View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Lehigh University: Lehigh Preserve

Lehigh University
Lehigh Preserve

Theses and Dissertations

2014

Level of Parent Involvement in a Multicomponent Treatment Package as a Predictor of Overall Behavioral Effects in Preschool Children At-Risk for ADHD

Lauren Cara Dullum-Moulton
Lehigh University

Follow this and additional works at: http://preserve.lehigh.edu/etd


Part of the Education Commons

Recommended Citation
Dullum-Moulton, Lauren Cara, "Level of Parent Involvement in a Multicomponent Treatment Package as a Predictor of Overall Behavioral Effects in Preschool Children At-Risk for ADHD" (2014). *Theses and Dissertations*. Paper 1477.

This Dissertation is brought to you for free and open access by Lehigh Preserve. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of Lehigh Preserve. For more information, please contact preserve@lehigh.edu.

Level of Parent Involvement in a Multicomponent Treatment Package as a Predictor of Overall Behavioral Effects in Preschool Children At-Risk for ADHD

by

Lauren Dullum-Moulton

Presented to the Graduate and Research Committee

of Lehigh University

in Candidacy for the Degree of

Doctor of Philosophy

in School Psychology

Lehigh University

March 2014

Copyright by Lauren Dullum-Moulton
2014

Certificate of Approval

Approved and recommended for acceptance as a dissertation in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

_____

Date

_____

George J. DuPaul, Ph.D.
Dissertation Director
Professor of School Psychology
Chair, Education and Human Services

_____

Accepted Date

Committee Members:

_____

Patricia Manz, Ph.D.
Associate Professor of School Psychology
Program Director

_____

Lee Kern, Ph.D.
Professor of Special Education
Program Director

_____

Barry L. McCurdy, Ph.D.,NCSP, BCBA-D
Director, Institute of Clinical Training and Research
Director, Center for Effective Schools
The Devereux Foundation

Acknowledgements

Without the support of many, this dissertation would not have come to fruition. First, thank you to my advisor, Dr. George J. DuPaul. His unwavering support was essential in my completion of the program as well as this dissertation. He never let me feel as though he had given up on me even when I went off-track and considered giving up myself. I would also like to thank my dissertation committee, Drs. Lee Kern, Patricia Manz, and Barry McCurdy. I am very grateful for the time, support and consideration you gave to this project.

I would also like to thank a very special friend, Dr. Kate Tresco, who provided assistance, guidance, and shared her expertise in statistics. She also offered emotional support and encouragement on a personal level, visiting me weekly as I laid hospitalized for 9 weeks fearing for the lives of my unborn twins. I looked forward to those visits. I cannot thank you enough for all you have done for me.

Finally, I owe so much to my family. My parents, John and Marylou Dullum made many sacrifices so I could receive the education I did. They instilled in me the importance of hard work and setting high expectations. They helped me develop into the woman I am today and I am eternally grateful for all they have done for me. I would also like to thank my husband, Steven, for believing in me and supporting me and my children, Addison, Owen, and Kendall who redefined my purpose in life and love me for just being "Mommy." In fact, I write this page with my 4-month old twins sitting in my lap and I realize the completion of this final hurdle serves perhaps most importantly as a lesson to my children of the importance of following your dreams and working hard even when it seems overwhelmingly impossible.

I dedicate this dissertation to my father, John R. Dullum, who passed away before I finished. He never got to see me complete my dream, and I think his dream as well. I hope he can see me now and that I have his admiration as he has mine. I finally finished, Daddy!

Table of Contents

List of Tables

Abstract

Attention deficit hyperactivity disorder (ADHD) is the most diagnosed form of psychopathology in the preschool population (Armstrong & Nettleton, 2004) with recent research suggesting approximately 12% of the preschool population meets diagnostic criteria for ADHD (Lavigne, LeBailly, Hopkins, & Binns, 2009). Potential negative outcomes of ADHD include hyperactivity, concentration difficulties, discipline problems, tantrums, attention seeking behavior, and poor sibling relationships (Lee et al., 2007). Long-term follow-up studies have indicated a high stability of these characteristics resulting in a range of potential negative outcomes (Lee, Lahey, Owens, & Hinshaw, 2007; Lahey, Pelham, Loney, Kipp, Ehrhardt, Lee, et al., 2004). With a sample of 71 preschool-aged children at risk for ADHD, the current study evaluated the impact of parent participation, defined as dosage, in a multi-component treatment protocol including family education and consultation based on individualized assessment-based intervention in the home setting on behavioral outcomes for young children at-risk for ADHD at baseline and 1 year post-enrollment. Results indicate greater dosages of parent involvement in family education and consultation did not result in a statistically significant improvement in positive behavior ratings including social skills, conduct problems, oppositional behavior and did not have a positive influence on parent-child interactions. However, the magnitude of variance accounted for in the models investigating family education and deviant behavior, consultation and social skills, and consultation and parent-child interactions was nearly in the moderate range, suggesting insufficient power likely impacted the lack of statistically significant results. Results indicate numerous families did not engage in the interventions provided, therefore recommendations for improving family access to interventions in practice are discussed as well as areas for future research.

Level of Parent Involvement in a Multicomponent Treatment Package as a Predictor of Overall Behavioral Effects in Preschool Children At-Risk for ADHD

Chapter 1: Statement of the Problem

Attention Deficit/Hyperactivity Disorder (ADHD) comprises pervasive problems of inattention, hyperactivity, and impulsiveness, and is one of the most prevalent childhood psychiatric disorders (Barkley, 2006). Although difficulties exist in diagnosing preschool children with ADHD, research has suggested that approximately 12% of the preschool population meet diagnostic criteria for ADHD (Lavigne, LeBailly, Hopkins, Gouze, & Binns, 2009). Future prevalence rates place at least one child with ADHD in every classroom in America, making it one of the most prevalent mental health disorders of childhood (Froehlich et al., 2007). Children with ADHD tend to exhibit problem behaviors in both home and school settings (Barkley, 2006). Preschool aged children at-risk for ADHD present within similar psychosocial impairments in relationships and functioning in the home and school setting similar to their school-aged counterparts in terms of prevalence rates, subtypes, and gender differences (Egger, Kondo, & Angold, 2006). Long-term follow up studies have indicated a high level of stability of these characteristics continuing from preschool through the elementary years resulting in a range of future negative outcomes (Lahey, Pelham, Loney, Kip, Ehrhardt, Lee, et al., 2004); Lee, Lehay, Owens, Hindshaw, 2008). Potential future outcomes include hyperactivity, concentration difficulties, discipline problems, tantrums, attention seeking behavior, negative peer regard, and poor sibling relations in children whose problems continued in elementary school (Lahey, Pelham, Looney, Lee, & Wilcutt, 2005).

Pharmacological Treatment

Research suggesting the magnitude and stability of these problems has led to the investigation of ways to ameliorate pervasive ADHD symptoms. Pharmacological and behavioral interventions have been used most often. It has been estimated that 4.5% of 4- to-17-year old children are treated with a stimulant for ADHD (Mayes, Bagwell, Erkulwater, 2008). Zito and colleagues (2000) have reported a threefold increase in stimulant prescriptions for 2- to 4- year-old children and found that approximately 1.2% of the preschool population are prescribed stimulant medication, presumably for the treatment of ADHD (Zito et al., 2000). Methylphenidate has become the most commonly used pharmacological treatment for symptoms of ADHD presenting before age 6 (Zito et al., 2000). With increasing rates of these prescriptions for this population, concerns have been raised that little is known about the safety and efficacy of medications in preschool aged children (Greenhill et al., 2003). The safety and efficacy of methylphenidate in preschoolers with ADHD continues to be investigated. The American Academy of Pediatrics (2011) has recommended stimulants not be the first-line treatment for ADHD symptoms in young children.

The Preschool ADHD Treatment Study (PATS) was designed to evaluate the efficacy and safety of methylphenidate for preschoolers with ADHD using a controlled multisite trial. The PATS trial determined the optimal methylphenidate doses for preschool children with severe symptoms of ADHD, the efficacy of methylphenidate, as well as their safety profile on methylphenidate. While behavioral outcome measures used in this study suggest that preschool children with ADHD benefit from treatment with methylphenidate, the frequency of adverse side effects was greater when compared to school aged children with ADHD (Greenhill et al., 2006). These adverse events included emotionality irritability, appetite loss, trouble sleeping, stomachaches, social withdrawal, lethargy, and high blood pressure (Greenhill et al., 2006).

Behavior Management Techniques

Family education. Family education in behavior management for children engaging in disruptive behaviors has appeared readily in the research as another treatment for challenging behavior. Raising a child with ADHD can increase levels of parental stress, diminish parental sense of competence, and thus strain family functioning (Egger et al., 2006). Parents may in turn develop a pattern of maladaptive and counterproductive parenting strategies (Deault, 2010) subsequently impairing the parent-child relationship (Ficher, 1990). This highlights the need to teache parents more effective strategies for managing these challenging behaviors (Chronis, Pelham, Gnagy, Roberts, & Arnoff, 2003). Thus, parenting practices have become a prime target for intervention.

Behavioral family education is one of the most widely used behavioral interventions for parents of children with ADHD (Barkley, 2006). Reviews on behavioral parent training (BPT) for externalizing behavior problems support the use of behavioral family education for children described as ADHD, oppositional, antisocial, and/or disruptive (Eyberg, Nelson, & Boggs, 2008; Lundhal, Risser, & Lovejoy, 2006), with family education meeting criteria as a well-established treatment for children with ADHD (Pelham & Fabiano, 2008). Previous researchers have provided evidence that family education in behavior management procedures for children with ADHD improve parent-child interactions by increasing child-compliance, use of appropriate parental commands, knowledge of appropriate parenting techniques, and positive parental statements (McGoey, Eckert, & DuPaul, 2002). Behavioral family education familiarizes parents in the use of behavior modification. Parents are taught to define behavior problems, implement assessment measures that further define the problem and its intensity, and educate parents in the

treatment plans that would be appropriate for the problems within their individualized context (Antshel & Barkley, 2008).

A number of behavioral parent-education programs have been supported by efficacy studies describing the outcomes for families that complete the treatment (Lonigan, Elbert, & Johnson, 1998). In a review of evidence-based psychosocial treatments for ADHD, Pelham and Fabiano (2008) reviewed 22 studies that investigated behavioral family education for children with ADHD since 1998. The behavioral family education programs were typically group-based and consisted of 8 to 16 sessions using manualized education programs. Review of this compilation of research revealed that behavioral family education interventions now clearly meet criteria for a well-established treatment for ADHD. These criteria were operationalized by the American Psychological Association (APA) Division 53, the Society of Clinical Child and Adolescent Psychology (Lonigan, et al., 1998). Expanding on and quantitatively validating Pelham and Fabiano (2008), Fabiano et al. (2009) completed a comprehensive research synthesis reviewing 174 studies of behavior modification treatments, including behavioral family education, and study designs since the first identified ADHD treatment paper published in 1976. Results offered overwhelming support for the effectiveness of behavioral treatments for ADHD, resulting in improved functioning of children with ADHD.

Differential effectiveness of family education has been noted in the research (Pelham & Fabiano, 2008). This has led researchers to examine a variety of child, parental, and familial variables that may predict treatment response. In a meta-analysis conducted by Reyno and McGrath (2006), family education literature was examined to isolate child, parent, and family variables that predict response to family education for child externalizing behavior problems. It was concluded that response to family education is often influenced by variables not directly

involving the child, with socioeconomic status and maternal mental health being particularly salient factors.

Previous researchers have provided evidence that family education in behavior management procedures for children with ADHD improve parent-child interactions by increasing child-compliance, use of appropriate parental commands, knowledge of appropriate parenting techniques, and positive parental statements (McGoey, et al., 2002). Most of this research has been conducted with the elementary school aged population. Despite this research base, there is a dearth of knowledge focusing on the treatment of young children at-risk for ADHD relative to the established research base of established treatment effects for elementary aged children with ADHD. The dearth of applicable research has left practitioners with the burden of transferring information from the literature on elementary school students with ADHD to the preschool population (McGoey, et al., 2005). The difficulty in transferring this information resides in the fact that preschool children with ADHD are significantly different from elementary school children in terms of overall developmental and behavioral expectations in the home and school settings. Similarly, parenting strategies differ for young children relative to older children (McGoey, et al., 2005).

A scarcity of studies exist utilizing family education in behavior management techniques to improve the behavior of preschool children with ADHD. Successful behavior management interventions have included reinforcing children's appropriate behavior, giving children effective directions and requests, teaching methods of self-control, and using consistent methods of discipline (McGoey, et al., 2002). A study conducted by McGoey and colleagues (2005), examined the outcome associated with an early intervention protocol combining family education and teacher consultation in behavioral techniques for young children at-risk for

ADHD. Results indicate the treatment group exhibited moderate increases in positive parenting behaviors and reductions in negative parent behavior across parent-directed and parent-supervised situations. Interestingly, child-compliance was not increased over and above changes found in the control group, despite the fact that this child behavior was specifically targeted in family education.

Sonuga-Barke and colleagues (2001) investigated the use of family education for preschool aged children with ADHD using the New Forrest Parenting Program. Treatment was provided in the home and was delivered by skilled specialist nurse-therapists. Results indicated family education using the New Forrest Parenting Program was associated with significant reductions in ADHD symptoms and a significant increase in maternal adjustment (Sonuga-Barke, Daley, Thompson, Laver-Bradburry, & Weeks, 2001). In a follow-up study, Sonuga-Barke and colleagues (2006) used an identical protocol to the one used in Sonuga-Barke et al, 2001 except the family education program was delivered by non-specialist nurses. Results indicated no significant improvements in ADHD symptoms suggesting children treated by nurses with experience working with children with ADHD experienced better outcomes compared to those working with unskilled nurses (Sonuga-Barke, et al., 2006).

Additionally Webster-Stratton and colleagues (2011) investigated the efficacy of a family education program for families of young children with ADHD. The combined parent and child program of the Incredible Years training program was utilized with young children with ADHD (ages 4 – 6). Results indicated mothers' reported significant parenting changes in appropriate and harsh discipline, use of physical punishment, and monitoring. Fathers did not report significant changes in parenting. Further, mothers and fathers alike reported treatment effects for ADHD symptoms (Webster-Stratton, Reid, & Beauchaine, 2011).

Functional behavior analysis/ functional analysis. Functional behavior analysis consists of a series of conditions in which the consequences resulting from inappropriate behavior are systematically manipulated while the effects of these consequences on a child's behavior are observed directly (Wacker et al., 1998). For example, relative changes in the rate of behavior across assessment conditions are compared to a control condition in which no external consequences are provided for the inappropriate behavior to determine which consequences reinforce or increase the occurrence of aberrant behavior. This assessment usually is conducted using a single-case experimental design with the participant also serving as the control (Wacker et al., 1998). Treatment is based on the results of the functional analysis. The consequence that has been identified as reinforcing the inappropriate behavior is withheld when inappropriate behavior occurs and is only delivered when a more adaptive behavior is exhibited (Wacker et al., 1998). If a function for a problem behavior is identified, the possible effectiveness of the intervention will presumably increase (Marcus, Swanson, & Vollmer, 2001; Wacker, et al., 1998). However, it should be noted that several studies have been conducted demonstrating that participants responded differently during functional analysis depending on the therapist conducting the assessment (English & Anderson, 2004; Ringdahl & Sellers, 2000).

Most studies involving functional analyses take place in the hospital or clinic setting with a person trained in applied behavior analysis conducting the analyses (Huete & Kurtz, 2010). Completing these analyses in an unfamiliar setting with persons not familiar with the client has brought the social validity of this into question (English & Anderson, 2004). In a study using a single-subject design including 5 children with intellectual disabilities, Heute and Kurtz (2010) found that conducting analog functional analyses with different therapists can result in different outcomes and this difference appears more pronounced for functional analyses with children

under 5 years of age. This suggests that when the caregiver can serve as the therapist in the functional analysis, conducting the analysis with both staff and caregiver may yield important information.

Kern and colleagues (2007) investigated a multicomponent intervention package, which included functional behavior assessment and functional analysis, with preschool-aged children at-risk for ADHD. Results indicated there were no significant group differences between the treatment and control group. Low participation rates in all three intervention components were reported as an aggregate measure, but percentages of participation in each intervention component was not provided. Authors note the need to parcel out the dosage defined as the comprehensiveness and intensity of the home-based intervention necessary to produce meaningful differences.

Based on the literature evaluating functional analysis and its effects, a gap becomes apparent in which little emphasis has been placed on functional analysis in the home, with most literature discussing functional analyses in the school setting or clinic setting. This gap can be problematic considering preschoolers spend most of their day in the home. Further, there is a dearth of research investigating functional analysis with preschool aged children at-risk for ADHD.

Dosage

Although behavioral family education and behavior management techniques have garnered support from the literature, very little is known regarding the dosage or intensity of behavioral interventions required to produce clinically meaningful effects for children with ADHD (Pelham & Fabiano, 2008). Numerous single-subject design studies suggest that more intensive treatment components are more effective than less intensive ones (e.g., Abramowitz et

al., 1992; Northup et al., 1999). In an investigation conducting a series of large crossover and between-group studies examining the comparative and combined impacts of different doses on behavioral interventions (none, low, and high) and methylphenidate (placebo, .15., .3, and .6 mg/kg per dose t.i.d.), results showed that the higher dose of behavior intervention was more effective than the lower dose on multiple measures of functioning (Fabiano et al., 2007; Pelham, Burrows-MacLean et al., 2008). To this date, there are no studies that investigate the impact of dose of interventions with preschool children at-risk for ADHD.

