervention. Results from each research questions are described in detail in the following sections. An overview of visual analysis and HLM results is presented in Table 24.

Table 24

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Visual Analysis</th>
<th>Hierarchical Linear Modeling</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECBI Intensity Scale</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ECBI Problems Scale</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>DPICS Labeled Praises</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DPICS Reflections</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>DPICS Behavior Descriptions</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*X indicates treatment effect or statistical significance

Research Question One

The first research question asked if mothers’ perceptions of child challenging behaviors change, and if so to what degree, from baseline to the end of PCIT treatment. The measures used to examine children’s challenging behaviors, included the ECBI and CBCL.

All mothers rated the frequency of their child’s behavior problems, as measured by the ECBI Intensity scale, as clinically significant at screening. Three of the mothers decreased in their ratings at the end of the intervention; however, only one dyad’s ratings reduced to a sub-clinical intensity level. Results from visual analysis, effect sizes, and multi-level modeling indicated there was not a consistent decrease in intensity levels or an overall average decrease in the frequency of children’s behavior problems. However, results from visual analysis and effect sizes did indicate effects of the intervention for some participants. Specifically, visual analysis results indicate that two dyads experienced a significant decrease in their ratings of the frequency
of their child’s behavior problems and another dyad experienced a noticeable decrease. These dyads demonstrated moderate to strong nonparametric effect sizes. Nonetheless, HLM results did not yield any statistically significant results and therefore indicate little to no intervention effect.

At screening, three of the four mothers’ reported clinically significant challenging behaviors that are problematic to them, as measured by the ECBI Problem scale. Three of the mothers decreased in their ratings at the end of the treatment, two of which decreased to sub-clinical stress levels. Results from visual analysis, effect sizes, and multi-level modeling indicated there was not a consistent decrease in problem levels or an overall average decrease in mothers’ stress associated with their child’s behavior problems. However, results from visual analysis and effect sizes did indicate effects of the intervention for some participants. Specifically, visual analysis results indicate that one dyad experienced a significant decrease in stress associated with their child’s behavior problems and another dyad experienced a noticeable decrease. These dyads demonstrated moderate to strong nonparametric effect sizes. Nonetheless, HLM results did not yield any statistically significant results and therefore indicate little to no intervention effect.

Three of the four mothers who participated in the intervention completed the CBCL at screening and at the end of the intervention. At screening, all three mothers rated their child’s externalizing behaviors as clinically significant. All mothers declined in their ratings of their child’s externalizing behaviors from screening to the end of the intervention; however, only two of the mothers’ ratings reduced to sub-clinical levels at the end of the intervention.

Hypotheses have been considered regarding the lack of statistically significant decreases in the intensity of children’s challenging behaviors and the degree of problems associated with these behaviors, as rated by the ECBI. One potential hypothesis pertains to extinction bursts in
the challenging behaviors exhibited by the child participants. Children may have increased their demonstrations of challenging behaviors in an effort to obtain the reinforcement they previously received from their mothers for this behavior. In turn, these increases in children’s challenging behaviors might have resulted in consistent or even increased levels of maternal stress associated with the challenging behaviors. Although these challenging behaviors declined in the present study, the decreases were not statistically significant. Visual analysis suggests the occurrence of extinction bursts several times over the course of the intervention. Specifically, Dyad 1 demonstrated an increase in challenging behaviors during the first two weeks of the intervention and an increase in stress levels associated with the behaviors at the first week of the intervention, which is when mothers implemented planned ignoring in response to their child’s challenging behaviors. Furthermore, Dyad 3 demonstrated increased stress levels associated with the challenging behaviors at the start of the intervention. These extinction bursts are particularly important to note in the present study due to the limited amount of baseline points. Most dyads in the present study only completed two baseline data sessions, which limited the ability to establish stable baselines in the present study. In the present study, most dyads reported high T-scores on both the Intensity and Problem scale of the ECBI during the baseline phases, which further increased (i.e., extinction burst) for some mothers during the first few weeks of the intervention. This is important to consider because the lack of baseline stability and the further increases may have masked the later decreases and thus contributed to the lack of statistically significant decreases found in the present study.