The amount of intervention received, or dose can vary based on parent engagement in the treatment. It appears from the literature that therapeutic engagement is an important construct in behavioral interventions for childhood disorders (Khanna & Kendall, 2009; Nix, Bierman, McMahon, & The Conduct Problems Research Group, 2009), however, review of the literature reveals there is little consensus on the definition of engagement (Tetley, Jinks, Huband, & Howells, 2011; Power et al., 2005). The concept of parent engagement has been defined in various ways including parent attendance (e.g., Baker, Roland, & Meagher, 2011; Arnold, Bayder, Reid, & Webster-Stratton, 2003), homework completion (Fabiano et al., 2009; Kazantzis & Lampropoulos, 2002) and treatment attrition rates (e.g., Boggs et al., 2004). Engagement has also been defined as attendance at the sessions and adherence to the intervention (Nock & Ferriter, 2005) and participant responsiveness (Dane & Schneider, 1998; Power et al., 2005). Power and colleagues (2005) present a reconceptualization of integrity that includes the traditional conceptualization of integrity as provider implementation but also includes participant engagement as a second component. Within this multidimensional concept of integrity, participant engagement is a function of the dosage received and responsiveness (Power et al., 2005).

Nix et al. (2009) measured dosage as attendance and the quality of parent participation, which included adherence defined as completion of between-session homework and implementation of skills during sessions. Results indicated the quality of parent participation contributed to parenting outcomes, however they did not measure the impact of engagement on child outcomes. Clarke and colleagues (2013) investigated parent engagement as a predictor of parent and child behaviors. Engagement was defined as attendance to sessions and adherence was defined as homework compliance. Results indicated that adherence to assigned therapeutic tasks (i.e., homework) was a stronger predictor of intervention response explaining more outcomes and greater variability in both parent and child outcomes.

The success of family education and consultation, including functional behavior assessments (FBA) and brief functional analyses (BFA) as individual treatment components for children with behavioral disorders and elementary aged children with ADHD has been documented in the literature. Considering this support coupled with the effectiveness of preliminary research with preschool aged children at-risk for ADHD, the current study is designed to examine the effectiveness of family education and individualized behavior management techniques derived from FBA and BFA as an intervention for challenging behavior displayed by preschool children at-risk for ADHD. Although family education programs for children with challenging behaviors have been shown effective in improving the behavior of children with challenging behavior, specific examination of longitudinal behavioral outcomes of preschool children at-risk for ADHD, taking into account varying levels of parent participation defined as dosage, have not been included.

Purpose, Research Questions, Hypotheses

The purpose of the present study was to examine the relationship between dosage of behavior management supports including family education, functional behavior assessment/brief functional analysis, and consultation and subsequent behavioral outcomes. Dosage of behavior management supports were determined first by the number of family education sessions attended. A secondary measure of dosage was determined by the number of consultation services parents participated in. This would include an FBA, BFA, and ongoing home consultation sessions. Specifically, the following research questions and hypotheses were examined:

Research Question 1

What is the relationship between dosage of parent involvement in family education and subsequent ratings of oppositional behavior, conduct problems, and social skills following 12 months of entrance into the study, beyond what is accounted for by severity of ADHD symptoms and demographic characteristics?

Hypothesis 1. Based on theoretical and conceptual assumptions, it was hypothesized that the dosage of parent involvement in family education would predict subsequent levels of deviant behavior defined as oppositional behavior and conduct problems. High levels of parent involvement in family education would predict lower levels of child oppositional behaviors and child conduct problems as measured by rating scales.

Hypothesis 2. Based on theoretical and conceptual assumptions, it was hypothesized that the dosage of parent involvement in family education would predict subsequent levels of social skills. High levels of parent involvement would predict more favorable levels of social skills measured by parent ratings.

Research Question 2

What incremental value does the dosage of consultation, which includes individualized assessment-based interventions, provide when evaluating subsequent ratings of oppositional behavior, conduct problems, and social skills following 12 months of entrance into the study, beyond what is accounted for by severity of ADHD symptoms and demographic characteristics?

Hypothesis 3. Based on theoretical and conceptual assumptions, it was hypothesized that the dosage of parent involvement in consultation in addition to their involvement in family education would predict improvement incrementally in subsequent levels of deviant behavior defined as oppositional behavior and conduct problems. High levels of parent involvement in consultation and family education would predict lower levels of child oppositional behaviors and child conduct problems as measured by rating scales.

Hypothesis 4. Based on theoretical and conceptual assumptions, it was hypothesized that the dosage of parent involvement in consultation which includes individualized assessment-based interventions in addition to their participation in family education would predict incremental improvement on subsequent levels of social skills. High levels of parent involvement would predict more favorable levels of social skills measured by parent ratings.

Research Question 3

What is the relationship between dosage of parent involvement in family education and subsequent parent-child interactions following 12 months of entrance into the study beyond what can be accounted for by severity of ADHD symptoms and demographic characteristics.

Hypothesis 5. Based on theoretical and conceptual assumptions, it was hypothesized that high dosages of parent involvement in family education, would have a positive influence on parent-child interactions. High levels of parent involvement would predict an increase in a composite

score of positive behaviors and a concomitant reduction in a composite score of negative behaviors observed during parent-child interactions.

Research Question 4

What incremental value does the dosage of consultation, which includes individualized assessment-based interventions provide when evaluating subsequent parent-child interactions following 12 months of entrance into the study beyond what can be accounted for by severity of ADHD symptoms and demographic characteristics.

Hypothesis 6. Based on theoretical and conceptual assumptions, it was hypothesized that the dosage of parent involvement in consultation in addition to their involvement in family education would predict improvement incrementally and would have a positive influence on parent-child interactions. High levels of parent involvement in consultation would predict a greater increase in a composite score of positive behaviors and a concomitant reduction in a composite score of negative behaviors observed during parent-child interactions.

Chapter 2. Review of the Literature

Attention Deficit Hyperactivity Disorder (ADHD) is a psychiatric diagnosis characterized by developmentally inappropriate levels of inattention and/or excessive amounts of motor activity/impulsivity (American Psychiatric Association [APA], 2000). Currently, ADHD is one of the most prevalent childhood psychiatric disorders (Barkley, 2006). Approximately 3% to 10% of elementary school-aged children in the United States are diagnosed with ADHD (APA, 2000; Barkley, 2006), with parental reports indicate increasing estimates of ADHD in the population (Visser, Bitsko, Danielson, Perou, & Blumberg, 2010). In the United States, ADHD is currently the most diagnosed form of psychopathology in the preschool population (Armstrong and Nettleton, 2004), with increased prevalence found among boys (Egger, et al., 2006). Recent research has suggested that approximately 12% of the preschool population meet diagnostic criteria for ADHD (Lavigne, et al., 2009), with previous studies estimating the prevalence of ADHD ranging from 2% to 7% of the preschool population meeting diagnostic criteria (Egger et al., 2006).

Children with ADHD tend to exhibit problem behaviors in both home and school settings (Barkley, 2006). The psychosocial impairment in relationships and functioning in school and home which have been clearly established in studies of older children with ADHD (Barkley, 2006) is already present during the preschool period (Egger et al., 2006). In fact, in a comprehensive review of published studies with children aged 2 – 5 years, Egger and colleagues (2006) found that ADHD related symptoms evidenced in younger children actually mirror those of older children in terms of prevalence rates, subtypes, and gender differences.

Preschoolers with ADHD place enormous caretaking demands on their parents and frequently display aggressive behavior when interacting with siblings or peers (Anastopoulous,

Rhoads, & Farley, 2006). Inattention and hyperactive-impulsive behaviors in preschool children have been shown to negatively impact relationship with adults as well as peers, behavior control, resulting in impaired functioning at home (e.g., Egger et al., 2006). Further, young children with or at-risk for ADHD often evidence difficulties acquiring academic readiness skills (Anastopoulous et al., 2006) apparent as a result of the expected levels of attention and decreased levels of hyperactivity/impulsiveness required by preschools and structured school readiness curricula (Wolraich, 2006). Potential negative outcomes include hyperactivity, concentration difficulties, discipline problems, tantrums, attention seeking behavior, and poor sibling relations (Lee et al., 2008) as well as significantly increased parenting stress (Deault, 2010) in children whose problems continued in elementary school.

Long-term follow-up studies have indicated a high level of stability of these characteristics continuing from preschool through the elementary years resulting in a range of potential negative outcomes (Lee, et al., 2008; Lahey, et al., 2004). In a longitudinal study, Lahey and colleagues (2004) found that preschool children diagnosed with ADHD continued to show evidence of global functional impairment, impairment in social relationships including peer relationships, as well as impaired academic functioning at a 3 year follow-up. Further, Lahey and colleagues (1998) found symptom severity was the most significant predictor of symptom persistence into middle childhood. Over 80% of children with ADHD in a prospective longitudinal study continued to suffer from ADHD-related dysfunction in adolescence (Barkley, Fischer, Smallish, & Fletcher, 2006). With the stability of symptoms predicting a myriad of negative future outcomes, it is unfortunate that to date, research focusing on the effectiveness of early intervention for preschool children with and at risk for ADHD is still in its infancy. It has been suggested that interventions for preschool-aged children may be more successful than those

for school aged children because behavior is less entrenched and behavioral control is an emerging part of development (Keenan & Wakschlag, 2000). Preschool-aged children must be exposed to interventions to combat the persistence and trajectory of the disorder.

Treatment of ADHD

Pharmacological treatment. Preschool children with ADHD have been treated with the same psychostimulants that have become the first-line treatment for the disorder in school-age children. The most widely used medications prescribed for ADHD are central nervous system (CNS) stimulants, including methylphenidate (MPH; Ritalin®, Concerta®, Metadate® CD), amphetamine compounds (Adderall®), and dextroamphetamine (Dexedrine®), with MPH being the most commonly prescribed (Connor, 2006; Wilens & Spencer, 2000; Zito et al., 2003). It has been estimated that approximately 4.5% of 4 to 17 year old children are using a stimulant (methylphenidate or amphetamine) as treatment for ADHD (Mayes, et al., 2008) and since 1990, there has been a threefold increase in stimulant prescriptions for 2-to 4-year-old children (Zito et al., 2000). The short-term behavioral effects of stimulants for children with ADHD include improvements in social, behavioral, and academic functioning. Additionally, reductions in classroom disruptiveness and increases in on-task behavior are among the most thoroughly documented results of stimulant treatment (Connor, 2006). Interactions with teachers, parents, and peers often are also improved by reductions in impulsivity, interruptions, and in some cases, aggression (Wilens & Spencer, 2000). In young children, stimulants have been shown to increase compliance with parental commands, decrease hostile and negative responses, and enhance responsiveness to the interactions of others (Barkley, 1981, 1988, 1989). However, the behavioral effects of stimulants are idiosyncratic and have been found to vary as a function of dose and target behavior (Fabiano et al., 2007). Additionally, environmental factors greatly

influence ADHD behaviors. Therefore, behavioral interventions that address environmental stimuli are critical components in the ADHD treatment package (DuPaul & Stoner, 2003; Pelham & Fabiano, 2008).

Increasing rates of prescriptions for psychotropic mediations given to U.S. children ages 2-5 years have raised concerns that not enough is known about the safety and efficacy of these agents in preschoolers (Greenhill et. al., 2003; Zito et al., 2000). There is a dearth of research of the effects of stimulant medication in preschool children (ages 3-6) with ADHD. To date, only 1 multisite study, the Preschool ADHD Treatment Study (PATS), has carefully assessed medication use in preschool-aged children. Previous research suggests that the adverse side-effects of stimulants are generally reported as elevated in preschoolers compared with treated older children (Firestone, Monteiro-Musten, Pisterman, Mercer, & Bennett, 1998). Further, response rates may be more variable for the preschool population than in older children receiving stimulant treatment (Connor, 2002). As such, the American Academy of Pediatrics (2011) has recommended that stimulants should not be the first-line treatment for the symptoms of ADHD in the very young child. Rather, the primary care clinician should prescribe evidence-based parent- and/or teacher-administered behavior therapy as a first line of treatment (AAP, 2011). Parent management behavioral methods meet criteria for evidence-based treatment for childhood ADHD, disruptive behavior, non-compliance, and oppositional defiant behavior and should be tried first (Anastopoulous et al., 2006; Connor, 2002).

Preschool ADHD Treatment Study (PATS). In response to concerns that little is known about the safety and efficacy of methylphenidate in preschoolers with ADHD, the National Institute of Mental Health supported the PATS project, a multisite clinical trial to determine the safety and efficacy of methylphenidate in preschoolers with ADHD. To date, this is the only

multi-site study examining this treatment. In this study, 279 children aged 3-5.5 years were initially enrolled in a family education program (Greenhill et al., 2006). Of these children, 169 then completed a 1-week open-label lean-in trial of four escalating dosages of immediate-release MPH, beginning at 1.25 mg and progressing to 7.5 mg given three times daily (Greenhill et al., 2006). After the open trial phase, 165 cases were randomized, and 145 cases completed a double-blind crossover design involving the best predictor dose of methylphenidate from the lead-in phase and the placebo conducted over 4 weeks. Patients were then followed for 40 weeks at their best dose (Greenhill et al., 2006).

Results of the open-label lead-in phase showed significant improvement at the 2.5-, 5, and 7.5mg doses on both parent and teacher ratings of ADHD symptoms (Greenhill et al., 2006). Side effects were dose-related, and most likely to occur at the 5- and 7.5-mg levels. These side effects included emotionality or irritability, appetite loss, trouble sleeping, stomachaches, social withdrawal, lethargy, high blood pressure and tachycardia. Moderate to severe adverse events were experiences by 25 to 30% of children assigned to the two highest total daily doses (15 and 22.5mg/day) of methylphenidate, compared with 15 to 20% of those assigned to placebo (Vaughn & Kratochvil, 2006). Follow-up of these cases lasted 13 months, with continuing demonstration of treatment efficacy (Greenhill et al., 2006).

Of note, the effect sizes for the dosages used in the PATS study suggest that the degree of improvement in symptoms may be somewhat lower in this age group than in school-age children and a higher frequency of adverse side effects with methylphenidate was reported compared to their school age counterparts (Greenhill, et al., 2006). It was further noted that height and weight growth rates may be reduced for some young children treated with methylphenidate (Swanson et al., 2006). Taking these data into consideration, the use of psychostimulants for treating ADHD

in early childhood requires consideration of the risks relative to potential positive effects. Results of the PATS study as well as guidelines established by the American Academy of Pediatrics (AAP, 2011), suggest that parent and/or teacher administered behavioral intervention should be the initial course of action before considering pharmacological treatment.

Behavior management. Behavior management techniques also have been used to improve the behavior of preschool children with ADHD. Successful behavior management interventions have included reinforcing children's appropriate behavior, giving children effective directions and requests, teaching methods of self-control, and using consistent methods of discipline (McGoey, et al., 2002). Although previous studies have determined many of these methods to be effective (McGoey et al., 2002), specific interventions for individual children that take into account the function of the behavior are limited. The effectiveness of deriving an intervention based on a conceptual understanding of environmental events rather than simply behavior topography has been demonstrated in the literature (Sokol, Kern, Arbolino, Thomas, & DuPaul, 2009). In fact, research suggests that taking into account function when deriving interventions may be more effective than interventions that do not take the function of the behavior into account (Ingram, Lewis-Palmer, & Sugai, 2005; Newcomber & Lewis, 2004).

Functional behavioral analysis consists of a series of conditions in which the consequences resulting from inappropriate behavior are systematically manipulated while the effects of these consequences on a child's behavior are observed directly (Wacker et al., 1998). For example, relative changes in the rate of behavior across assessment conditions are compared to a control condition in which no external consequences are provided for the inappropriate behavior to determine which consequences reinforce or increase the occurrence of aberrant behavior. This assessment usually is conducted using a single-case experimental design with the

participant also serving as the control (Wacker et al., 1998). Treatment is based on the results of the functional analysis. When conducting a functional analysis, individuals are exposed to a variety of conditions previously shown to be associated with problem behavior during 10-minute sessions. The conditions include presenting tasks, withholding attention, and removal of a preferred activity or item. Function is inferred when problem behavior is elicited during a specific condition (i.e. access, escape, or attention). The consequence that has been identified as reinforcing the inappropriate behavior is withheld when inappropriate behavior occurs and is only delivered when a more adaptive behavior is exhibited (Wacker et al., 1998). If a function for a problem behavior is identified, the possible effectiveness of the intervention will presumably increase (Marcus, et al.r, 2001; Wacker, et al., 1998). Wacker and colleagues (1990) developed an abbreviated version referred to as brief functional analysis (BFA) with fewer condition replications and shorter sessions (i.e., 5 minutes). Research on this procedure suggests that BFA provides higher similar outcomes when compared to the extended FA version (e.g., Kahng & Iwata, 1999; Wallace & Iwata, 1999).

The extent to which functional analysis stimulates conditions in the natural environment, has come into question (Huete & Kurtz, 2010). Functional analysis is typically conducted by behavior therapists with training in applied behavior analysis and these therapists are typically not familiar to the client and typically occur in a clinic setting (Huete & Kurtz, 2010). The person conducting the functional analysis is a relevant stimulus, and unless the individual has a history of exhibiting problem behavior in the presence of adults other than parents, the individual's response in the presence of a novel person may be different, resulting in inaccurate FA outcomes (Huete & Kurtz, 2010). These factors increase the probability that identified

functions are inaccurately identified leading intervention development not matched to function. This suggests that it may be more effective to train parents to conduct the functional analyses.

Results of a few recent studies have shown that caregivers can be trained to implement functional analyses for severe behavior problems (Barretto, Wacker, Harding, Lee, & Berg, 2006; Wallace, Doney, Mintz-Resudek, & Tarbox, 2004). In an investigation using a single subject design with five children aged 2-5 years old, Huete and Kurtz (2010) investigated parent-conducted functional analysis compared to FA conducted by unfamiliar therapists. Results indicated that conducting analog functional analysis with different therapists can result in varying outcomes in terms of behaviors observed and identified function.

Based on the literature evaluating functional analysis and its effects, a gap becomes apparent in which little emphasis has been placed on functional analysis in the home, with most literature discussing functional analyses in the school or clinic setting with therapists conducting the analyses. This gap can be problematic considering preschoolers spend most of their day in the home. Further, the parent may be a relevant stimulus in the child's history of responding in the natural environment, and having the parents absent from the FA procedures may compromise obtained findings. Umbreit (1995) conducted a study exploring the potential of functional assessment and subsequent interventions in reducing disruptive behaviors of a child with ADHD in the school setting. Results indicated that the treatment package derived from the assessment eliminated most disruptive behavior in the inclusive general education classroom.

Family education. As stated previously, the most commonly used treatment in the clinical management of children with ADHD is stimulant medication therapy. However, 10-20% of those who receive this treatment do not show clinically significant improvements in their primary ADHD symptomology (Greenhill, Halperin, & Abikoff, Connor, 2006). Further, in

effort to reduce the aversive side-effects of medication therapy, it is common for physicians to limit the prescriptions to daily dosages with effects wearing off prior to dinner time and some physicians limit children's medication regimes to school days only (Vaughan & Kratochvil, 2006). Therefore, there is a significant portion of the day in which children do not experience the therapeutic benefits from stimulant medication. This necessitates parents to utilize alternate strategies for managing child behavioral difficulties in the home. Further, raising a child with ADHD can strain family functioning with high levels of parental stress and diminished sense of parental competence (Egger et al., 2006). Over time, parents may develop maladaptive and counterproductive parenting strategies to deal with these problems (Deault, 2010) by using reactive parenting strategies and coercive escalations (Dishion et al., 2008) leading to the impairment of the parent-child relationship (Fischer, 1990). This clearly highlights the need to teach parents more effective ways of managing this challenging behavior (Chronis, et al., 2003; Dishion et al., 2008). Behavioral family education is an intervention to provide parents with strategies and information to empower them to limit stressful patterns of parent-child interaction (Lee, Niew, Yang, Chen, & Lin, 2012). Behavioral family education primarily emphasizes social contingencies in which the parent provides positive reinforcement for the child's prosocial behavior and ignores or punishes negative behavior using techniques such as removal of privileges or time out (Antshel & Barkley, 2008).

Family education has been found to meet criteria as a well-established treatment for children with ADHD (Pelham & Fabiano, 2008). Family education programs have proven efficacious in improving parent-child interactions and, in turn, reducing children's externalizing behaviors (Dishon et al., 2008; McMahon, Wells, & Kotler, 2006) and the effects appear to be maintained over time (Webster-Stratton, Reid, & Hammond, 2004). Currently, there is a dearth

of systematic examinations of the effectiveness of family education on populations of young children with ADHD. Although many variations of family education exist, they all share the common therapeutic objective to teach parents specialized child management techniques (Anastopoulos, et al., 2006). More specifically, family education provides parents with behavior modification techniques that are based on social learning principles. Parents are taught to identify and manipulate antecedents and consequences of child behavior; target and monitor problematic behavior; reward prosocial behavior through praise, positive attention, and tangible rewards; and decrease unwanted behavior through planned ignoring, time-out and other nonphysical discipline techniques (Anastopoulos et al., 2006; Chronis, Chacko, Fabiano, Wymbs, & Pelham, 2004).

Most studies investigating family education are limited to school-aged children (Songua-Barke, et al., 2006). Across studies, there is enormous variability with respect to the manner in which ADHD is defined. As the literature is reviewed, some studies of children with other externalizing disorders will be discussed because there are few studies that specifically selected children with ADHD and because the diagnostic overlap is high in studies of children with oppositional defiant disorder (ODD) and conduct disorder (CD) (Chronis, et al., 2004). Further, the manner in which family education outcomes have been assessed is also highly variable, ranging from measuring changes in child behavior, to changes in other areas of family functioning. Changes in parenting style presumably provide children with opportunities for acquiring greater self-control over their behavior (Anastopoulos, Shelton, DuPaul, & Guevremont, 1993). In addition to targeting primary ADHD symptoms, family education can also prevent, reduce or eliminate secondary features of oppositional defiant behavior or conduct problems that the child may be displaying. To the extent that such behavior problems come

under control, a child with ADHD is likely to be exposed to less failure, frustration, correction, and criticism (Anastopoulos et al., 2006).

Many family education programs have focused on delivering didactic instruction to parents focusing on effective behavioral strategies, providing effective commands, including establishing rules, and following through with established contingencies (Anastopoulos, et al., 1993; Canu & Berman, 2011; Chacko, et al, 2009; Fabiano et al., 2009). Other studies have investigated the benefits of family education and child behavior outcomes as mediated by reductions in observed negative parenting, with reductions in observed negative parenting and subsequent improvement in mother-reported child disruptive behavior (Chronis-Tuscano, et al., 2011). Similarly, Fabiano and colleagues investigated the role of family education with fathers and observed subsequent reductions in negative parenting interactions (Fabiano, Pelham, & Cunningham, 2012). Other studies have also focused outcomes on the reduction of stress (Treacy, Tripp, & Baird, 2005) and maternal symptoms of depression (Chronis, Gamble, Roberts, & Pelham,2006).

All of the aforementioned studies included school-aged children with ADHD. In this age group, ADHD symptoms have usually become compounded by a range of complications associated with school failure and school exclusion (Barkley, 2006). Thus by this time, it may have become more difficult to modify behavioral symptomology. For this reason, the preschool years may offer a better opportunity to intervene in order to modify the condition because behavior is less entrenched and behavioral control is emerging as part of development (Keenan & Wakschlag, 2000). Further, the parent as change agent may be the most appropriate vehicle for intervention for preschool-aged children (Sonuga-Barke, et al., 2001).

The role of brief family education in the treatment of young children aged two to three years was investigated by Dishion and colleagues (2008) using the Family Check-Up (FCU) model. The FCU is a brief, three-session intervention based on motivational interviewing and modeled after the Drinker's Check-up (Miller & Rollnick, 2002). Participants included 731 mother-child dyads recruited from the WIC program. These children were not identified as at-risk for ADHD per say; rather they met study criteria for future behavior problems based on socioeconomic, family, and/or child risk factors. With a modest effect size, results indicate that caregiver reports at child ages 2, 3, and 4 revealed decreased behavior problems as compared to the control group. Direct observation of caregivers' positive behavior supports provided to children ages 2 and 3 were found to mediate improvements in childrens' early problem behavior. Further, using a person-centered analysis of data, it was revealed that the intervention effect on child problem behavior was most pronounced among the children who were at highest risk at age 2 and was found to be larger than the effect for the entire sample. This study supports the efficacy of preventative family education aimed at reducing child conduct problems in early childhood among families at high-risk (Dishion et al., 2008).

The role of family education in the treatment of preschool children with ADHD was investigated by Pisterman and colleagues (1992). Families of 57 children were randomly assigned to an immediate treatment group or a delayed treatment group and participated in a 12-session program focused on attention and compliance education. Results of this study found that family education was effective in improving compliance in preschool children with ADHD; they revealed a significant increase in the percentage of compliance and a significant decrease in the time taken to complete a compliance task command list. Parents issued proportionately more appropriate commands and more consistently reinforced compliance. In addition to these specific

compliance-management skills, overall style of parent interaction improved in that parents issued proportionately fewer directive statements and increased the proportion of positive feedback to their children. These results maintained at 3-month follow-up. Results of this investigation did not yield positive effects on measures of attention following the family education protocol.

Sonuga-Barke and colleagues (2001) also investigated the effectiveness of family education for preschool children at-risk for ADHD. Utilizing a randomized controlled trial, families of 3-year old children were either assigned to family education (n=30), parent counseling and support (n=28), or a wait-list control group (n=20), using the New Forest Parenting Program. Intervention lasted eight weeks and occurred on a one-to-one basis. Treatment was provided in the family home and was delivered by skilled specialist nurse-therapists. Parents participating in the family education group received coaching in child management techniques while the parent counseling and support group received nondirective support and counseling. Measures of child symptoms and maternal well being were collected pre-treatment, post-treatment, and at 15 weeks follow-up. Results indicate that when delivered by experienced and specialist therapists, family education using the New Forest Parenting Program produced significant reductions in ADHD as measured by the Parental Account of Childhood Symptoms (PACS; Taylor et. al, 1991) as well as direct observation measures compared to the counseling and support group and the wait-list controls. Family education also produced a significant increase in maternal adjustment relative to the parent counseling and support group and the wait-list controls. These effects maintained for 15 weeks after treatment. This study found clinically significant outcomes for preschool aged children with ADHD, but it did not investigate parent participation or dosage of intervention.

In a follow-up study, Sonuga-Barke and colleagues (2006) used a protocol identical to the one used in the Sonuga-Barke et al. (2001) study to investigate whether similar positive results were obtained with the New Forest Parenting Program when delivered by non-specialist nurses provided brief training. Using a sample of 69 children receiving family education and 10 children assigned to a wait-list group, no significant improvements in ADHD symptoms were found using the New Forest Parenting Program. Qualitative analysis suggested that children treated by nurses with experience working with preschool aged children with ADHD experienced better outcomes, than those who worked with unskilled nurses. The sample size was too limited to quantitatively determine therapist effects. This study extended the research on the New Forest Parenting Program, but it did not investigate parent participation or dosage of intervention.

The Incredible Years (IY) is a family education program that was designed for the treatment of conduct disorders in young children and has been found effective in reducing severe problem behavior (e.g. Scott et al, 2001; Webster-Stratton & Hammond, 2004; Webster-Stratton et al, 2004). Webster-Stratton, Reid, and Beauchaine (2011) investigated the effectiveness of IY with young children with ADHD. The IY program includes an education program for both parents and children. The curricula include 20 weekly sessions lasting 2 hours each. Lessons target improving academic, social, and behavioral functioning with videos of children with ADHD used as supplementary teaching materials.

Using a sample of 99 young children aged between 4 and 6 years old, Webster-Stratton and colleagues (2011) conducted a randomized clinical trial to investigate the effectiveness of IY. Results indicated that both mothers and fathers reported statistically significant reductions in child inattentive and hyperactive behaviors as well as increases in social competence. Mothers

reported significant treatment effects with increases in appropriate parenting and decreases in negative parenting strategies such as physical punishment. Fathers however, did not report significant changes in parenting practices. Direct observation of parent and child behavior corroborated this finding indicating treatment effects for mothers' praise and coaching, mothers' critical statements, and child total deviant behaviors. Mothers and fathers both reported treatment effects for children's externalizing behaviors with significant treatment effects for children's emotion vocabulary and problem-solving ability. Rates of attendance for mothers and fathers were found to be quite high, with an average of 18.5 and 17.1 sessions attended out of 20, respectively. Strategies for achieving high rates of attendance were not noted.

Bor, Sandars, and Markie-Dadds (2002) also investigated the effects of a family education program, the Triple-P Positive Parenting Program (Sanders, 1999), on preschool aged children with ADHD and co-occurring disruptive behavior. The investigators randomly assigned the families of 87 preschool aged children with co-occurring disruptive behavior and ADHD to either an enhanced behavioral family intervention (EBFI), standard behavioral family intervention (SBFI), or a waitlist control. Both the EBFI and SBFI groups received family education using the Triple-P Positive Parenting Program which consisted of 10 hr of intervention with a therapist and modeling and role-playing exercises that focus on managing challenging behaviors and promoting child competence. In addition to receiving the Triple-P Positive Parenting Program, the EBFI group also received partner support training and coping skills training designed to address the family risk factors of marital conflict and parental adjustment, respectively. Participants in the EBFI condition received on average, 14 hr of intervention with a therapist.

Results indicate that both intervention conditions were associated with positive outcomes for parents and children when compared to the wait-list condition. Both groups experienced significant reductions in parent-reported child behavior concerns and dysfunctional parenting and significant increases in parent competence when compared to the wait list control. The EBFI condition was associated with significantly less observed child negative behavior in comparison to the wait list control. Gains were maintained at 1-year follow up. Overall, the enhanced program was not shown to be superior to the standard program using any of the outcome measures at post-intervention or follow-up. Upon investigation of attrition, Bor et al. (2002) reported that 72% of participants completed intervention and post-assessment, but they did not report on the percentage of treatment sessions attended to garner a sense of dosage.

Lakes, Vargas, Riggs, Schmidt, and Baird (2011) evaluated the effectiveness of a program that provides community-based 10-week family education to parents of preschool aged children with attention and behavior difficulties with a sample of 154 preschool aged children and their parents. Using the Community Family education program (COPE; Cunningham, Bremnerm, Secord, 1998) parents were provided with 10 weekly family education sessions focused on appropriate child development and positive parenting skills. Results indicated statistically significant improvements in parenting behaviors such as the use of transitional statements, praise, and planning ahead from pre- to post-intervention. Statistically significant improvements in child social behaviors were also found. Parents reported a significant decrease in emotional challenges, peer problems, conduct problems, hyperactivity and inattention, as well as significant increases in prosocial behaviors. Lakes et al. defined participation in terms number of family education sessions attended: (a) completion (8 or more sessions), (b) partial completion (4-7 sessions), and (c) non-completion (3 or fewer sessions). It was reported that of the 327

initially enrolled caregivers, 31% completed 8 or more sessions, 35% completed four to seven sessions, and 31% completed 3 or fewer sessions. Although it is beneficial that the authors reported on percentages of family education sessions attended, the impact level of participation on parent and child outcomes were not examined.

Barkley et al. (2000) investigated on the effects of a family education program highlighted the sobering difficulty of achieving high levels of parent attendance in family education. Their investigation included 158 kindergarten participants identified as having high levels of aggressive, hyperactive, impulsive, and inattentive behavior. These children were randomly assigned to four treatment conditions lasting the kindergarten school year: no treatment control (n = 42), family education only (n = 39), treatment classroom only (n = 37), or family education with treatment classroom (n = 40). Family education consisted of 10 weekly sessions focused on basic behavioral principals such as rewards, attending, time out, positive reinforcement, and appropriate management in public places. Treatment classrooms included the implementation of behavioral interventions such as social skills training, daily report cards, token economies, and response cost. This classroom was guided by a master teacher and a child psychologist.

Results indicated that the treatment classroom resulted in improvements in teacher ratings of attention, self-control, aggression, social skills, parent ratings of adaptive behavior, as well as direct observations of externalizing behavior in the classroom than those in the family education group only (Barkley et al., 2000). Results indicate there were no significant main effects for family education or any significant interaction of family education with classroom treatment on any of the child function outcomes measured. Barkley et al. (2000) posit this ineffectiveness of the family education is due in large part to the failure of many families to attend the education

program, or if they did attend, to do so consistently. Data indicated that less than 50% of the families offered the education attended at least 50% or more of the education sessions. Further, 35% of parents in the family education group only and 31% in the treatment classroom combined with family education did not attend any family education sessions. Interestingly, data indicated that parents who did not attend any family education sessions rated their children as having fewer behavior concerns than those who did attend. This might imply that such parents did not have the same need for this training. These results are contrary to those found by Bor and colleagues (2002) who found that parents who rated their children as having high levels of challenging behaviors were less likely to attend. Barkley et al. caution against concluding that the education program is ineffective, rather that the education protocol has no reasonable chance of assisting families with more effectively managing their children's behavior unless parents cooperate with the education protocol.

In a study by McGoey and colleagues (2005), a comprehensive multi-component intervention protocol combining family education and teacher consultation in behavioral techniques for preschool-aged children at-risk for ADHD was investigated. The multi-component intervention included school-based behavioral consultation, family education and pharmacological treatment if necessary. Using a sample of preschool aged students demonstrating symptoms of ADHD, 58 students were randomly assigned to either a multicomponent intervention group (n = 30) or a Community Treatment Control (CTC) group (n = 27). Participants in the CTC group did not receive treatment from project staff; rather they were expected to receive community-based services as determined by their primary care physician. Participants in the multicomponent intervention group received a family education program that consisted of 12 two-hour sessions with 6 to 10 sets of parents. These sessions used

the procedures outlined by Webster-Stratton (1996) and included discussions of topics such as behavioral strategies, safety, and modifications in the home environment. Data collected measured child behavior and social-emotional functioning, pre-academic skills, family functioning, parental knowledge of ADHD, parental stress, medical outcomes and service utilization.

Results indicated there were improvements in most areas of behavior for both groups over 12 months. Minimal differences in outcomes between groups were found based on statistical analysis and effect sizes when the impact of the multicomponent intervention over and above changes evidenced by the community treatment control group was measured. Both groups indicated moderate improvements in terms of school readiness; however academic readiness skills, as measured by the Battelle Developmental Inventory (BDI; Newborg, Stock, & Wnek, 1988) did not improve for either group. The multicomponent intervention evidenced more pronounced changes in family coping, especially in the areas of acquiring social support, family resources, and parental knowledge of ADHD compared to the control group. McGoey et al. (2005) did not report on parental attendance or engagement in the components of the treatment protocol.

Kern and colleagues (2007) also investigated the effectiveness of two different parent interventions with preschool aged children at-risk for ADHD using a multicomponent protocol. A sample of 135 preschool aged children at-risk for ADHD were randomly assigned to either the multicomponent intervention (n = 71) or the family education intervention (n = 64). The multicomponent intervention combined family education using the COPE program (Cunningham, Bremnerm, Secord, 1998) and individualized assessment-based intervention in the home setting using functional assessment data and preschool or daycare setting using behavioral

consultation procedures. The family education intervention (n = 64), involved family education only using the Early Childhood Systematic Training for Effective Parenting (Dinkmeyer, McKay, Dinkmeyer, Dinkmeyer, & McKay, 1997). Results indicate that children in both groups made significant improvements in behavior and school readiness skills when compared to baseline, with no significant difference in intervention groups 1 year post-intervention.

These findings were inconsistent with the hypothesis that the multicomponent intervention using individualized assessment-based intervention would be superior to family education alone. Kern and colleagues reported that only 51% of the children received all three of the MCI components. This included attending at least one family education session and development of intervention plan in the home and school.