Another hypothesis pertains to the adequacy of the PCIT manual in addressing the unique challenging behaviors presented by children with ASD and their mothers’ elevated and distinct stress levels. Research indicates that mothers’ of children with ASD have higher stress levels
compared to mothers of typically developing children and those with other disabilities (Davis & Carter, 2008; Dumas, Wolfe, Fisman, & Culligan; 1991). Research suggests that higher levels of autism symptoms were associated with higher levels of parental stress (Hastings & Johnson, 2001). In the present study, mothers with higher stress levels may have rated their child’s challenging behaviors more severely. Previous researchers examining the use of PCIT for children with ASD have highlighted the need for flexibility with the PCIT manual, as well as the need to spend additional time consulting with mothers of children with ASD (Agazzi et al., 2013; Solomon et al., 2008). In the present study, adaptations to the PCIT procedures were made for one of the dyads because the child was considered non-verbal. The adaptations made for this child align with those recommended for children with developmental disabilities (Bagner & Eyberg, 2007). Specifically, the adaptations made to PDI procedures included the following: (a) verbal command combined with gestural cue, (b) modeled commands, (c) physical commands, (d) introduction of time-out after child masters compliance three consecutive times, (e) time-out reduced to 25 seconds and 5 quiet seconds, and (f) time-out holding chair in place of time-out room for 10 seconds and 5 quiet seconds. Although these adaptations followed those recommended for children with developmental disabilities and were similar to those used by Lesack et al. (2014), they were not created specifically for children with ASD. The lack of formal adaptations and guidelines for children with ASD could have contributed to the lack of statistically significant results in the present study. Furthermore, although the therapists demonstrated flexibility (i.e., tailoring) in the time spent with the other mothers in the present study, no formal adaptations were made for these children, which could also have impacted the results in the present study.
A final hypothesis pertains to the unique challenging behaviors presented by young children with autism. Children with ASD are so affected by their disorder that it permeates daily life. Although the ECBI scores did not statistically decline to sub-clinical levels for the participants in this study, they should also be interpreted from a clinical standpoint. Children with ASD often engage in repetitive behaviors and exhibit strong resistance to changes in routines or patterns (Wilkinson, 2014). Due to the nature of ASD, this may have resulted in resistance from the children to change their behaviors to sub-clinical levels, which is often seen in PCIT. However, mothers who participated in the study endorsed that they liked the treatment and more specifically that they felt more confident in their techniques for managing their child’s behavior. Additionally, as previously stated although there was not a statistically significant decrease in challenging behaviors, the children did decrease over the course of treatment. Thus, it is important to note that the decrease in behaviors may be interpreted to be significant from a clinical standpoint. Specifically, it is difficult to change challenging behaviors in all children but especially in young children with ASD, which was done in the present study. Mothers also endorsed satisfaction with the treatment, which is important from a clinical standpoint because the mothers felt that they were better able to manage their child’s behavior and were more confident in their ability to do so. Finally, it may be that PCIT addresses certain issues in children with ASD (i.e., following directions) but does not address a range of behaviors, such as those measured by the ECBI. Therefore, it may be that the ECBI did not fully capture the progress children with ASD made during PCIT.

In sum, past literature indicates that the frequency of challenging behaviors exhibited by young children with ASD and the amount of problems they pose to their parents decrease to some degree at the end of PCIT. However, these studies (Agazzi et al., 2013; Armstrong &
Kimonis, 2012) demonstrated decreases lacking statistically significant and that did not reduce to sub-clinical levels. In contrast, other studies (Lesack et al., 2014; Solomon et al., 2008) demonstrated that children’s challenging behaviors reduced to sub-clinical levels after PCIT. The current study suggests that PCIT resulted in decreases in child challenging behaviors; however, these decreases were not statistically significant or reduced to sub-clinical levels for all participants. These findings may be due to the higher T-scores on the ECBI for the participants in the present study and the lack of adaptations made for the dyads.

**Research Question Two**

The second research question asked if mothers’ parenting practices (i.e., labeled praises, reflections, behavior descriptions) change, and if so to what degree, from baseline to the end of CDI. The DPICS was used to measure mothers’ parenting practices.

**Labeled praises.** Data analysis of mothers’ labeled praise skills indicated that all dyads increased in mean verbalizations of labeled praises from baseline to the end of CDI. Results from visual analysis, effect sizes, and multi-level modeling indicated an increase in labeled praise levels and an overall average increase in mothers’ use of this positive parenting skill. Specifically, visual analysis results indicated that all dyads experienced a significant increase in their use of labeled praises. Additionally, all dyads demonstrated strong nonparametric effect sizes (i.e., 100% or 1.00). As reported in Table 18, HLM analyses revealed several areas that were statistically significant. The average change in slope from baseline to the end of CDI was significant. The average treatment effect was also significant. Overall, these findings suggest that PCIT was effective in increasing mothers’ parenting practices (i.e., use of labeled praises) from baseline to the end of CDI.
**Reflections.** Data analysis of mothers’ reflection skills indicated that all dyads increased in mean verbalizations of reflections from baseline to the end of CDI. Results from visual analysis, effect sizes, and multi-level modeling indicated an increase in reflection levels and an overall average increase in mothers’ use of this positive parenting skill. Specifically, visual analysis results indicated that three dyads experienced a significant increase in their use of labeled praises and the other dyad demonstrated a noticeable increase. Furthermore, all dyads demonstrated moderate to strong nonparametric effect sizes. As reported in Table 20, HLM analyses revealed a statistically significant treatment effect. Overall, these findings suggest that PCIT was effective in increasing mothers’ parenting practices (i.e., use of reflections) from baseline to the end of CDI.