In a follow-up study, DuPaul and colleagues (2013) using the same data set from the Kern et al. (2007) study, investigated the maintenance of treatment effects at 24 months post-enrollment. Outcome measures in the DuPaul and colleagues (2013) investigation were broadened beyond those investigated in the Kern at al. (2007) study and included systematic direct observation of child and parent behavior , assessment of child numeracy skills, parent stress, family coping, and injury prevention. Similar to findings from the 2007 investigation, results indicated no statistically different differences in growth between groups for any variable investigated, although across groups, statistically significant improvements were indicated for 27 of 46 dependent measures investigated. Therefore, similar to the Kern et al. (2007) findings, there was significant improvement across most areas of functioning between both groups.

Impact of Dosage of Behavioral Interventions

A significant amount of research literature has addressed the empirical question of who benefits from evidence-based behavioral interventions (e.g. Fabiano et al., 2009; Lee, Niew,

Yang, Chen, Lin, 2012; Pelham & Fabiano, 2008). Variable outcomes in response to family education programs and participation in multicomponent behavioral treatment interventions have led researchers to suggest the impact of dosage of intervention and participation in behavioral interventions be further investigated (e.g. Barkley et al., 2000; Kern et al., 2007; Power et al., 2005). The importance of parent engagement in behavioral interventions has been become increasingly researched (Nix, Bierman, McMahon, & The Conduct Problems Prevention Research Group, 2009). Studying parent engagement assists in the understanding of the complexity of these programs, by parsing out which intervention processes are effective rather than simply asking whether intervention programs in general are effective (Korfmacher et al., 2008).

Throughout the literature, parent engagement has been defined by researchers in various ways. Korfmacher and colleagues (2008) use an overarching term of parent involvement which they define as the process of the parent connecting with and using the services of a program to the best of the parent's and the program's ability. Using a multi-dimensional construct, Korfmacher and colleagues (2008) attempt to describe the complex interactions that make-up the way families experience interventions. Their construct includes two broad dimensions. The first is participation which refers to the quantity of intervention, or how much of an intervention a family receives (i.e. frequency of home visits or the duration of staff-family contacts). The second dimension is engagement which refers to the emotional quality of the interactions with the program, such as how the family members feel about the services they receive.

In a systematic review of the literature on engagement measures for psychosocial treatments, Tetley, Jinks, Huband, and Howells (2011) found that therapeutic engagement is an important construct to assess, however there is little consensus in the literature as to the

definition of engagement. The most popular dimensions of engagement in treatment assessed in the literature are homework completion (assessed by 38%), contribution to therapy (assessed by 23%), the working alliance (assessed by 29%), treatment attendance (assessed by 15%), treatment completion (assessed by 3%), and supportive and helpful behaviors to other clients in group therapy (assessed by 10%) (Tetley et al, 2011). It is important to note most of these investigations of parent engagement have included children with mixed diagnoses with a majority of studies focusing on treatment for children with oppositional defiant disorder (ODD) and conduct disorder (CD) rather than ADHD.

Recently, some researchers have conceptualized parental engagement as inclusionary of an overall construct of integrity (Dane & Schnider, 1998; Power et al., 2005) with *integrity* defined as "the degree to which an intervention is implemented as planned" (Gresham, Gansale, Noell, Cohen, & Rosenblum, 1993, p. 254). The prevailing approach to monitoring integrity is based on a hierarchical model in which there is an uneven balance of power between the researchers and interventionists (Power et al., 2005). Integrity is determined by evaluating whether interventionists are adhering to expectations of the program as it was prescribed by the researchers. This has utility for efficacy research, but it has little value for effectiveness research, in which the focus is conducting investigations in naturalistic settings in a manner that is responsive to the needs of major stakeholders (e.g. interventionists and participants) and directly linked with practice (Power et al., 2005). A framework for reconceptualizing integrity has been proposed offering five dimensions of integrity (Dane & Schnider, 1998). This reconceptualization delineates both therapist and client contributions of integrity with successful implementation resulting from the therapist delivering the intervention as intended and the client receiving it as intended (Dane & Schnider, 1998; Power et al., 2005). Thus, this

reconceptualization adds participant engagement as a contributor to integrity, with the dosage received, participant adherence, and participant responsiveness comprising the three dimensions that make up the participant engagement component of integrity (Power et al., 2005). Dosage of intervention received is therefore one aspect of a multidimensional concept of intervention integrity (Power et al., 2005).

Several theoretical models propose that successful parental engagement in mental health services for children has both direct and indirect influences on child outcomes (Berkel, Mauricio, Shoenfelder, & Sandler, 2011). Most studies have examined engagement exclusively in terms of attendance with findings suggesting that higher rates of attendance generally predict improvements in parenting behavior (Baydar, Ried, & Webster-Stratton, 2003).There are limited studies investigating the relationship of intervention outcomes with attendance to family education sessions and adherence with behavioral interventions. Nix and colleagues (2009) investigated parental attendance to family education sessions with the Fast Track program as well as the quality of parent participation which was defined by clinical adherence to the interventions (i.e., implementation of skills within sessions and homework completion between sessions). Results of this investigation indicated that the quality of parent participation contributed uniquely to the prediction of four parenting outcomes: physical punishment, school involvement, perceptions of the child, and warmth. This study was limited however, in that impact of engagement on child outcomes was not examined. In a study by Clarke and colleagues (2013), parent attendance and adherence to psychosocial intervention for children with ADHD investigated the impact of parent engagement on both parent and child response to psychosocial intervention. Families of 92 school-aged children with ADHD participated in this study using Family-School Success (FSS) as the intervention. Attendance was defined as the percentage of

individual, group, and family-school sessions attended by the caregiver. Adherence was assessed using a measure of homework compliance. Results indicated that the number of sessions attended predicted intervention outcomes to some degree; however, adherence to assigned intervention items between sessions (i.e., homework) was a much stronger predictor of parent and child response to treatment. This study highlights the importance of investigating not only parent attendance as a predictor of future outcomes but also parent involvement or adherence with treatment interventions, as a predictor of future parent and child outcomes. Parent attendance as well as participation or adherence with intervention components impacts the dosage of intervention received.

Family Demographics as a Predictor of Engagement

Ecological systems including those that exist culturally and within the community, school, and home can impact parental engagement including such factors as race, poverty, level of education, and social skills (Snell-Johns, Mendez, & Smith, 2004). Variables relating to ethnicity have been well researched in the literature in terms of predictors of parental engagement with many studies including ethnicity as one of numerous outcome variables (e.g., Baker et al., 2011; Kazdin et al., 1997; Lavigne et al, 2010). This research can assist in the determination of strategies that can increase parent engagement, including attendance (Snell-Johns et al., 2004).

Arnold and colleagues (2003) completed an investigation evaluating the impact of ethnicity on attendance of parent of children with ADHD. The effects ethnicity had on family education session attendance was investigated using the sample from the National Institute of Mental health Multimodal Treatment Study of Children with ADHD (MTA Cooperative Group, 1999). Results indicated that African American families attended 12% fewer family education

sessions than Caucasian parents and had 13% less attendance when encapsulating all aspects of treatment including medication management sessions. Latino parents had 15% less attendance than Caucasian parents when considering overall treatment. These differences were not statistically significant. These data suggest however, that ethnic minority status is an important predictor for consideration in investigations of family education attendance.

Socio-economic status (SES) has also been investigated as a predictor of parental participation in treatment. Numerous studies have found that low-income families attend fewer treatment sessions compared to their higher SES counterparts (e.g. Ingoldsby, 2010; Jensen & Lowry, 2012; Kazdin et al., 1997; Lavigne, et al., 2010; Snell-Johns et al., 2004). Alternately, Peters et al. (2005) found that mothers from higher SES backgrounds were significantly more likely to complete a family education program than those from lower income backgrounds.

Power and colleagues (2010) have found that with the availability of multimodal interventions, treatment resources are generally underutilized by children and families from racial and ethnic minority backgrounds and low SES. Using a sample of 80 cases, Power and colleagues (2010) investigated early indicators of engagement and potential strategies to improve treatment initiation. Using the Partnering to Achieve School Success (PASS) service, this study examined the pre-treatment telephone call history of contacts between clinicians and families. The findings indicated that despite persistent efforts to reach families by telephone and initiate the process of treatment engagement by phone, 35% of families referred for intervention never attended the initial session. These findings attest to the challenges of engaging families from ethnic minority and low income backgrounds in psychosocial intervention (Power et al, 2010). Therefore, research has indicated that ethnicity and SES are important predictors of family

engagement in treatment and the dosage of treatment therefore received as a result (Power et al, 2010).

Purpose and Contributions of Present Study

The present investigation expands key areas of the literature in several ways. Currently there is a dearth of investigations focusing on the treatment of young children at-risk for ADHD relative to the established research base of treatment effects for school-aged children with ADHD. Further a scarcity of studies exist utilizing family education in behavior management techniques to improve the behavior of preschool-aged children with ADHD. Further few studies have trained parents to implement functional analysis in the home setting for challenging behavior. Functional analysis is typically conducted by behavior therapists with training in applied behavior analysis and these therapists are typically not familiar to the client and assessment typically occurs in a clinic setting. This study extended the explorations of family education and functional assessment for preschool aged children with ADHD by elucidating the contribution of dosage by assessing parent participation in family education and functional analysis on subsequent child behavior outcomes. If dosage of family education and functional analysis contributes to intervention outcomes, intense efforts should focus on strategies to initiate and maintain engagement of parents with these interventions.

Chapter 3. Method

Participants and Setting

Participants at entry included 71 children aged 3 to 5 years who were part of a larger study investigating the effects of a multi-component early intervention protocol for young children at-risk for ADHD (Kern et al., 2007). Upon entry to the study, participants ranged in age from 3 to 5 years (M = 4; SD = 0.69). The mean age of participants was 53.2 months (SD = 8.9). Fifty-four (76.0%) were male and 17 (24%) were female. Forty-nine (68.9%) were Caucasian, 11 (14.3%) Hispanic, 2 (3%) African American, 8 (11.3%) other (e.g. biracial), and 1 (1.5%) was of unspecified ethnicity.

Prior to participation in the intervention, parents completed a demographic questionnaire that was created specifically for the purpose of the study. This included basic characteristics such as ethnicity, marital status, and employment status. Questions were posed in a multiple-choice or open-ended format. Employment status was derived via the Hollingshead scale (Hollingshead & Redlich, 1958) and was included as the measure of socio-economic status.

In terms of demographic characteristics, parents of 47 (66.7%) children were married. Remaining parents report either living together (n = 10; 13.3%), separated (n = 4; 5.9%), or single (n = 5; 7.4%). Data for 5 (6.7%) parents were unavailable. In terms of the highest level of education reported for parent or parent dyad, 31.9% of parents reported having some college education, whereas 25.9% graduated from college and 14.1% held advanced graduate degrees or professional certification. Eighteen and a half percent graduated high school. 3% did not graduate high school, and there was unavailable data for 6.7%. Working status in the household was reported as the following; full time (n = 43; 61%), part time (n = 5; 7%), and unemployed (n = 9; 13%). Employment status derived via the Hollingshead scale (Hollingshead & Redlich,

1958) yielded the following; of those who were employed, clerical or sales work (*n* = 14; 19%) and personnel or administration (*n* = 13; 18%) were endorsed as the most common occupations. Skilled manual employment was the next most frequent occupation to be endorsed (*n* = 12; 17%), followed by business management (*n* = 9; 12.6%), and higher executive (*n* = 4; 6%). Three (4%) described themselves as machine operators and 1 (0.7%) was an unskilled employee. Nineteen percent did not report their occupation. Please see Table 1 for demographic information. The following is a description of relevant methodological aspects of the larger study.

Children recruited for the study exhibited significant difficulties with inattention, impulsive behavior, and/or over activity. Additional selection criteria included (a) parent and teacher ratings at or above the 93rd percentile obtained on one or more of the following Conners' Rating Scale (Conners, 1997) factors: Hyperactivity, Conners' ADHD Index, Conners' Global Index: Restless-Impulsive, DSM-IV: Hyperactive-Impulsive, and DSM-IV: Total; and (b) diagnosis of one of the three subtypes of ADHD based on parent interview with the preschool version of Diagnostic Interview Schedule for Children (DISC-IV; Shaffer, Fischer, Lucas, Dulcan, & Schwab-Stone, 2000). Children with pervasive developmental disorders, or conduct disorders were not admitted to the study.

The family education sessions were held in a classroom in a local hospital where media equipment was easily accessible. Childcare and snacks were available to the parents during the family education sessions. Transportation was also provided if needed. Home consultation and data collection took place in the participants' respective homes.

Screening and Measures

Conners Rating Scales-Revised (Conners, 1997). The first stage of the screening process required parents to complete the *Conners Rating Scales—Revised* (CRS-R; Conners, 1997) to confirm the presence of ADHD symptoms. The parent version of the CRS-R consists of 80 items and is appropriate for use with children ages 3 to 17 years. Items are rated using a four-point Likert scale ranging from 0 (not at all true) to 3 (very much true). Seven subscales derived from factor analysis on the parent rating scale include: oppositional; cognitive problems; hyperactivity-impulsivity; anxious shy; perfectionism; social problems; and psychosomatic. All scales on the CRS-R have exemplary psychometric properties (Conners, Sitarenos, Parker, & Epstein, 1998). Using a sample of 2,200 children aged 3-17 years of predominately European American descent, internal consistency alpha coefficients ranged from .75 to .94 on the parent scales. Further test-retest reliability for oppositional, cognitive problems, and hyperactivity-impulsivity subscales on the parent rating scale are .60, .78, and .71 (Conners, et al., 1998).

Computerized NIMH Diagnostic Interview Schedule for Children (Parent Version) (CDISC 4.0). The *CDISC 4.0* is the computerized version of the *NIMH-DISC IV*, which may be used to assess 34 child and adolescent psychiatric diagnoses based upon *DSM-IV* criteria (Shaffer et al., 1998). This was used to measure parent-reported ODD symptoms. A trained interviewer conducted the highly structured interview, and only the disruptive behavior disorders module (ADHD, Conduct Disorder, and Oppositional Defiant Disorder) was administered with parents. The interview took about an hour to complete. The Spanish version of the *CDISC 4.0* was administered by a Spanish speaking interviewer for parents whose primary language was Spanish. The majority of the questions require “yes” or “no” responses, although there are a few questions with the response options of “sometimes” or “somewhat” and others aimed at

assessing onset of symptoms and degree of impairment (Shaffer et al., 1998). Children who meet criteria for conduct disorder on the DISC were also excluded from the study.

The *NIMH-DISC IV* displays adequate psychometric properties. It has produced diagnostic decisions with high reliability (Shaffer et al., 1998). The reliability of the CDISC 4.0 has been investigated by Fisher et al. (1997) in a clinical sample of children from diverse ethnic backgrounds. Test-retest reliabilities over a mean interval of 6.6 days were 0.79 for ADHD, 0.54 for ODD, and 0.43 for CD. Formal validity testing of the CDISC 4.0 has not been done, although earlier computerized versions have demonstrated diagnostic sensitivity for psychiatric disorders (Shaffer et al., 2000).

Psychometric information specific to the CDISC 4.0 is still emerging; however the DISC-IV and its previous versions are widely used and tested in both the clinical and general population (Johnson, Barrett, Ddds, Fox, & Short, 1999). The DISC-IV has demonstrated strong interrater reliability ($r = 0.93$) and test-retest reliability ($r = 0.64$) for past year diagnoses (Shaeffer et al., 2000; Schwab-Stone, Shaffer, & Dulcan, 1996).

Modified Checklist for Autism in Toddlers (Robins, Fein, Barton, & Green, 2001). Children with pervasive developmental disorders were not admitted to the study. To rule out autism, the *Modified Checklist for Autism in Toddlers* (MCHAT; Robins, et. al, 2001) was administered. Questions included in the MCHAT ask about symptoms consistent with autism spectrum disorders. The MCHAT was used to screen for behaviors that would lead to additional assessments. The MCHAT was tested with a sample of 1,122 parents at well-child pediatrician visits and with 171 parents of identified at-risk children through early intervention services. Reliability was determined using Cronbach's alpha. The MCHAT had an alpha of .85 indicating appropriate internal consistency (Robbins, et. al., 2001). If parents endorse two or more

questions on the MCHAT, the Gilliam Autism Rating Scale (GARS; Gilliam, 1995) was then administered. The GARS is purported to identify individuals with autistic disorder and contains 56 items which are scored using a four point Likert scale ranging from never to frequently observed, which yields an overall Autism Quotient (M = 100; SD = 15). The Autism Quotient is intended to determine likelihood that a subject has an autistic disorder (Gilliam, 1995). The GARS was tested using a sample of 284 teachers and parents of children with Autism Spectrum Disorders. Employing Cronbach's (1951) coefficient alpha, the following reliability estimates of the four original subscales for internal consistency are .82 for Stereotyped Behaviors, .89 for Communication, .93 for Social Interaction, and .68 for Developmental Disturbance (Lecavalier, 2005). Any child receiving an "Autism Quotient" above 121 was excluded from the study.

Differential Abilities Scale (Elliott, 1990). To exclude children with possible developmental disabilities, cognitive abilities were assessed using the *Differential Abilities Scale* (DAS; Elliott, 1990). The DAS is an individually administered test battery intending to measure cognitive and achievement levels for children for classification and diagnostic purposes. It consists of 20 subtests, 17 cognitive and 3 achievement subtests yielding an overall cognitive ability score and achievement scores divided amongst three different age levels; lower preschool (2 years, 6 months to 3 years, 5 months), upper preschool (3 years, 6 months to 5 years, 11 months), and school age (6 years to 17 years, 11 months). The preschool version was used for the purposes of this study which produces the General Conceptual Ability standard score, which is an overall composite score. It also includes verbal and nonverbal composite scores. For screening purposes of this study, the General Conceptual Ability standard score was used. Children with a standard score below 80 were excluded. The Differential Abilities Scale has adequate psychometric properties. Using a sample of English-proficient children aged 2 to 17

years matched to the United States census data and oversampled for children of African American or Hispanic descent, test-retest reliability coefficients ranged from .83 to .93 across composites, indicating high levels of stability over time (Elliott, 1997).

Dependent Measures

Dependent measures were collected to assess treatment effects on behavioral functioning commonly associated with symptoms of ADHD to determine the impact of the level of parent involvement in family education and consultation. Some of the measures that were used have been developed for older children; however, due to the nature of a longitudinal study, these specific instruments were selected to keep consistency in measurement for longitudinal comparisons across time.

Child Behavior Checklist (Achenbach, 1991). The Child Behavior Checklist (CBCL) is one of the most common measures used in investigations of social, emotional, and behavior problems in children. The CBCL consists of 118 items rated on a 3-point scale (0= not true, 1= somewhat or sometimes true, 2= very true or often true) that load on the Internalizing, Externalizing, and Total Problems Scales. This study focused specifically on the Oppositional Defiant and Conduct Problems subscales within the Externalizing Problems scale. Raw scores were used to measure change because they are more sensitive to change over time. The Oppositional Defiant and Conduct Problems subscales were used in this study as a dependent measure because noncompliant and oppositional behaviors were hypothesized to often be the target of interventions. The internal consistency, concurrent validity, and test-retest reliability of this scale have been well demonstrated (Achenbach, 1991).

Social Skills Rating System—Parent Form (Gresham & Elliott, 1990). *The Social Skills Rating System – Parent Form (SSRS-P)* is a 55-item rating scale for children in

kindergarten through sixth grade, which assesses the domains of social skills and problem behaviors. Items on the SSRS-P are rated on a 3-point rating scale (0 = Never, 1 = Sometimes, 2 = Very often). Raw scores on the following subscales on the SSRS-P served as dependent measures for this study; Cooperation, Assertion, Self-Control, and Responsibility. The psychometric properties for the SSRS-P are adequate (Gresham & Elliott, 1990). Test-retest reliability for the parent form over four weeks was adequate, ranging from .48 to .88. Criterion related validity was established by comparing the SSRS-P with the Child Behavior Checklist-Parent Report Form (CBCL; Achenbach & Edelbrock, 1983). Adequate levels of criterion validity were established using these instruments.

Parent Child Interactions (PCI). Data collectors blind to the purposes of the study and group membership of participants collected observational data at baseline and 12 months in the home setting using adapted procedures developed by Timm and Strain (2002). Observations were conducted during one 30-minute period during baseline and intervention data collection. These observations were conducted immediately before, during, and after dinnertime in order to maximize potential for parent-child interactions. In an effort to be unobtrusive, the determination as to when these observations would take place was made based on collaboration with the family for each individual participant. The coding system consisted of a 10-s, partial interval coding system in which observers coded all behaviors witnessed within each interval. These observations collect data on positive and negative parent-child interactions, as well as child positive social behavior, and parent alpha commands. More specifically, behaviors observed using the coding system included both parent and child behaviors. Child codes were characterized by negative and positive behaviors. Negative behaviors included noncompliance to adult commands, inappropriate non-social behavior such as breaking rules of conduct, and

negative social behaviors directed at an adult or another child. Positive behaviors included compliance with adult commands, appropriate non-social behavior, and positive social behavior. Specifically, this study focused on the following parent-child observation variables; parent alpha command, child non-compliance, and negative parental response. Operational definitions for these codes are provided in Appendix A. These dimensions served as dependent measures for this study.

Assessment of interobserver agreement was calculated on at least 30% of the observations. Interobserver agreement data were collected by two trained data collectors recording behavior simultaneously and independently. Agreement was assessed on an interval-by-interval basis. Total percentage agreement was calculated by dividing the number of agreements per session by the number of agreements and disagreements and multiplied by 100%. Mean total agreement was calculated to be 94.5% (range = 89%-98%) for the parent-child interactions.

Predictor Variables

Child Behavior Checklist (Achenbach, 1991). In order to gain a measure of severity of ADHD symptoms at baseline, this study focused specifically on the Attention Deficit Hyperactivity Problems raw score on the CBCL obtained at pretreatment. Raw scores were used because they are more sensitive to change over time.

Socioeconomic Risk Factor. A socioeconomic risk factor was derived for each participant using a 0-2 scale. A combination of parent report on occupation and employment derived via the Hollingshead scale (Hollingshead & Redlich, 1958) status was used to determine if the participant was of low income. Participants were assigned a “low income” status if they were reported as working part-time, unemployed, or disabled. They were also assigned a “low

income" status if the highest family reported occupation was skilled manual employment, machine operator, or unskilled employee. Data available on ethnicity to determine if the participant was non-white. If data were provided on both mother and father, the highest occupation and employment status of the two was used. A score of zero was assigned if the family did not have any socioeconomic risk factors (i.e., Caucasian and not low income), a score of one was assigned if the family had one socioeconomic risk factor (e.g., non-white or low income), and a score of two was assigned if the family had two socioeconomic risk factors (i.e., non-white and low income). Including a socioeconomic risk factor allowed for an investigation of the relationship between family demographics and the impact of family engagement which was defined as dosage.

Dosage. Dosage of behavior management supports was quantified two-fold. First, attendance was computed as the number of family education sessions attended by a caregiver during the first 12 months of treatment. Session attendance was determined using the facilitator's written record as the primary source. A secondary measure of dosage was determined by the hours of home-based consultation services parents participated in to include an FBA, BFA, PBSP, and ongoing home consultation sessions.

Procedure

Pediatricians, parents, and teachers provided referrals for this larger scale project. Participant recruitment consisted of sending brochures to preschools, day-care centers, and pediatricians' offices within a 30-mile radius of Lehigh University. These brochures contained general project information as well as characteristics of children at-risk for ADHD. Recruitment took place over four years. Children recruited for the study exhibited significant difficulties with inattention, impulsive behavior, and/or over activity.

Recruitment efforts yielded a total of 536 contacts. When parents first contacted the project office, they participated in an interview in which information was solicited regarding child engagement in challenging behaviors. If the parent indicated the child engaged in hyperactive and impulsive behavior (i.e., extremely active, problems keeping attention, easily distracted, acts quickly without thinking, and fidgets and squirms often), a three-part screening process began.

Once children passed the screening process and met research criteria for ADHD as described previously, informed consent was obtained from all parents, and children were randomly assigned to either a Multi-Component Intervention (MCI) group or a Family education (PE) group using a computer-generated random-numbers table. The proposed study includes only those families assigned to the MCI group.

Upon enrollment in the study and assignment to intervention groups, participants were grouped into cohorts for family education. Cohorts were formed approximately every three months to avoid intervention delay. Due to the varying rate of enrollment, cohort size ranged from 4 to 24 families. Each cohort was assigned a consultant who was responsible for delivering intervention components to parents and children in their cohort. Advanced doctoral students in school psychology, special education, or counseling psychology served as consultants.

All consultants completed a week-long community-based education on group facilitation. In addition, all consultants reviewed procedural manuals related to the project and were initially supervised by one of the principal investigators of the larger scale project. Consultants for the MCI intervention group had prior graduate coursework in behavioral assessment, intervention, and consultation.

All family education sessions for the MCI group were audiotaped. Procedural integrity was evaluated by a principal investigator for 17.1% of the MCI sessions. Integrity checklists were created for the purpose of this study which included all topics, subtopics, and activities that comprised the respective family education sessions. Mean session integrity was 96.4% (range 42-100%) for the MCI group. The session that received a 42% session integrity was an outlier. During this session, there was a very difficult-to-manage parent that was continually off-topic and the facilitator was unable to complete the session as intended. When integrity measured below a 90% threshold, one of the principal investigators met with the consultant to provide specific feedback.

Assessments used for data collection occurred at project entry (baseline) and at six months and one year to yield a total of three assessment phases. Assessments included the CBCL, CRS-R, and the SSRS, as described above. These assessments were mailed to parents along with a postage enclosed envelope. Upon receipt of completed packet, parents received a stipend of $50.

Multi-Component Intervention (MCI). Participants received an intervention package focused on various domains. Intervention components included family education classes and individualized assessment-based intervention in the home.

Family education. Family education was delivered through the Community Parent education (COPE) Program (Cunningham, Bremner, & Secord-Gilbert, 1997). The curriculum of this program develops the more specialized approaches needed to promote positive behavior, improve self-regulation, reduce antisocial behavior, and cope with the child's difficulties more successfully. The COPE program uses a coping modeling-problem solving approach to skill acquisition in which participants formulate their own solutions. Participants observed videotapes

depicting exaggerated versions of common parenting errors, were asked to identify what went wrong, discussed the impact of these errors on child behavior and family relationships, devised alternative strategies, and formulated supporting rationales. To ensure sessions are facilitated as intended, the initial session was observed and feedback provided by one of the principal investigators of the larger scale study or by a consultant who successfully completed family education with a prior cohort.

The parenting course was organized into 20 bi-weekly sessions. All sessions were facilitated by consultants who were doctoral students in special education or school psychology. All consultants were trained and supervised in the implementation of the procedures. If parents were unable to attend a session, materials explaining the session were sent to the participant's home through the mail within 7 days from the session. To increase participation, transportation was available as well as the provision of childcare and snacks. During each session, parents reviewed situations where the preceding session's strategies were applied successfully. Parents were encouraged to consider the long- term impact of strategies on parent-child relationships, self-regulation, or social conduct. Parents were taught to trouble-shoot parenting errors by observing brief videotaped vignettes depicting exaggerated parenting errors. Parents then formulated solutions to videotaped child management errors by identifying mistakes and discussing potential consequences. To encourage the application of the newly formed strategies, parents were asked to suggest several situations to which the session's strategy might be applied and to formulate detailed plans regarding implementation. Parents were assigned homework based on the strategies taught, requiring the identification of situations in which new strategies could be utilized. At following sessions, parents were encouraged to share situations in which they attempted new strategies and reflect on the overall effectiveness.

Topics covered throughout the curriculum included encouraging positive behavior and improving parent-child relationships, balancing family relationships, avoiding conflicts, managing transitions, increasing compliance, improving self-regulation, responding to antisocial behavior, point systems, coordinating child management plans, and solving outstanding problems. Further, parents received specific training in functional behavior assessment. Two initial sessions provided an overview of the research project and an introduction to ADHD (e.g., characteristics, prevalence, history, basic interventions).

Of the 20 sessions, 3 sessions were devoted to specific training in functional behavior assessment. These sessions were not part of the COPE program. The first of these sessions provided an overview of behavior functions. Videotaped vignettes accompanied instruction to illustrate the concept of context-related behavior and function. During the second functional behavior assessment session, parents were taught strategies to identify the function of their child's problem behavior at home. Parents were provided the opportunity to select and practice three preferred formats for collecting data (e.g., written description of antecedents and consequences, description of ongoing activity and frequency of problem behavior during that activity, and a checklist of antecedent and subsequent events). Parents were also introduced to intervention strategies that are matched to behavioral function. Instruction was provided in developing antecedent interventions, skill building, and providing consequences in a manner least likely to reinforce inappropriate behavior. If parents were unable to attend any of these three sessions, the consultant offered a tutorial on these sessions in the participant's home.

Functional Behavior Assessment. Parents also met with consultants for a 40-minute problem identification interview (Kratochwill & Bergan, 1990). In this interview, parents identified a specific problem and were asked to collect Antecedent, Behavior, and Consequence

(ABC) data on this behavior for one week. In a subsequent problem analysis interview (Kratochwill & Bergan, 1990), the consultant met with the parent and collaboratively reviewed the data collected and generated hypotheses regarding antecedents and consequences that might have been maintaining the behavior, designed interventions, and set desired goals.

Parents were asked to collect ABC data on their child's behavior as it occurred before the first consultation meeting. Parents directly observed the child and recorded anecdotal data over one week before the first consultation meeting. Parents were trained to collect ABC data during the family education sessions. A functional behavior assessment was then conducted collaboratively with the consultant and each child's parent. Using the ABC data, hypotheses were developed collaboratively based on the variables proposed to be maintaining behavior.

Once these hypotheses were developed regarding behavior function, conditions were staged to confirm these functions and to assist in intervention development. Functional analysis conditions ensued using a single case sequential design with contingency reversals conducted based on the results of the brief functional analysis (BFA). Each session lasted between 5 and 10 minutes with a brief (1 to 2 minute) break between sessions during which the child played. Parents took an active role in this functional analysis procedure. The BFA was completed in the homes of the participants and used materials during the sessions that were familiar items and found in the participants' homes. Items used during the BFA included participants' preferred items as identified by the parents (e.g., computer, Play Doh) as well as items required to complete routines or tasks (e.g. toothbrush, items to clean up).The BFA was conducted with slight variation of the procedures described by Northup et al. (1991).

A total of 71 participants received the multicomponent intervention. Of these participants, 48% did not participate in the BFA process, although it was intended for all parents

to participate. Lack of participation included moving away, dropping out of the study, requesting support only in the daycare or preschool setting, or unavailability of parents. The BFA was implemented with 52% of participants. Children with available BFA data were not significantly different from children whose BFA were unavailable with respect to parent ratings of hyperactivity-impulsivity, parent-rated impairment, or global cognitive abilities (all *p*s > .05). Children with unavailable BFA data were not rated by parents as significantly more inattentive and oppositional than those with BFA data available (p <.05).

Analogue assessment phase. In the analogue assessment phase, child behaviors were assessed in the following four conditions: (a) Play (control condition), (b) Positive reinforcement: attention, (c) Positive reinforcement: tangible, and (d) Negative reinforcement: escape. The consultant recorded the child's display of target behaviors during each phase. Conditions were presented in a random order for all participants and each session was 5 min in length with at least a 2-min break between sessions.

Replication phase. The conditions that produce the lowest and highest rate of the target behavior during the analogue assessment phase were replicated in that order. Each condition followed the same format as described above.

Contingency reversal phase. During the contingency reversal phase, the consequence that followed the inappropriate behavior during the functional analysis conditions were presented following an alternative appropriate behavior and was withheld following a target behavior.

During the functional analysis, data was collected on child and parent behaviors using a 15-second partial interval recording procedure. A 15-second whole interval coding procedure was used to collect data on the child engagement in appropriate behavior. The following child behaviors were coded using the videotaped functional analysis procedures. *Appropriate Behavior*

was coded when the child appropriately engaged with materials or another person, complied with instructions, and did not demonstrate any instance of inappropriate behavior. The behavior of *Aggression* was recorded if the child engaged in any form of inappropriate physical action directed at another person (e.g., kicking, biting, pushing, slapping, punching, spitting, or throwing objects at someone). *Disruption* was defined as any action that disrupts the environment or task (e.g., throwing objects although not directed at someone, banging, tapping, or using objects inappropriately or forcefully). *Inappropriate vocal behavior* was coded if the child engaged in screaming, yelling, crying, whining, or making noises at a volume above conversation or inappropriate to the context. *Noncompliance* was defined as refusing to comply with a directive, request, or prompt within 5 s after it was issued. *An inappropriate sibling interaction* was defined as any aggressive, disruptive, or inappropriate vocal behavior directed at a sibling (e.g., taking a toy away, calling the sibling a derogatory name). *Appropriate sibling interaction* was recorded when the child was engaged appropriately with sibling either playing next to one another with the same set of toys (e.g. blocks, or doll house) or engaged in the same activity (e.g., sharing toys or playing a structured game). The children did not need to be verbally interacting with one another for this to be coded.

Interoberserver agreement data were calculated during 33% of the functional analysis conditions on behavior occurrence, nonoccurrence, and total agreement for child and parent behaviors. Prior to coding data, the data collectors received a 2-hour training on the dependent measures and data collection system, using practice videotapes. Training consisted of a review of the dependent measures and operational definitions as well as examples and non-examples of the behaviors. Coding began once the data collectors demonstrated 80% reliability or higher on the identification of specific child and parent behaviors. Interobserver agreement was calculated by

dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. During the functional analysis, occurrence and total agreement was calculated for each of the child and parent behaviors.

All functional analyses were completed in the home by a parent receiving coaching from a consultant who was a doctoral student in school psychology or special education with prior coursework and experience in applied behavior analysis and behavioral assessment. Students serving as consultants received a 1-hour training session consisting of review of written procedures for conducting a functional analysis, discussion of behavioral definitions, and answering any questions. Further, consultants observed a minimum of one functional analysis and conducted three functional analyses with coaching.

The general purpose and procedures were described to the parent prior to beginning the BFA. The parent was asked to assist in generating ideas about activities and tasks that could be used during the sessions and specific procedures were reviewed and modeled for the parent. Coaching was available to the parent during the analysis, if needed. Coaching took the form of prompting parents to provide reinforcement following child problem behavior.

Intervention Development and Intervention Evaluation. After the functional behavioral assessment was completed and a function maintaining the child's problem behavior was identified, an individualized intervention plan based on behavioral function was devised. These interventions included antecedent strategies, skill building, and/or consequent approaches. Parents received training in implementing the interventions. Throughout intervention phases, parents were cued to collect frequency/duration data on the target behavior for one week prior to a meeting with a consultant. During this meeting the data was reviewed and progress assessed. Current interventions were reviewed and, if necessary, altered. These decisions were made

collaboratively by the parent and consultant based on the data the parent collected and the parent report.