**Behavior descriptions.** Data analysis of mothers’ behavior description skills indicated that all dyads increased in mean verbalizations of behavior descriptions from baseline to the end of CDI. Results from visual analysis, effect sizes, and multi-level modeling indicated an increase in behavior description levels and an overall average increase in mothers’ use of this positive parenting skill. Specifically, visual analysis results indicated that three dyads experienced a significant increase in their use of behavior descriptions and the other dyad demonstrated a noticeable increase. Furthermore, all dyads demonstrated strong nonparametric effect sizes. As reported in Table 22, HLM analyses revealed a statistically significant treatment effect. Overall, these findings suggest that PCIT was effective in increasing mothers’ parenting practices (i.e., use of behavior descriptions) from baseline to the end of CDI.

Due to the fact that mothers’ are required to reach skill mastery prior to moving to the second phase of treatment, it was expected that there would be evidence of a treatment effect for mothers’ positive parenting practices. This finding aligns with previous research indicating that
mothers’ of children with disruptive behaviors improve in their parenting practices during PCIT (Eisenstad et al., 1993; Eyberg et al., 1995). Previous research examining PCIT for children with ASD also found that PCIT improved mothers’ use of positive parenting skills (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014). In the present study, mothers took between three and five weeks ($M = 3.75$, $SD = 0.83$) to reach mastery for the positive parenting skills. The mothers’ in the present study mastered the positive parenting skills quicker than the average length of time (i.e., six to seven sessions) indicated by the PCIT manual (Eyberg & Funderburk, 2011). The length of time for mastery is important to note because typical ABA based treatments for children with ASD often last for up to two to three years (National Autism Center, 2015). Children with ASD exhibit high rates of disruptive behaviors and mothers want a treatment that prioritizes these challenging behaviors before treating other behaviors associated with ASD (Masse, 2010). It may be that the mothers in the present study had elevated levels of dedication to treatment and mastering the positive parenting skills because of the unique and high levels of challenging behaviors associated with ASD (de Bruin et al., 2007).

In sum, past research indicates that PCIT results in improved positive parenting skills for mothers of children with ASD (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014). The findings of the current study align with past research findings and demonstrated that all mothers improved in their use of positive parenting skills. Therefore, PCIT appears to be an effective treatment for improving the parenting skills of mothers with children diagnosed with ASD.

**Research Question Three**

The final research question examined mothers’ satisfaction with PCIT (confidence in discipline skills, quality of parent-child interaction, child’s behavior, overall family adjustment)
at the end of treatment. The TAI was used to measure mothers’ level of satisfaction with treatment.

Three out of the five mothers recruited for the study completed the TAI on the last day of treatment. Mothers indicated high levels of satisfaction with PCIT. Specifically, two mothers indicated that they “learned very many useful techniques” for disciplining their child and one mother indicated she “learned several useful techniques. Two mothers indicated they “learned several useful techniques” for teaching their children new skills while one mother indicated that she “learned very many useful techniques.” Two mothers reported their relationship with their child was “somewhat better than before” and one mother indicated it was “very much better than before.” In regards to mothers’ confidence in their discipline abilities, two mothers felt “much more confident” and one mother felt “somewhat more confident.” Two mothers reported that their child’s major behavior problems and compliance had “greatly improved” from prior to PCIT until now and one mother felt it had “somewhat improved.” Two mothers were “somewhat satisfied” with the progress made in their child’s general behavior while one mother responded that she felt “neutral” in regards to the progress. Two mothers reported that PCIT “helped somewhat” with other family or personal problems not related to their child, while one mother felt that PCIT “neither helped nor hindered” with other problems. Additionally, two mothers felt that the intervention used to improve their child’s behaviors was “very good “ and one mother rated it as “good.” Finally, all mothers reported that they “liked it very much” when asked to report their overall feelings towards PCIT.

It was expected that mothers in the present study would be highly satisfied with PCIT. The findings of the present study align with previous research indicating that mothers of children with challenging behaviors are highly satisfied with PCIT (Bager & Eyberg, 2007; Eisenstadt et
al., 1993). Although the mothers that completed PCIT indicated high levels of satisfaction with treatment, only three out of the five mothers recruited for the study fully completed treatment. As previously stated, one dyad dropped out after baseline and another dropped out during PDI. Therefore, it is important to note that the results obtained from the TAI may have been biased as only mothers who went through the entire treatment completed the TAI. The rate of attrition in the present study was 40%, which is 7% higher than the rate of attrition in PCIT found by previous researchers. Specifically, Werba et al. (2006) found that 33% of families enrolled in PCIT dropped out of treatment. The rate of attrition for families of children with ASD enrolled in PCIT is unclear since three of the studies (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014) only included one participant and the other study (Solomon et al., 2008) involved a treatment and wait-list group. The existing studies examining the use of PCIT for children with ASD lacks a measure of treatment satisfaction; therefore the present study provides a unique contribution to the limited literature base (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014; Solomon et al., 2008).

Previous research suggests that mothers of children with challenging behaviors indicate high levels of satisfaction with PCIT (Bager & Eyberg, 2007; Eisenstadt et al., 1993). The current study aligns with previous research and suggests that mothers who complete PCIT report high levels of satisfaction with PCIT, as rated by the TAI. Therefore suggesting that PCIT is a satisfactory treatment for mothers of children with ASD. Mothers reported a lot of gains from participating in PCIT, such as improved confidence in managing their child’s behavior. This is especially important for mothers of children with ASD because they often experience high stress levels (Davis & Carter, 2008). However, these findings may be biased because only mothers who completed the entire treatment filled out the TAI.
**Contributions to Literature**

The findings of the present study extend upon the limited literature base pertaining to the use of PCIT for young children with ASD. The results from this study align with the findings from some previous researchers examining the use of PCIT to reduce challenging behaviors in children with ASD (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Solomon et al., 2008). The present study included multiple child participants with clinically significant ECBI and CBCL scores at baseline that decreased to some degree at the end of PCIT. However, these decreases lacked statistical significance and were not reduced to sub-clinical levels for all participants, similar to results found by Agazzi et al. (2013) and Armstrong and Kimonis (2012). In contrast, Solomon et al. (2008) utilized a larger sample size and found that children’s challenging behaviors reduced to sub-clinical levels on both the Problem and Intensity scales of the ECBI but these decreases were not statistically significant. In the present study mothers’ baseline T-scores on the Problem and Intensity scales were much higher than the baseline scores in the study conducted by Solomon et al. (2008), which is a potential reason for the difference in findings. Additionally, Lesack et al. (2014) utilized an adapted format of PCIT for seven months until parents’ ratings of child challenging behaviors reduced to sub-clinical levels on both the Problem and Intensity scales of the ECBI. A potential reason for the differing results in the present study pertains to the clinical nature of the study in which it was not possible to continue providing services for such a length about of time due to other constraining factors (e.g., insurance, family work schedule, school attendance). The changes made in the present study aligned with those used in the study conducted by Lesack et al. (2014); however, the length of treatment was shorter and did not require children too reach sub-clinical levels prior to discharge.
The results of this study align with those found by some previous researchers and provide unique contributions to the limited literature base. Specifically, all of the previous studies only employed one method of statistical analysis (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014) and just one of these studies involved the use of a wait-listed control group (Solomon et al., 2008). The present study involved the use of multiple data analysis techniques such as visual analysis and HLM in order to determine the presence of a treatment effect. There are many advantages to the design and analyses used in the present study. Single-case design is advantageous because it involves the establishment of experimental control, which is required in order to make causal inferences regarding the effects of a treatment (Kratochwill et al., 2010). Furthermore, the single-case design employed in the present study was practical from a clinical standpoint. Specifically, the design required a minimal number of participants but generated a lot of data through the collection of repeated measures (Kratochwill et al., 2010). In addition, the present study employed HLM as an additional method for data analysis, which increases the credibility of the results. Specifically, HLM provides a more sophisticated interpretation of treatment effects and allows researchers to answer a greater array of questions about the treatment (Parker & Vannest, 2012). Using HLM provides researchers with a method to examine average treatment effects and how those effects change over time. Furthermore, it can address variability among participants in the treatment effect, as well as whether characteristics of the cases account for this variation, which can not be done using solely visual analysis (Davis, Gagne, Fredrick, Alberto, Waugh, & Haardofer, 2012; Rindskopf & Ferron, 2014). Additionally, three of the studies were case studies and therefore only included one child participant. In the present study, four dyads participated in the intervention and three of them completed the entire length of the treatment. Furthermore, the four existing studies only included male child
participants while the present study included both male and female child participants. In sum, the present study may be the first study conducted to examine the effects of PCIT on behavior problems in young children with ASD and mothers’ parenting practices using comprehensive data analyses, female participants, and high levels of treatment fidelity and integrity.