Procedural Integrity. Procedural integrity data were generated by videotaping functional assessment procedures. The integrity of the procedures during every session of the functional analysis was assessed. Each functional analysis condition had a specific consequence that would immediately follow the occurrence of target behaviors during the same or subsequent 15-second interval. Each of the following behaviors were coded. Attention was recorded if the parent interacted with the child during the attention condition within 30-s following problem behaviors. Escape was coded if the parent provided the child with a break from the task during the escape condition within 30-s contingent on the occurrence of problem behaviors. Finally, Tangible was scored if the parent allows the child to have access to the preferred item during the tangible condition within 30-s following the presence of problem behaviors. Procedural integrity for the functional analysis procedures was generated by video recording functional analysis sessions and subsequently coding each phase within the functional analysis session for each participant. Procedural integrity data were calculated as the percentage of intervals in which the target behavior was followed by the "correct" consequence and during which no other independent variable occurred, divided by the percentage of intervals in which the target behavior occurred. Integrity was calculated in terms of percentage for each session.

Procedural integrity data were also generated by audio taping all family education sessions. The integrity of the sessions was assessed by comparing audio taped session to a pre-designed script outlining components of each session. Procedural integrity data were calculated as the number of components completed divided by the total number of components. Integrity was calculated in terms of percentage for each family education session.

Data Analysis

Evaluating associated assumptions. Prior to analyzing the data though hierarchical regression analysis (detailed below), the associated assumptions of hierarchical regression were conducted. The assumptions were investigated within the samples relevant to each research question detailed in the following sections. These assumptions include independence of observations, normality, linearity, homoscedasticity, and multicollinearity. Normality was examined by examining histograms, visual examination of P-P plots, and skewness and kurtosis statistics. Skewness and kurtosis statistics were evaluated following recommendations by Leech, Barett, and Morgan (2005). If the absolute value of a statistic divided by the respective standard error was 2.5 or less, then the distribution of the variable was accepted as approximately normal. Examination of residual plots was used to evaluate linearity and non-linear forms of regression were considered if this assumption is not fulfilled. Homosedasticity of residuals, or the constant variance of the residuals, was determined by examining a scatter plot of residuals. If needed, violations were corrected using data transformations. Multicollinearity was considered by examining bivariate correlations among all variables and predictors were narrowed as necessary if this assumption is not satisfied. Collinearity diagnostics including tolerance or the variance-inflation factor (VIF) were also used to confirm satisfaction of this assumption. Once each of the aforementioned assumptions was tested and addressed, the hypotheses were evaluated using the following multiple regression models.

Regression analyses. Intervention effects of overall impact of family education on the MCI group was determined using separate regression analyses for each dependent variable at 12 months participation in the study using data collected at baseline and 12 months. All data available for each participant will be used regardless of the dose of actual intervention received.

Three different prediction models using hierarchical regression analyses were proposed to examine the four research questions posed for this investigation. Raw scores obtained on the Oppositional Defiant and Conduct Problems subscales within the Externalizing Problems scale of the CBCL served as the criterion measure for the model addressing the first hypothesis of the first research question and fourth hypothesis of the third research question. Raw scores on the Cooperation, Assertion, Self-Control, and Responsibility subscales on the SSRS-P served as the criterion measure for the first research question addressing the second hypothesis and the third research question addressing the fifth hypothesis. A composite measure derived using factor analytic procedures using a forced 1-factor model based on the following parent-child observation variables; parent alpha command, child non-compliance, and negative parental response served as the criterion measure to address the third research question and the fourth research question.

To address the first research question, the regression model served to investigate the predictors of parent participation in family education on behavioral outcomes after one year of treatment. Given that previous research suggests that severity of impairment and demographic characteristics account for future impairment in functioning, the severity of symptoms at pre-treatment (inattention and hyperactivity/impulsivity) was entered into the model to serve as the base of the prediction model. Entering this variable first into the model will render the analysis as an analysis of covariance which eliminates pre-test variability from the outcome measure. Next, the socioeconomic risk variable was entered into the model using a 0-2 scale based on the number of socioeconomic risk variables the family has (i.e., 0 = white and not low income, 1 = white and low income or non-white or low income, and 2 = non-white and low income). Gender was not entered into the model because there is no theoretical or empirical evidence to suggest

that gender is a predictor of overall outcomes. Age was also not entered into the model because the age range (i.e. 3-5 years) is very restrictive to begin with and there is no theoretical or empirical evidence to suggest that difference between 3 to 5 years old children will be a predictor of overall outcomes. Finally, the dosage of parent participation in family education was added in the next step in the model. Such an analysis allowed for the evaluation of the unique contribution of parent involvement in parent education above and beyond the impact of the severity of ADHD symptoms and socioeconomic risk. To address the second research question, the above model was replicated except the dosage of parent participation in consultation was added in the final step of the model. This final step allowed for the evaluation of the incremental value of consultation.

To address the third research question, a regression model served to evaluate the predictive role of parent participation in family education and parent-child interactions. Using exploratory factor analysis, a composite measure was derived from the following variables: parent alpha command, child noncompliance, and negative parental response. It can be assumed these three variables occur in succession, demonstrating the dynamic of parent-child negative interactions. Therefore, using the procedure of principal component analysis, a composite score was created using a forced 1-factor procedure. Cronbach's alpha (Cronbach, 1951) was used to measure the reliability of the composite score derived. The alpha coefficient for the parent-child interaction composite at 1-year and 6-months was .63 and .65 respectively for three items included. Values below .7 can be expected and are considered acceptable (Kline, 1999).

Similar to the previous model, severity of symptoms at pre-treatment (inattention and hyperactivity/impulsivity) was entered first into the model. The next step entered the socioeconomic risk variable as described above. Finally, the dosage of parent participation in

family education was added as the last step. To address the fourth research question, the above model was replicated with the inclusion of the dosage of parent participation in consultation in the final step of the model. This allowed for the evaluation of the incremental predictive value of consultation above and beyond attendance at family education sessions.

Power Analysis. In order to achieve sufficient power (.80) to detect moderate effect size (r = .50) for the planned hierarchical multiple regression analyses using three predictors for the first and third research questions, assuming an alpha level of .05, 76 participants were necessary to include in the sample. In order to achieve sufficient power (.80) to detect moderate effect size (r = .50) for the planned hierarchical multiple regression analyses using four predictors for the second and fourth research questions, assuming an alpha level of .05, 84 participants were necessary to include in the sample. With a sample size of 71 participants, this analysis suggests 5 or 8 more subjects are needed respectively to provide adequate power to detect a moderate effect size. The obtained power for each analysis will be reported in the results section.

Chapter 4. Results

Testing of Assumptions

Prior to testing the research questions, the assumptions of hierarchical multiple regression analyses were examined to ensure the appropriateness of the data. The following assumptions were evaluated: independence of observations, normality, linearity, homoscedasticity, and multicollinearity.

Independence of observations. Testing for independence of observations ensures errors associated with one observation are not correlated with errors of other observations. The Durbin-Watson statistic was used to evaluate this assumption, with values around 2.0 and ranging from 1.5 to 2.5 generally considered acceptable (Cohen, Cohen, West, & Aiken, 2003). Durbin-Watson values in all samples at both 1-year post-enrollment and 6-months post-enrollment were within the range of 1.64 to 2.42, indicating the assumption of independence of observations was satisfied.

Normality. The assumption of normality was examined through visual inspection of histograms and normal q-q plots and through evaluation of skewness and kurtosis statistics for each predictor and criterion variable. Histogram and probability plots were observed to represent normal distributions. Skewness and kurtosis statistics were evaluated following recommendations by Leech, Barett, and Morgan (2005). If the absolute value of a statistic divided by the respective standard error was 2.5 or less, then the distribution of the variable was accepted as approximately normal. All predictors had skewness and kurtosis values under 2.5. The aforementioned indicators were considered collectively to evaluate normality. Distributions of the criterion variables satisfied the assumption of normality.

Linearity. The assumption of linearity was tested by examining linear relationships between the outcome variable and the predictor variables by examining plots of observed verses predicted variables. These plots showed that points were randomly distributed along a digital line. Therefore, the assumption of linearity was satisfied within each regression equation.

Homoscedasticity. Homoscedasticity of the residuals was evaluated by observing a scatterplot of the residuals. Absence of curves and patterns in these residual plots indicates residual errors are dispersed randomly throughout the range of estimated dependents. Scatterplots indicated that residuals were distributed approximately equally across values, suggesting the assumption of homoscedasticity was fulfilled.

Multicollinearity. Multicollinearity was evaluated using the collinearity diagnostic statistics of tolerance and variance-inflation factor (VIF). Evaluation of multicollinearity is necessary to ensure that no variable is a near perfect linear combination of any other variable, which would result in inflated regression coefficients. Cohen et al. (2003) suggested tolerance values of .10 or less and VIF values of 10 or higher indicate serious problems with multicollinearity. Results indicate values for tolerance and VIF were within acceptable ranges for all models, indicating the assumption of multicollinearity was satisfied in all regressions.

Demographic Characteristics

Demographic characteristics for the current study are provided in Table 1. The total sample was mostly Caucasian, married, and had full-time employment status. There was greater variability in employment position and education levels. The greatest percentage of parents reported that they were employed in clerical or sales, administrative or personnel, skilled manual employment, or business management. Of parents who reported on their education level, from

greatest to least, most parents reported they had some college education, were a high school graduate, or graduated college.

Descriptive Data

Descriptive statistics, including means and standard deviations, for all predictor and criterion measures at one year post-enrollment including oppositional/defiance and conduct disorder scores, social skills, and parent-child interaction variables, respectively are presented in Tables 2, 3, and 4. Three separate hierarchical regression analyses were used to evaluate the research questions. For all three models, severity of symptoms at baseline was included in the first step of the model. This consisted of raw score ratings on the Attention Deficit Hyperactivity Problems subscale from the CBCL Oppositional Defiant and Conduct Problems subscale (Achenbach, 1991) at baseline.

A socio-economic risk factor was generated for each participant using a combination of occupation and employment status to determine if the participant was of low income as well as data on ethnicity to determine if the participant was non-white. Each participant was assigned a SES risk factor of 0, 1, or 2 (0= no risk factors, 1 = either low income or non-white, 2 = low income and non-white). This socio-economic risk factor was entered at the next step of the model.

The dosage of parent participation in parent education sessions (i.e., number of sessions attended) was entered in the third step of the model. Lastly, the dosage of parent participation in assessment-based intervention and consultation (i.e., total number of consultation hours received) was entered into the model.

Planned Comparisons

A series of three multiple regression analyses with four levels each were completed first to address the planned comparisons noted in the research questions. These are described below. Post hoc analyses consisting of three additional multiple regression analyses were completed as a result of the data derived from the planned comparisons. These results are described following the planned comparisons below.

Hierarchical Regression Analyses for Oppositional Behavior, Conduct Problems, and Social Skills 1-Year Post-Enrollment. A hierarchical multiple regression analysis was conducted to evaluate the first research question. Correlations between predictors and outcome variable are presented above the diagonal in Table 5. Using the CBCL Oppositional Defiant Disorder and Conduct Disorder raw scores combined at one-year post-enrollment as the criterion variable, the base model, including severity of symptoms at baseline as described previously, was not found to be statistically significant (F (1,18) = 0.77; R^2= 0.01). The addition of a socio-economic risk factor in the second step was also non-significant (F= (2, 17) = 0.91; R^2=.0.01), as was the addition of the number of family education sessions attended in the third step (F = (3, 16) = 0.97; R^2= 0.02).

To evaluate the second research question investigating the incremental value of the dosage of consultation services received which was operationalized as the number of consultation hours provided, a fourth step was added in the hierarchical multiple regression analysis described above. The addition of the total number of consultation hours received was also non-significant (F (4, 15) = 0.99; R^2=.0.02). Results for the data set are provided in Table 6. The obtained power for this model was .97

A second hierarchical multiple regression analysis was conducted to continue the evaluation of the first research question. Correlations between predictors and outcome variable

are presented above the diagonal in Table 7. Using the SSIS-P Social Skills raw score at one-year post-enrollment as the criterion variable, the base model including severity of symptoms at baseline was not found to be statistically significant (F= (1, 27) = 0.66; R^2= 0.01). The addition of a socio-economic risk factor in the second step of the model was also not statistically significant (F= (2, 26) = 0.54; R^2 = 0.05). The addition of the number of family education sessions attended in the third step was also not significant (F= (3, 25) = 0.54; R^2=0.08).

A fourth step was added to the model to investigate the incremental value of the dosage of consultation received in the second research question. The addition of the total number of consultation hours received in the fourth step of the model was also not statistically significant F= (4, 24) = 0.61; R^2=0.1). Results for the data set are provided in Table 8. The obtained power for this model was .85.

Hierarchical Regression Analyses for Parent-Child Interactions 1-Year Post-Enrollment. A third hierarchical multiple regression analysis was conducted to evaluate the third research question. Correlations between the predictor measures and the outcome variable are presented above the diagonal in Table 9. A composite score was derived from factor analytic procedures using a forced 1-factor model based on the following parent-child observation variables: parent alpha command, child non-compliance, and negative parental response which served as the criterion measure. The base model including severity of symptoms at baseline was not found to be statistically significant (F (1, 33) = 0.23; R^2= 0.04). The addition of a socio-economic risk factor in the second step of the model was also not statistically significant (F= (2, 32) = 0.47; R^2=0.05). Adding the number of family education sessions attended in the third step was also not significant (F= (3, 31) = 0.56; R^2= - 0.06).

To evaluate the fourth research question investigating the incremental value of the dosage of consultation services operationalized as the number of consultation hours received, a fourth step was added in the hierarchical multiple regression analysis described above. The addition of the total number of consultation hours received was also non-significant (F (4, 30) = 0.70; R^2=.0.07). Results for the data set are provided in Table 10. The obtained power for this model was .87.

Post Hoc Analyses

As a result of the non-significant outcomes across all three criterion measures analyzed at one-year post-enrollment, post hoc analyses were completed using three multiple regression analyses using the same predictor and criterion variables at 6-months post-enrollment. It was hypothesized that large amounts of missing data may have limited power to detect statistically significant regression coefficients at 1-year post-enrollment. A greater amount of data was available at 6-months post-enrollment, therefore these data were also analyzed. Descriptive statistics, including means and standard deviations, for all predictor and criterion measures at 6-months post-enrollment including oppositional/defiance and conduct disorder scores, social skills, and parent-child interaction variables, respectively are presented in Tables 11, 12, and 13.

Hierarchical Regression Analyses for Oppositional Behavior, Conduct Problems, and Social Skills 6-Months Post-Enrollment. A hierarchical multiple regression analysis was conducted to evaluate the relationship between dosage of parent involvement in family education and subsequent ratings of oppositional behavior, conduct problems, and social skills following 6-months of participation in the study rather than one year as originally proposed. Correlations between predictors and outcome variable are presented above the diagonal in Table 14.

Using the CBCL Oppositional Defiant Disorder and Conduct Disorder raw scores combined at 6-months post-enrollment as the criterion measure, revealed a statistically significant baseline prediction model (F (1, 34) = 0.01, p<.01; R^2=0.21). The addition of the socio-economic risk factor in the second step did not significantly improve the prediction model (ΔF (1, 33) = 0.83; ΔR^2= 0.001), rather with these variables included, the overall prediction model was no longer statistically significant (F (2, 33) = 0.02; R^2= 0.21). The addition of the number of family education sessions attended in the third step, however, resulted in a significant improvement in prediction over the previous model (Δ F (1, 32) =0.04, p<.05; ΔR^2=0 .10) and an overall statistically significant model (F (3, 32) =0.01, p<.01; R^2=0.31). Finally, a fourth step was added to the model to investigate the incremental value of the dosage of consultation received. The addition of the number of consultation hours received in the fourth step of the model did not result in significant improvement in prediction (ΔF (4, 31) = 0.97; ΔR^2= 0.000). In contrast, with the amount of consultation hours received included in the model, the overall prediction model was no longer statistically significant (F (4, 31) = 0.02; R^2= 0.31). The obtained power for this model was .75.

Examination of individual beta coefficients in this final model identified severity of symptoms at baseline (p<.01) and number of family education sessions attended (p<.05) to be statistically significant predictors. Both severity of symptoms at baseline and number of family education sessions attended were found to be positively associated with the criterion variable with both having positive beta weights. Thus, improvement ratings in oppositional behavior and conduct problems at 6 months post-enrollment was predicted by severity of ADHD symptoms at pretreatment and the number of family education sessions attended. The standardized beta coefficients for all indicators in each of the four steps are listed in Table 15.

A hierarchical multiple regression analysis was conducted to evaluate the relationship between dosage of parent involvement in family education and subsequent ratings of social skills at 6-months post-enrollment. Correlations between predictors and outcome variable are presented above the diagonal in Table 16. Using the SSRS-P Social Skills raw score at 6-months post-enrollment as the criterion variable, the base model including severity of symptoms at baseline was not found to be statistically significant (F (1,35) = 0.50; R^2= 0.01). The addition of a socio-economic risk factor in the second step of the model was also not statistically significant (F = (2, 34) = 0.24; R^2 = 0.09). The addition of the number of family education sessions attended in the third step was also not statistically significant (F= (3, 33) = 0.40; R^2 = 0.09). A fourth step was added to the model to investigate the incremental value of the dosage of consultation received. The addition of the total number of consultation hours received in the fourth step of the model was also not statistically significant F = (4, 32) = 0.56; R^2 = 0.09). Results for the data set are provided in Table 17. The obtained power for this model was .86.

Hierarchical Regression Analyses for Parent-Child Interactions 6-Months Post-Enrollment. A third hierarchical multiple regression analysis was conducted to evaluate the relationship between parent involvement in family education and subsequent parent-child interactions. Correlations between the predictor measures and the outcome variable are presented above the diagonal in Table 18. As described in the one-year analysis previously noted, a composite score was derived from factor analytic procedures using a forced 1-factor model based on the following parent-child observation variables: parent alpha command, child non-compliance, and negative parental response, which served as the criterion measure.