Implications for Practice

The present study demonstrates that PCIT did not lead to statistically significant decreases in the challenging behaviors exhibited by young children with ASD. It may be that certain adaptations and/or modifications were needed in order to adapt to the unique needs of families of children with ASD. Although brief guidelines exist for adapting PCIT to be used with typically developing toddlers and developmentally delayed children there are not specifically designed for working with young children with ASD (Bagner & Eyberg, 2007; Lesack et al., 2014). During treatment, PCIT therapists commonly tailor sessions by changing their delivery style or the focus of essential elements in order to meet the needs of the family. In contrast to tailoring, adaptations involve changing the treatment model so that it may be used with a specific population or situation (Eyberg, 2005). Lesack et al. (2014) is one study that demonstrates that an adapted version of PCIT was successful at improving the behavioral outcomes of a young child with ASD. Specifically, the adaptations used by Lesack et al. (2014) that differed from the present study included the following adaptations to the time-out procedures: (a) time-out lasted 1 minute and 2 quiet seconds; and (b) time-out use was limited and used exclusively on two commands identified as safety concerns by the mother, as well as for aggression and/or intense disruptions. More importantly, the study conducted by Lesack et al. (2014) required child participants to reach sub-clinical levels on the ECBI prior to discharge, therefore treatment lasted seven months. In the present study adaptations were made for one participant; however, as
previously stated, the length of the intervention was much shorter because children were not required to meet sub-clinical levels prior to discharge. It is possible that the mothers in the experienced difficulty when implementing the skills outside of the clinic in their daily routines. Furthermore, children with ASD may require a longer lasting treatment in order to show a statistically significant decrease in challenging behaviors because of the severity and pervasiveness of their behaviors. As such, is it essential to examine and address the need for both an adapted PCIT treatment model and more stringent discharge criteria when working with young children with ASD and their families. Future studies should aim to determine the average length of treatment necessary for children with ASD to reach sub-clinical levels of challenging behaviors.

The findings from the present study indicate that PCIT is an effective intervention for improving mothers’ parenting practices. Previous research suggests that improved parenting practices results in improved parent-child relationships for mothers and their child with ASD (Agazzi et al., 2013; Armstrong & Kimonis, 2012; Lesack et al., 2014). According to the theoretical underpinnings of the CDI phase, which focuses on the use of positive parenting practices, mothers were taught skills that allowed them to pay attention to their child in a manner that strengthened their relationship and also built their confidence and self-esteem (Armstrong & Kimonis, 2012). Specifically, mothers’ were able to build a secure and stable relationship with their child through the use of techniques such as social attention and nondirective play (Ainsworth, 1989). These outcomes pose important implications for children’s development, as research suggests that a positive parent-child relationship is critical to the development of young children (Dawson & Ashman, 2000).
Finally, the CDI skills (i.e., positive parenting skills) used in PCIT could be implemented by other caretakers (i.e., teachers) and across environments (e.g., school, home). Given that mothers improved in their use of positive parenting practices in such a short amount of time and reported an improved relationship with their child, it may be beneficial to teach PCIT skills to teachers. Challenging behaviors and deficits in social functioning place children with ASD at a higher risk for social exclusion or isolation (Chung, Chung, Edgar-Smith, Palmer, & Huang, 2015; Montgomery et al., 2014). This is important to note because social exclusion is associated with poor student-teacher relationships for children with ASD in a general education classroom (Robertson, Chamberlain, & Kasari, 2003). Furthermore, mothers in the present study might have considered the information that they heard from their child’s teachers regarding their problematic behaviors in the school environment and incorporated this into their rating scales. Therefore, educating teachers on the use of the skills described in PCIT may result the development of positive student-teacher relationships for children with ASD.

**Limitations of the Present Study and Future Directions**

The findings of the present study contribute to the literature in several ways. However, there are some limitations to be noted and considered when interpreting the results. These limitations are discussed in detail and potential future directions for research are presented.

Intervention start points were pre-determined and baseline sessions were limited to a minimum of two baseline sessions, which may have prevented the establishment of stable baselines. Baseline lengths were pre-determined and limited to two sessions due to the clinical setting in which the study was conducted, which required that services be provided in a timely manner. As such, participants began baseline as they were referred to the study, which may have limited the amount of experimental control in the study especially pertaining to history effects. In
an attempt to address this limitation and adhere to WWC’s recommendation of at least three baseline points (Kratochwill et al., 2010) two additional baseline points were added for Dyad 4. Future studies should be conducted in a setting that allows for longer baseline sessions to ensure the establishment of stable baselines and improve the accurate identification of treatment effects.