The base model that included severity of symptoms at baseline was not found to be statistically significant (F (1, 29) = 0.99; R^2= 0.00). The addition of a socio-economic risk factor

in the second step of the model was also not statistically significant (F= (2, 28) =1.00; R^2 = 0.00). Adding the number of family education sessions attended in the third step was also not statistically significant (F = (3, 27) = 0.98; R^2 = - 0.08). Upon investigating the incremental value of the dosage of consultation services defined by the number of consultation hours received, a fourth step and final was added in the hierarchical multiple regression analysis described above. The addition of the total number of consultation hours received was also not statistically significant (F (4, 26) = 0.16; R^2=.0.22). Results for the data set are provided in Table 19. The obtained power for this model was .79.

Missing Data Patterns

In order to appropriately address missing data across variables any significant differences between those who completed assessments versus those who did not were examined by conducting a multivariate analysis of variance (MANOVA) one-year post-enrollment and 6-months post-enrollment.

Data at 1-Year Post-Enrollment. Participants with data available were compared to participants without data available based on the categorical variables of ethnicity and gender. Groups were also compared based on numerical comparisons of the highest occupation between both parents, age of the child, and severity of symptoms at baseline. Differences in gender were compared based on participants who had data available for the independent variables and at least one dependent variable at one-year post-enrollment. Out of 73 possible participants, 52% of them had complete data. Results indicated that participants did not differ significantly in gender between those who had data available and those with missing data, χ^2 (1) = 0.003, p = .95. Differences in ethnicity of participants who had data available at one-year post-enrollment compared to those with missing data were also compared. Out of 73 possible participants,

complete data were available for 54% of them. Results indicated that participants did not differ significantly in ethnicity between those who had complete data and those with missing data, χ^2 (1) = 2.01, p = 0.15.

Using numerical data, *t*-tests were used to determine differences between participants who had data available for the independent variables and at least one dependent variable at one-year post-enrollment for the highest household occupation. Out of a total of 73 participants, data were available for 45% of them. Results indicated that participants did not differ significantly with regard to the highest household occupation for those with available data (M = 4.03) and those with missing data (M = 4.29; t (48) = 0.72, p = 0.48). Differences between the age of participants who had data available compared to those with missing data were also examined using *t*-tests. Out of a total of 73 participants, data were available for 52% of participants. Results indicated that participants who had independent variables and at least one dependent variable available at one-year post-baseline (M = 3.87) did not differ in terms of age from those with missing data (M = 4.06; t (71) = 1.09, p = 0.28). Group differences in severity of symptoms at baseline between participants who had independent variables available and at least one dependent variable were compared to those with missing data. Out of a total of 73 participants, data were available for 52% of participants. Results of the *t*-test indicated no statistically significant group differences in severity of symptoms at baseline for participants who had available data (M = 10.53) and those who had missing data (M = 9.14; t (58) = -1.76, p = 0.08).

Data at 6-Months Post-Enrollment. Differences between participants with available data and those without available data were compared based on the above-described measures of ethnicity, gender, highest household occupation, age, and severity of symptoms at baseline. As described previously, participants were categorized as having data if they had data available for

the independent variables and at least one dependent variable at 6-months post-enrollment. Out of 73 possible participants, 55% of them had data. Results indicated that participants did not differ significantly in gender between those who had data available and those with missing data χ^2 (1) = 1.93, p = 0.17. Ethnic differences between participants who had data available and those who did not at 6-months post-enrollment were also compared. Out of 73 possible participants, data were available for 56% of them. Results indicated that participants did not differ significantly in ethnicity between those who had data and those with missing data χ^2 (1) = 1.46, p = 0.23.

A *t*-test was used to determine differences between participants who had data available for the independent variables and at least one dependent variable at 6-months post-enrollment for the highest household occupation. Out of a total of 73 participants, data were available for 45% of them. Results indicated that participants did not differ significantly with regard to the highest household occupation for those with available data (M = 4.00) and those with missing data (M = 4.41; t (48) = 1.22, p = 0.23). Differences between the age of participants who had data available compared to those with missing data were also examined using *t*-tests. Out of a total of 73 participants, data were available for 55% of participants. Results indicated that participants who had independent variables and at least one dependent variable available at 6-months post-baseline (M = 3.85) did not differ from those with missing data (M = 4.09; t (71) = 1.40, p = 0.17). Group differences in severity of symptoms at baseline between participants who had independent variables available and at least one dependent variable were compared to those with missing data. Out of a total of 73 participants, data were available for 55% or participants. Results of the *t*-test indicated no significant group differences in severity of symptoms at

baseline for participants who had available data (M = 10.10) and those who had missing data (M = 9.85; t (58) = -0.30, p = 0.76).

Chapter 5. Discussion

The purpose of the present study was to examine the relationship between dosage of behavior management supports including family education, functional behavior assessment/brief functional analysis, and consultation and subsequent behavioral outcomes for young children with ADHD. These outcomes included ratings of oppositional behavior and conduct problems, social skills, and parent-child interactions. Dosage of behavior management supports was determined first by the number of family education sessions attended and a secondary measure of dosage was determined by the number hours parents participated in consultation services. These hours included an FBA, BFA, and ongoing home consultation sessions. The findings from this study were inconsistent with all original hypotheses proposed in that higher dosages of parent attendance at parent education sessions did not result in a reduction of deviant behavior, an increase on social skills, or an improvement in parent-child interactions. Further the addition of dosage of individualized assessment-based consultation also did not improve the presence of deviant behavior, social skills, or parent-child interactions.

The treatment variable of dosage of parent involvement in family education did not account for statistically significant variance in levels of deviant behavior defined as oppositional behavior and conduct problems at 1-year post-enrollment. As such, greater attendance in family education did not indicate lower levels of child oppositional behaviors and child conduct problems as measured by rating scales. Post-hoc analyses revealed that family education session attendance accounted for significantly more variance in post-intervention measures of conduct disorder and oppositional behavior at 6-months post-enrollment than socio-economic risk factor, resulting in a significant prediction model. Further, a significant base model was revealed indicating that at 6-months post-enrollment, baseline levels of symptom severity accounted for

significant variance in measures of conduct disorder and oppositional behavior. Significant results found at 6-months post-enrollment compared to non-significant results at 1-year post-enrollment likely speaks to the insufficient number of participants available to detect statistical significance. At 1-year post-enrollment, data were available for 20 participants compared to 36 participants at 6-months post- enrollment. This significant finding is consistent with current literature in favor of early intervention provided through family education. Research on family education with young children at-risk for ADHD has provided evidence that family education is efficacious at reducing challenging behavior manifestations typically associated with ADHD (e.g. Kern et. al, 2007; McGoey et. al, 2005; Sonuga-Barke et, al, 2006; Webster-Stratton et. al, 2011).

Results indicated that dosage of consultation, which included individualized assessment-based interventions, did not account for significantly more variance in subsequent ratings of oppositional behavior and conduct problems following 1-year post-enrollment beyond what was accounted for by severity of ADHD symptoms and demographic characteristics. Post-hoc analysis evaluating ratings of oppositional behavior and conduct problems at 6-month post-enrollment were also not statistically significant. Further, the variable of attendance at family education sessions did not account for significantly more variance in ratings of social skills beyond symptom severity and SES risk factors following 1-year post-enrollment. As such, greater levels of involvement in family education sessions did not predict more favorable ratings of social skills. Post-hoc analysis evaluating ratings of social skills at 6-months post-enrollment also did not reveal statically significant variance in ratings beyond severity of symptoms at enrollment and SES risk factor.

Adding the variable of dosage of consultation, which included individualized assessment-based interventions also did not account for significantly more variance in ratings of social skills at 1-year post-enrollment beyond the predictors of symptom severity and SES risk factor. The same results were obtained when 6-month post-treatment social skill ratings were considered. Thus, the dosage of consultation received which included individualized assessment-based interventions did not predict more favorable ratings of social skills at 1-year post-enrollment or 6-months post-enrollment. Similarly, the variable of attendance of family education sessions did not account for a significant variance of parent-child interactions at 1-year post-enrollment beyond the predictors of symptom severity and SES risk factor. Identical results were obtained when 6-month parent-child interactions were considered.

Finally, the treatment variable of consultation including individualized assessment-based interventions did not account for statistically significant variance in parent-child interactions beyond symptom severity and SES risk factor. Results indicated the dosage of parent involvement in consultation in addition to their involvement in family education did not predict improvement incrementally and did not have a positive influence on parent-child interactions to levels of statistical significance. Higher levels of parent involvement in consultation did not predict a greater increase in a composite score of positive behaviors and a concomitant reduction in a composite score of negative behaviors observed during parent-child interactions. Post-hoc analysis of parent-child interactions at 6-months post-enrollment also did not reveal a statistically significant model.

Attendance in Family Education Sessions

Inconsistent with the first, second, and fifth hypotheses, the variable of attendance in family education sessions did not account for statically significant variance in the prediction

models. Upon evaluating levels of deviant behavior defined as oppositional behavior and conduct problems at one-year post-enrollment, attendance at family education sessions only accounted for 2% of the variance in the model with a sample size of 20 participants. Alternatively, when oppositional behavior and conduct problems at 6-months post-enrollment were investigated, attendance at family education sessions accounted for 31% of the variance, revealing a statically significant model with a sample size of 36 participants. This suggests that a more robust sample size, may have allowed for statistically significant variance in the model to be observed. At 1-year post enrollment with a sample size of 29, attendance at family education sessions accounted for 8% of the variance in the model when evaluating social skills. This indicates an effect size of .08, which nearly reaches a medium effect size (Cohen, 1992). Therefore, the magnitude of variance accounted for was in the moderate range, suggesting the insufficient power in the study likely impacted the lack of statistically significant results. With a sample size of 35 participants, attendance at family education sessions did not predict a significant variance in the model when evaluating parent-child interactions, predicting only 6% of the variance.

These findings were inconsistent with previous findings indicating family education is effective at ameliorating child conduct problems in preschool aged children at-risk for ADHD (e.g. Dishion et al., 2008; McGoey et al., 2005; Pisterman et al, 1992; Sonuga-Barke et al.,2001; Sonuga-Barke et al.,2006). These studies did not report on parental attendance or engagement in the components of the treatment protocol. It is quite reasonable to assume that attendance at family education sessions is essential for this intervention to be effective. Webster-Stratton et al. (2011) did report on attendance rates, which were found to be quite high in both the treatment condition and the waitlist control groups, with an average of 18.5 and 17.1 sessions attended out

of 20, respectively, and found significant improvement in child inattentive and hyperactive behaviors as well as increases in social competence. Strategies for achieving high rates of attendance were not noted. Barkley and colleagues' (2000) investigation on the effects of a family education program highlighted the sobering difficulty of achieving high levels of parent attendance in family education as they reported families attended an average of 3.3 out of 14 education sessions. They posit that the ineffectiveness of family education is due in large part to the failure of many families to attend the education program, or if they did attend, to do so inconsistently (Barkley et al., 2000). In the current study, it is likely that low levels of parent attendance at parent education sessions impacted overall behavioral outcomes.

Dosage of Participation in Individualized Assessment-Based Consultation

The third, fourth, and sixth hypotheses posited there would be a relationship between the dosage of parent participation in individualized assessment-based consultation and a reduction in deviant behaviors, an increase in social skills, an increase positive behaviors and a concomitant reduction of negative behaviors observed during parent-child interactions. Data did not support these hypotheses. At 1-year post-enrollment when oppositional behavior and conduct problems were evaluated, with a sample size of 20, dosage of consultation received only accounted for 2% of the variance. The evaluation of social skills at one-year post-intervention using a sample size of 29 also did not reveal that dosage of consultation accounted for statistically significant variance in the model. However, dosage of consultation received accounted for 10% of the variance in the model investigating social skills. This indicates an effect size of .10, which nearly reaches a medium effect size with .02 being a small effect size and .15 a medium effect size (Cohen, 1992). Therefore, the magnitude of variance accounted for was in the moderate range, suggesting the insufficient power in the study likely impacted the lack of statistically significant

results. Finally, at 1-year post-enrollment, with a sample size of 35, the dosage of consultation received did not account for statically significant variance in the parent-child interaction data, with dosage of consultation received accounting for 7% of the variance. Again, it should be noted this indicates an effect size of .07 which nearly reaches a medium effect size (Cohen, 1992), implicating insufficient power as a likely culprit for the lack of statistically significant results.

These findings were unexpected based on theoretical and conceptual assumptions as well as previous research on behavior management techniques. Prior studies specifically examining the dosage of consultation received as a mediator of treatment outcomes have not been conducted. However, numerous studies have investigated the efficacy of behavior management techniques in general including a meta-analysis, which has found behavior management techniques are effective for treating ADHD (Fabiano et. al., 2009). In one such study, consultation sessions included reinforcing children's appropriate behavior, giving children effective directions and requests, teaching methods of self-control, and using consistent methods of discipline, were found to be effective (McGoey, et al., 2002). Further, the utility of using family education to mediate parent and child behavior using procedures based on functional analysis was demonstrated to be effective using a single-subject design (Marcus et al., 2001). In fact, previous research suggested that taking into account function when designing individualized interventions during consultation is more effective than interventions that do not take the function of the behavior into account (Ingram, et al., 2005; Newcomber & Lewis, 2004). The current study may have experienced similar results if all participants were exposed to consultation that included FBA and FA.

Limitations

Results of this investigation must be interpreted cautiously due to several methodological concerns inherent in the design and sample. First, the relatively small sample size must be strongly considered when evaluating the reliability of the results of the regression models. Although a power analysis suggested the sample size was near adequate, many parents did not return the rating scales, significantly reducing the sample size from previous projections. It is possible that the relatively small sample size limited the power of the regression analyses as well as the generalization of the findings. Although it should be noted that despite a lower sample size than originally projected, the obtained power for all regression analyses was adequate. Next, these findings are incongruent with past research that suggests interactions between behavioral management interventions and behavior functioning (Fabiano et. al., 2009) and family education and improved behavior functioning (e.g. Dishion et al., 2008; McGoey et al., 2005; Pisterman et al, 1992; Sonuga-Barke et al., 2001; Sonuga-Barke et al., 2006; Webster-Stratton et al., 2011). Post-hoc analysis investigating oppositional behavior and conduct problems at 6-months post-enrollment revealed that family education attendance accounted for statistically significant variance in post-intervention measures of conduct disorder and oppositional behavior at 6-months post-enrollment, further suggesting that a more robust sample size may have translated into statistically significant results. It should also be noted that outside of what was initially to be investigated, partial treatment response was evaluated in post-hoc analyses at 6-months post-enrollment. Unfortunately due to the procedure in which the data were recorded, detailed information as to specific parent education sessions attended and the sum of consultation hours received at 6-months was not available. Therefore as a proxy, data regarding parent education sessions and consultation hours at 1-year post-enrollment were divided in half and used in the analyses at 6-months post-enrollment. Although it is understood this in not a true measure, it

allowed for an approximate investigation. In an attempt to investigate the relatively small sample size, DuPaul and colleagues (2013) completed an attrition analyses on these data. Results revealed the overall pattern of attrition indicated that dropouts were likely to have milder ADHD and externalizing behaviors. This suggests that as participants' behavior improved, families were more likely to cease participation in services.

The quality and consistency of the parent education sessions may also come into question. Procedural integrity was evaluated for 17.1% of the family education sessions. Best practices recommends procedural integrity checks occur for 30% of the sessions. With procedural integrity available for only 17.1% of the sessions, there is a concern that not all families received the same treatment during the family education sessions. Further, the integrity checks available reveal a wide range with the lowest integrity check dipping down to 42%. Although the 42% is considered an outlier as previously described, it does highlight a possible concern that the treatment may not have been delivered as intended.

The indicator for dosage of consultation received also has a number of concerns and may be considered a limitation. This variable was calculated by summing the total number of home-based consultations received regardless of the specific-type of intervention such as informal consultation sessions and FBA-driven consultation sessions and the completion of an FA. This assumes that all consultation sessions and associated interventions were equally effective, which is unlikely to be true. It also should be noted that not all parents participated in the parent-child observation sessions, which drastically reduced the available sample size as well.

The indicator of SES risk factor was somewhat of an arbitrary measurement and therefore may be considered a limitation as well. In an attempt to capture information on a group that could be considered "low income," an arbitrary cut-off was imposed if the highest family

employment status was working part-time, unemployed, or disabled. They were also assigned a "low income" status if the highest family reported occupation was skilled manual employment, machine operator, or unskilled employee. Thus, this grouping may not have correctly captured the participants who were low income. The U.S. government officially defines poverty as a specific dollar amount that varies by family size but is the same across the continental U.S. Advocates argue that the latter is flawed because it is based on outdated assumptions about family expenditures (Bernstein, 2007) and there is a push to redefine the poverty definition using contemporary standards on family expenditures (Cauthen, 2007). In the literature, the term "low income" has been used to describe family income below two times the federal poverty level (Bernstein, 2007). This study did not use either the prevailing method for defining poverty nor did it use the contemporary standards currently being discussed. Nature of the direct observation data used in the current study to capture parent-child interactions represents another limitation. Using direct observation data based on a single, brief observation period may be insufficient to reflect variation in child and parent behaviors. It is possible that explained variance would increase by including direct observation data summarized across multiple time points or longer durations of behavior. Combining observations across time points may be warranted for capturing oppositional behaviors, which may occur less frequently than other symptoms of ADHD.