An additional limitation of the study is small sample size. Although five families initially enrolled in the study, one dropped out after baseline and one dropped out during the second phase of the intervention. This small sample size may have hindered the accurate detection of treatment effects using multi-level modeling. Although the dropout rate in the present study was consistent with PCIT attrition rates (Gallagher, 2003) having more families would have strengthened the results of the present study. Additionally, the small sample size solely included young children with ASD, which may limit the generalizability of the results to a very specific population. However, it is important to note that the research is very limited on PCIT for ASD, thus the present study provides important information relevant to this specific population. Future studies should be conducted that include larger sample sizes in order to investigate the effectiveness of PCIT for young children with ASD with improved statistical power to gain further insight into the effects of the intervention for this specific population.

Another limitation pertains to the measures used in the present study. The majority of the results relied solely on mothers’ reports. Generalization of skills is particularly important for children with ASD (Burrell & Burrego, 2012) therefore, it may have been beneficial to obtain reports of the children’s behaviors in other settings by obtaining input from teachers using measures such as the Sutter-Eyberg Student Behavior Inventory (SESBI; Eyberg & Pincus, 1999) or the Child Behavior Checklist Teacher Report Form (CBCL-TRF; Achenbach, 1991). Additionally, the present study did not include a measure that examined specific symptoms of
ASD. Although measures of children’s challenging behaviors are important, it would have been beneficial to examine the effect of PCIT on symptoms specific to ASD (e.g., social communication, repetitive behaviors). A final limitation related to the measures used in the study pertains to the specificity of the CBCL as a measure of challenging behaviors. The CBCL does not incorporate a measure of compliance; however, in the present study the DPICS provided a measure of child compliance with commands. Future studies should include additional methods to measure children’s challenging behaviors in other settings, such as reports from teachers or other individuals in frequent contact with the child. Future studies should employ additional measures, such as the Autism Spectrum Rating Scales (ASRS; Goldstein & Naglieri, 2009) to examine specific symptoms of ASD in order to determine if they improve as a result of PCIT. Measures specific to compliance with parent commands should be included in future research.

Conclusions

There is a need for research to identify evidence-based interventions that involve parent training to address the challenging behaviors exhibited by young children with ASD. Children with ASD need to receive treatment as early as possible and if left untreated, the challenging behaviors they exhibit are unlikely to decrease (Wilkinson, 2014). Given the prevalence of comorbid disruptive behavior disorders in young children with ASD and the empirical support for PCIT, the current study examined the use of PCIT for behavioral outcomes in young children with ASD. Results indicated that PCIT significantly improved mothers’ use of positive parenting practices (i.e., labeled praises, reflections, behavior descriptions). Findings also indicated that mothers’ reported high levels of satisfaction with PCIT at the end of treatment. Additional research should identify effective strategies for reducing challenging behaviors exhibited by young children with ASD.
References


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Appendices
Appendix A: Parent Consent Form

Informed Consent to Participate in Research
Information to Consider Before Taking Part in this Research Study

IRB Study #Pro00016849

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: “Maternal health among mothers of children with autism spectrum disorder: The effect of PCIT on reducing maternal stress and symptoms of anxiety and depression.”

The person who is in charge of this research study is Heather Agazzi, Ph.D. 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 research will be conducted at the University of South Florida. This research is being sponsored by the USF Women’s Health Collaborative.

Purpose of the study
The purpose of this study is to:

- Determine if an evidence-based intervention, called Parent-Child Interaction Therapy (PCIT), is effective for reducing maternal stress and symptoms of anxiety and depression among mothers of children with autism spectrum disorder (ASD). Parent-Child Interaction Therapy is an evidence-based intervention developed by Dr. Sheila Eyberg that teaches parents how to manage their children’s behavior problems.

- The study will measure the impact of PCIT on the number of symptoms of stress, anxiety and depression reported by mothers. The study will also assess changes in
caregivers’ parenting practices and satisfaction with PCIT as well as the number and intensity of child behavior problems.

**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 of stress, anxiety and depression among mothers of children with ASD.

We are learning that PCIT is an effective treatment for children on the autism spectrum. 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 difficult behaviors, alleviate parent stress, and increase parents’ behavior management skills. Thus, we want to learn the effects of PCIT on the stress levels of mothers of children with ASD, as well as whether it has any effect on maternal reported symptoms of anxiety and depression.

**Why are you being asked to take part?**

- We are asking you to take part in this study because your child has been diagnosed with an ASD and displays intense levels of 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?**

If you choose to participate in this study, you will be asked to complete questionnaires about your child as part of a screening process. This study visit will take about 35 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 stress, symptoms of anxiety or depression, current parenting practices and your child’s problem behaviors, and any other existing clinical problems. The five children and mothers who are able to participate in this study will be asked to participate in two baseline observations before starting PCIT. Each baseline study visit will last 35 minutes. The baseline observations will be done so we can compare parents’ stress levels, symptoms of anxiety or depression, behavior management skills and children’s behaviors before and after PCIT. During baseline and treatment sessions, you will wear a blue-tooth device and be observed through a one-way mirror.

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 (or less) 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 you 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 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 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.

**Total Number of Participants**

Ten 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**

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 reduce your parenting stress or affect symptoms of anxiety or depression- that is why we are doing this study. By volunteering you are helping us learn more about parenting a child with ASD. We will learn more about what does or does not help families with this condition. What we learn may help others in the future.

**Risks or Discomfort**

There is minimal risk to participants; however, the following risks may occur:

- You may feel some stress when you are being trained in the use of new skills and coached through a one-way mirror via Bluetooth technology. Some mothers report feeling uncomfortable having someone watch them interact with their child initially, but typically report comfort with the procedures by the 2nd or 3rd visit.

- 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 symptoms of stress, anxiety or depression.

If you experience any of these risks or discomfort, please call the PI, Heather Agazzi, Ph.D., 813-974-0603 or e-mail anytime at hcurtiss@health.usf.edu.
Compensation
You will be paid $10 after the first baseline study visit, $10 half way through PCIT, $10 after you complete PCIT, and $10 after the three-month follow up session for a total amount of up to $40.

Cost
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 but a sliding scale is available to those who report financial hardship. The sliding scale rate is: $35 for a 45-60 min. session and $45 for a 70 min. plus session. Your time during screening, baseline observations, and completion of questionnaires is not part of the bill for PCIT. The total cost of the intervention will depend on the number of PCIT sessions you attend.

Authorization to Use and Disclose Protected Health Information
Who will see your health information?
In this research study, we use and share your 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 identifiable health information. If you authorize us to use your 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 you for research purposes within the USF health care system. You are also allowing USF to share your 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 information?
To conduct this research, USF and the people and organizations below may use or share your information. They may only use and share your 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 you and may use the information to conduct the research:
• The medical staff that takes care of you and those who are part of this research study;

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 information with them. If you have questions about who they are, you should ask the study team. Individuals who receive your health information for this research study may not be required by the HIPAA Privacy Rule to protect it and may share your 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 information with others. If the sponsor or others share your information, your 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 health information as described in this document for any and all study/research related purposes. Your authorization to use your 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, substance abuse, 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 you will not be able to take part in this research study and therefore not be able to receive the research related interventions. However, your health care outside of this study and benefits will not change.
How Do I Withdraw Permission to Use My 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 health information in the research. If you revoke your permission:

- You will no longer be a participant in this research study;
- We will stop collecting new information about you;
- 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:
Heather Agazzi, Ph.D.
For IRB Study # Pro00016849
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 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 have to break confidentiality if you disclose thoughts of harming yourself or another person, including child abuse or if your child discloses child abuse.

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 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. If we discover that your child is receiving applied behavior analysis while receiving PCIT, we will withdraw your child from the study, but not PCIT.

You can get the answers to your questions, concerns, or complaints.
If you have any questions, concerns or complaints about this study, call Heather Agazzi, Ph.D., 813-974-0603.

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 Parent Taking Part in Study

Date

Printed Name of Parent Taking Part in Study

Printed Name of Child 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 B: 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 #Pro00016849

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: “Maternal health among mothers of children with autism spectrum disorder: The effect of PCIT on reducing maternal stress and symptoms of anxiety and depression.”

The person who is in charge of this research study is Heather Agazzi. 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 research will be conducted at the University of South Florida. This research is being sponsored by the USF Women’s Health Collaborative.

Why is this research being done?
• The purpose of this study is to determine if Parent-Child Interaction Therapy (PCIT) may improve symptoms of anxiety and depression as well as decrease stress among mothers of children with ASD.

We need to learn more about the efficacy of PCIT for children and their mothers. Therefore, we are offering this study to children with ASD and their mothers who are not participating in another form of behavior intervention. If your child is participating in applied behavior analysis (ABA) then he/she 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 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 has a diagnosis of ASD 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 as part of a screening process. This study visit will take about 35 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 stress, symptoms of anxiety or depression, current parenting practices and your child’s problem behaviors, and any other existing clinical problems. The five children and mothers who are able to participate in this study will be asked to participate in two baseline observations before starting PCIT. Each baseline study visit will last 35 minutes. The baseline observations will be done so we can compare parents’ stress levels, symptoms of anxiety or depression, behavior management skills and children’s behaviors before and after PCIT. During baseline and treatment sessions, you will wear a blue-tooth device and be observed through a one-way mirror.

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 (or less) 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 you 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 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 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, $10 half way through PCIT, $10 after you complete PCIT, and $10 after the three-month follow up session for a total amount of up to $40.

**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 but a sliding scale is available to those who report financial hardship. The sliding scale rate is: $35 for a 45-60 min. session and $45 for a 70 min. plus session. Your time during screening, baseline observations, and completion of questionnaires is not part of the bill for PCIT. 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 reduce your parenting stress or affect symptoms of anxiety or depression— that is why we are doing this study. By volunteering you are helping us learn more about parenting a child with ASD. We will learn more about what does or does not help families with this condition. What we learn may help others in the future.

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

There is minimal risk to participants; however, the following risks may occur:

- You may feel some stress when you are being trained in the use of new skills and coached through a one-way mirror via Bluetooth technology. Some mothers report feeling uncomfortable having someone watch them interact with their child initially, but typically report comfort with the procedures by the 2nd or 3rd visit.
- 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 symptoms of stress, anxiety and/or depression and may not lead to a decrease in your child’s behavior problems.

If your child experiences any of these risks or discomfort, please call the PI, Heather Agazzi, Ph.D., 813-974-0603.

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:
Heather Agazzi
For IRB Study # Pro00016849
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:

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:

Heather Agazzi
For IRB Study # Pro00016849
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 have to break confidentiality if you disclose thoughts of harming yourself or another person, including child abuse or if your child discloses child abuse.

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. If we discover that your child is receiving applied behavior analysis while receiving PCIT, we will withdraw your child from the study, but not PCIT.

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

If you have any questions, concerns or complaints about this study, call Heather Agazzi, Ph.D. at 813-974-0603.
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

_____________________________
Printed Name of Person Obtaining Informed Consent
Appendix C: Demographic Questionnaire

Parent Child Interaction Therapy for ASD
Demographic Questions

Are you the child's:
- Biological Parent
- Adoptive Parent
- Foster Parent
- Grandparent
- Other: __________

Your marital status:
- Married
- Single
- Divorced
- Separated
- Widowed
- Other: __________

Your Age: __________

Are you currently employed?
- Yes
- No

Does your child currently receive any therapies or services?
- None
- Speech/Language Therapy
- Physical Therapy (PT)
- Occupational Therapy (OT)
- Early Intervention (Early Steps)
- Special Education (School IEP)
- Individual Counseling/Therapy for: ____________________________
- Group Counseling/Therapy for: ____________________________
- Other therapies/services: ____________________________

Does your child currently attend school or daycare?
- Home with parent/relative
- Daycare (friend/relative)
- Daycare (professional)
- Preschool
- Voluntary Pre-Kindergarten
- Elementary School
- Other: ____________________________

What racial group do you identify with?
- African American/Black
- American Indian/Alaskan Native
- Asian/Asian Indian Caucasian/White
- Hawaiian/Pacific Islander
- Other: ____________________________

What ethnic group do you identify with?
- Hispanic or Latino
- NOT Hispanic or Latino

What is your highest level of education?
- Less than high school
- Completed high school
- Technical school degree
- Two-year college degree
- Four-year college degree
- Graduate degree
Appendix D: IRB Approval

5/5/2014

Heather Agazzi, Ph.D.
Pediatrics
13101 N. Bruce B. Downs Blvd
Tampa, FL 33612

RE: Full Board Approval for Initial Review
IRB#: Pro00016849
Title: Maternal health among mothers of children with autism spectrum disorder: The effect of PCIT on reducing maternal stress and symptoms of anxiety and depression

Study Approval Period: 4/18/2014 to 4/18/2015

Dear Dr. Agazzi:

On 4/18/2014, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents outlined below.

Approved Item(s):
Protocol Document(s):
Protocol

Consent/Assent Document(s)*:
Parent consent.pdf
Parent Permission Form PCIT-ASD 3-27-14.doc.pdf

Consent/Assent Script(s):
Child assent for 7 years and older.
Informed Consent Script no screening questions.doc

*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).
Your study qualifies for a waiver of the requirements for the documentation of informed consent as outlined in the federal regulations at 45CFR46.117(c) which states that an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either: (1) That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or (2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context.

This research involving children 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,

Kristen Salomon, Ph.D., Vice Chairperson
USF Institutional Review Board
Appendix E: Diagram of PCIT Setting