Finally, the intent-to-treat nature of the research presents another potential limitation, with many families not receiving the full complement of interventions or any interventions at all. Thus, families may have received no intervention or very little intervention while other families took advantage of all available interventions. This could have been one intervention for a short period of time or multiple interventions for the entire duration of the study. Specifically, out of a total

38 participants who were included in at least one of the three models at 1-year post-intervention, the mean number of family education sessions attended was 8.08 sessions (*SD* = 7.04, Range = 0-20). Of 38 participants at 1-year post-enrollment, the mean number of consultation hours received was 8.83 hours (*SD* = 7.04, Range = 0-22). Post-hoc analysis at 6-months post-intervention indicated that out of 40 participants, the mean number of family education sessions received was 4.09 sessions (SD = 3.62, Range = 0-10). These data suggest most families participated in less than half the intended parent education treatment component at both 1-year post intervention and 6-months post-intervention. Finally, at 6-months post-intervention, the mean number of consultation hours received was 4.45 hours (*SD* = 3.29, Range = 0-11). These data indicate that many families did not receive the intended dosage of intervention the study intended. Therefore, the lack of statistically significant findings for most analyses may be due to lack of exposure to the intended intervention package, suggesting the actual dosage received was insufficient in producing significant levels of behavioral change. Participant data were included in the model if they had a full set of independent and dependent data available, regardless to the exposure to the intervention.

Clinical Implications

Although somewhat tempered due to the aforementioned methodological limitations, the findings from this investigation have several potential implications for clinical practice. It is quite plausible that minimal to moderate exposure to both family education and direct consultation services translated into a non-statistically significant impact on behavioral functioning and parent-child interactions. If a greater level of participation does contribute to intervention outcomes, given the overall low participation rates in family education and direct consultation sessions, perhaps additional strategies should be carefully considered to increase

participation when employing family education and consultation as intervention components in practice. In the current study, family education sessions consisted of 20 bi-weekly sessions. The span of these sessions over 40 weeks may have been too great for parents to remain completely committed. In practice, condensing family education sessions into fewer sessions over a shorter period of time may garner more family participation in this intervention. Previous research has indicated efficacy with fewer family education sessions. Using a brief family education protocol, Dishion and colleagues (2008) found modest effects with just three family education sessions. Twelve family education sessions were utilized in a study by Pisterman and colleagues (1992), which found a reduction in non-compliant behaviors. Sonuga-Barke and colleagues (2001) provided eight family education sessions and found a significant reduction in ADHD symptomology post-intervention. Bor and colleagues (2002) used a 10-hour family education protocol resulting in significant reductions in reported child behavior concerns and dysfunctional parenting. Attendance rates were not provided in these studies, but it is possible that these less time consuming family education treatment protocols translated into greater parent attendance and more favorable results.

Length of the session may have impacted family participation in the current study. The sessions were 2-hours in duration which may have been too much of a time commitment on a weekday evening especially with families' work schedulea. When providing family education sessions as an intervention in practice, shortening the sessions may provide a more appealing time commitment for families translating into more favorable attendance rates. The current study also made sincere efforts to provide family education sessions in a convenient location. Low attendance rates suggest this location may not have been convenient enough. When organizing family education sessions as an intervention in practice, holding sessions in a location

where parents frequent may increase attendance. For example, Sonuga-Barke and colleagues (2001) provided family education one-on-one in the participants' homes and found significant reductions in ADHD symptomology.

Upon initial review of these data, it was hypothesized that low family involvement in family education sessions may have resulted from families preferring to participate in the home consultation due to the ease and the convenience of the intervention taking place in the home. However, review of a correlation coefficient revealed a significant positive correlation for all six models indicating that families that received more family education sessions also received more home consultation hours. This suggests that families that were more engaged with family education were also more engaged in home consultation. This indicates a further need to improve participation in family education sessions as a means to gain parent buy-in when implementing a multi-component treatment protocol.

In the current study, participation in home consultation was low and may have been impacted by several factors. The home consultation session took place in the participants' homes with consultants observing parent-child dynamics. It is possible that families did not feel comfortable inviting consultants into their home for this service delivery as they may have felt under scrutiny. The level of comfort parents have inviting consultants in the home may differ dramatically among participants and will likely vary depending on individual participant differences, such as level of desire for assistance, openness for observation and feedback on parenting styles, as well as level of comfort and compatibility with the individual consultant. As such, it is difficult to predict which participants may be comfortable with this delivery in the home compared to an alternate setting. When designing and offering consultation sessions to clients in practice, flexibility as to the location of service delivery by providing the option to

families to hold family consultation services in an alternate setting or the client's home, may increase participation.

The consultant-family relationship was not evaluated in the current study, although this relationship may have had a vital impact on the dosage of consultation families received, with a poor match between family and consultant impacting parent participation. Recent research on early childhood home visiting indicates a multi-dimensional construct influences family involvement. This construct includes various factors such as parent characteristics, qualities of the consultant, and specific program features (Korfmacher et al., 2008). One assumption is that involvement includes two broad dimensions; participation (i.e., the quality of the intervention received) and engagement (i.e., the emotional quality of the interactions with the program) (Fantuzzo et al., 2000). The current study measured participation via attendance records but did not measure engagement, which has been discussed in the literature as the context of the helping relationship that forms between the consultant and the consultee. Understanding the quality of this relation and implementing procedures to strengthen this is paramount to treatment and future outcomes (Korfmacher et al., 2008). In practice, it is essential to focus on the relationship between the family and the consultant and take steps to foster positive interactions to nurture this bond.

Specialized skills on the part of the consultant or trainer may also have an impact on family participation and behavioral outcomes. In the current study, consultants were school psychology or special education graduate students who had prior graduate coursework in behavioral assessment, intervention, and consultation. There may have been some variation in the specialized skills these consultants possessed that may have impacted the quality of consultation some participants received or the dosage they were exposed to. Research conducted

by Sonuga-Barke and colleagues (2001) investigated the effectiveness of family education for preschool children at-risk for ADHD and found that when delivered by experienced and specialist therapists, family education produced significant reductions in ADHD symptoms. In a follow-up study, Sonuga-Barke and colleagues (2006) used a protocol identical to the one used in the Sonuga-Barke et al. (2001) study to investigate whether similar positive results were obtained when family education was delivered by non-specialist consultants who were only provided brief training. Results indicated no significant improvements in ADHD symptoms were found suggesting that children treated by consultants with experience working with preschool aged children with ADHD experienced better outcomes, than those who worked with unskilled consultants. This research highlights the importance of ensuring consultants have the necessary experience to provide appropriate consultation to families in practice.

Implications for Future Research

Results of the current study suggest several implications for future research. As noted previously, a large portion of caregivers participated in little to no intervention provided. It has been hypothesized that lack of exposure to the intervention coupled with insufficient power impacted the lack of statically significant results. Finding near moderate levels of variance in some of the models as well as statistically significant results at 6-months post-enrollment for improvement in deviant behaviors further suggest a deficit in sample size significantly impacted the results. Data from parental completion of assessments were available for many more participants than actually received the intervention. There was monetary compensation provided for assessment completion, which many parents responded to. In future studies, it may be beneficial to link similar contingencies with family attendance in family education and participation in consultation to increase participation in the intervention.

In the current study it is possible that although intervention effects on behavioral functioning and parent-child interactions were not evident at 1-year post-intervention, they may become evident at a later time, as they will be exposed to a greater number of situations where they will have to display appropriate social skills and employ self-regulation. The expectation that children will be able to demonstrate these appropriate behaviors consistently will become more of a social norm thereby increasing the frequency and opportunity for children to display these appropriate behaviors. As these expectations and opportunities increase, it is plausible that parents receiving family education and individualized consultation will be more skilled at assessing the environment and providing targeted interventions to support their children, resulting in an improvement in behavioral functioning and parent-child interactions. In a study by Shaw and colleagues (2006), implementation of a family education protocol for families of 2-year old children with conduct problems resulted in non-significant differences at 1-year post-intervention; however, significant differences were obtained at 2-years post-intervention. In a follow-up study to Kern and colleagues (2007) where family education alone and family education in combination with assessment-based consultation was provided, DuPaul and colleagues (2013) investigated findings at 2-years post-enrollment. Results indicated statistically significant improvement across numerous dependent measures including but not limited to parent ratings of ADHD symptoms, aggressive and noncompliant behavior, social behaviors, and direct observation of child and parent behaviors. However, specific group differences were not found between family education alone and family education combined with assessment-based consultation. Perhaps in the current study, significant impact of dosage may emerge after 1-year post-enrollment.

An issue that seems to have emerged from previous research as well as this study has been what dose or intensity of behavioral treatment is required to produce clinically meaningful effects for children with ADHD. Future research should investigate the minimal intervention component(s) and dosage necessary to translate into effective outcomes for young children at-risk for ADHD. Further, individual differences between children to determine which children require relatively more intensive treatments and which children can improve with a lower dose of behavioral treatments should be investigated as few studies have systematically manipulated the intensity/dose of behavior modification interventions. Due to fairly low participation in intervention components, it appears great effort is needed to garner family involvement; therefore, it may be beneficial to parcel out the magnitude of interventions necessary to address specific types and intensity of behaviors, in order to employ the most parsimonious interventions. With this population, it may be that complex and intense interventions are not necessary because behaviors of many young children may be less intense and long history of reinforcement for inappropriate behavior has not had the opportunity to be established yet, therefore behavior is less entrenched. Finally, it is very likely the current study did not have a sufficiently robust sample size to detect statistically significant results. Therefore, this study should be replicated with a larger sample size in order to accurately evaluate the posited hypotheses. This will provide a greater understanding of the impact of family education and individualized assessment-based consultation and future behavioral outcomes and parent-child interactions.

As previously reported, the current study measured the treatment integrity of the family education sessions and procedural integrity of the functional analyses. This was done in a manner consistent with the prevailing approach to integrity monitoring. Alternatively, in light of

more contemporary research on treatment integrity (Perepletchikova & Kazdin, 2005; Power, et al, 2005), it can be argued the measure used may have only monitored integrity in a cursory manner and failed to include the perceptions and beliefs of service providers in planning interventions and monitoring integrity. Dane and Schneider (1998) have expanded the more traditional concept of integrity to include five dimensions to measure both the quantity and quality of the implementation. Gathering this information allows for more confident conversations regarding intervention effectiveness (Hagermoser Sanetti & Kratochwill, 2009; Power et al., 2005). Future research in this area should incorporate an expanded and more comprehensive assessment of treatment integrity.

Conclusions

Results of the study were contrary to much of the current literature on the efficacy of family education and individualized assessment-based consultation. Improvements in deviant behavior and conduct disorder were predicted by the severity of symptoms at pre-treatment and the dosage of participation in family education sessions only at 6-months post-intervention. This model had 44% more participants compared to the models run at 1-year post-enrollment. With a more robust sample at 1-year post-enrollment, statistically significant prediction models may have been found and hypotheses posited for this study would be validated. This assumption remains based on previous research and theoretical and conceptual assumptions. Unfortunately, conclusions regarding the specific effects of the dosage of family education and individualized assessment-based consultation and deviant behaviors, social skills, and parent-child interactions are tempered due to the lack of significant variance found within the models. Future studies are needed to parcel out the dosage of family education and consultation needed to ameliorate challenging behaviors and improve social skills. A firmer grasp on the dosage needed to improve

behavior may indicate that simpler and less intensive treatment packages may be effective with young children. A reduction in the time commitment required by families for education on intervention, intervention development, and intervention implementation, may improve the participation rate and therefore enhance efficacy. Further research in reducing behaviors commonly associated with ADHD in young children is imperative in order to reduce the negative long-term outcomes that typically follow as these children age, supporting the need to expose preschool-aged children to interventions to combat the persistence and trajectory of ADHD and related difficulties.

References

Abramowitz, A. J., Eckstrand, D., O'Leary, S. G., & Dulcan, M. K. (1992). Adhd children's responses to stimulant medication and two intensities of a behavioral intervention. *Behavior Modification, 16,* 193-203.

Achenbach, T. M. (1991). Manual for the Child Behavior Checklist/ 4-18 and 1991 profile. Burlington: University of Vermont., Department of Psychiatry.

American Academy of Pediatrics (2011). AHDH: Clinical practice guideline for the diagnosis, evaluation, and treatment of Attention-Deficit/Hyperactivity Disorder in children and adolescents. *Pediatrics.* Online publication. Doi:10.1542/peds.2011-2654

American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders,* 4th ed. Washington, D.C.: American Psychiatric Association.

Anastopoulos, A.D., Rhoads, H. R., & Farley, S. E. (2006). Counseling and Training Parents. In R. A. Barkley (Ed.), *Attention-Deficit Hyperactivity Disorder: A handbook for diagnosis and treatment* (3rd ed., pp. 453-479). New York: Guilford.

Anastopoulos, A.D., Shelton, T. L., DuPaul, G. J., & Guevremont, D. C. (1993). Parent training for attention-deficit hyperactivity disorder: Its impact on parent functioning. *Journal of Abnormal Child Psychology, 21,* 581-596.

Antshel, K. M. & Barkley, R. A. (2008). Psychosocial interventions in attention deficit hyperactivity disorder. *Child and Adolescent Psychiatric Clinics of North America, 17,* 421-437.

Arnold, L.E., Elliott, M., Sachs, L., Bird, H., Kraemer, H. C., Wells, K. C., et al. (2003). Effects of ethnicity on treatment attendance, stimulant response/dose, and 14-month outcome in ADHD. *Journal of Counseling and Clinical Psychology, 71*(4)., 713-727.

Armstrong, M. B., & Nettleton, S. K. (2004). Attention deficit hyperactivity disorder and preschool children. *Seminars in Speech and Language, 25,* 225-232.

Baker, C. N., Arnold, D. H., & Meagher, S. (2011). Enrollment and attendance in a parent training prevention program for conduct problems. *Prevention Science, 12,* 126-138.

Barkley, R. A. (1981). The use of psychopharmacology to study reciprocal influences in parent-child interaction. *Journal of Abnormal Child Psychology, 9 (3),* 303-310.

Barkley, R. A. (1988). The effects of methylphenidate on the interactions of preschool ADHD children with their mothers. *Journal of the Academy of Child and Adolescent Psychiatry, 27 (3),* 336-341.

Barkley, R. A. (1989). Hyperactive girls and boys: Stimulant drug effects on mother-child interactions. *Journal of Child Psychiatry and Psychiatry, 30 (3),* 379-390.

Barkley, R.A. (2006). *Attention Deficit-Hyperactivity Disorder: A handbook for diagnosis and treatment* (3rd ed.). New York: Guilford.

Barkley, R.A., Fischer, M., Smallish, L., & Fletcher, K. (2006). Young adult outcome of hyperactive children: Adaptive functioning in major life activities. *Journal of the American Academy of Child and Adolescent Psychiatry, 45,* 192-202.

Barkley, R.A., Shelton, T. L., Crosswait, C., Moorehouse, M., Fletcher, K., Barrett, S., …Metevia, L. (2000). Multi-method psycho-educational intervention for preschool children with disruptive behavior: Preliminary results at post-treatment. *Journal of Child Psychology and Psychiatry, 41,* 319-332.

Barretto, A., Wacker, D. P., Harding, J., Lee, J., & Berg, W. (2006). Using telemedicine to conduct behavioral assessments. *Journal of Applied Behavior Analysis, 39,* 333-340.

Baydar, N., Ried, M. J., & Webster-Stratton, C. (2003). The role of mental health factors and program engagement in the effectiveness of a preventive parenting program for head start Mothers. *Child Development, 74,* 1433-1453.

Berkel, C. Mauricio, A. M., Shoenfelder, E., & Sandler, I. N. (2011). Putting the pieces together: An integrated model of program implementation. *Prevention Science, 12,* 23-33.

Bernstein, J. (2007). More Poverty than Meets the Eye. Washington. DC: Economic Policy Institute.

Bor, W. Sanders, M. R., & Markie-Dadds, C. (2002). The effects of the triple P-positive parenting program on preschool children with co-occurring disruptive behavior and attentional/hyperactive difficulties. *Journal of Abnormal Child Psychology: An official Publication of the International Society for Research in Child and Adolescent Psychopathology, 30*(6), 571-587.

Canu, W. H., & Bearman, S. K. (2011). Community0clinic-based parent intervention addressing noncompliance in children with attention-deficit/hyperactivity disorder. *Cognitive and Behavioral Practice, 18,* 491-501.

Cauthen, N. (2007). Testimony on measuring poverty in America. Testimony before the House Subcommittee on Income Security and Family Support Committee on Ways and Means; Aug. 1, 2007.

Chacko, A., Wymbs, F. A., Pelham, W. E., Swanger-Gagne, M. S., Girio, E., … O'Connor, B. (2009). Enhancing traditional behavioral parent training for single mothers of children with ADHD. *Journal of Clinical Child and Adolescent Psychology, 38,* 206-218.

Chronis, A. M., Chacko, A., Fabiano, G. A., Wymbs, B. T., & Pelham, W. E. (2004). Enhancements to the behavioral parent training paradigm for families of children with ADHD: Review and future directions. *Clinical Child and Family Psychology Review, 7,* 1-27.

Chronis, A. M., Gamble, S. A., Roberts, J. E., & Pelham, W. E. (2006). Cognitive-behavioral depression treatment for mothers of children with attention-deficit/hyperactivity disorder. *Behavior Therapy, 37*(2), 143-158.

Chronis-Tuscano, A., O'Brien, K. A., Johnston, C., Jones, H. A., Clarke, T. L., …Seymour, K. E. (2011). The relation between maternal ADHD symptoms & improvements in child behavior following brief behavioral parent training is mediated by change in negative parenting. *Journal of Abnormal Child Psychology, 39,* 1047-1057.

Chronis, A. M., Pelham, W. E., Gnagy, E. M., Roberts, J. E., Aronoff, H. R. (2003). Impact of late-afternoon stimulant dosing for children with ADHD on parent and parent-child domains. *Journal of Clinical Child and Adolescent Psychology, 32,* 121-129.

Clarke, A. T., Marshall, A. T., Mautone, J. A., Soffer, S. L., Jones, J. A., Costigan, T. E., Petterson, A., Jawad, A. F., & Powers, T. (2013). Parent attendance and homework adherence predict response to a family-school intervention for children with ADHD. *Journal of Clinical Child and Adolescent Psychology,* DOI: 10.1080/15374416.2013/15374416.2013.794697

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,*155-159.

Cohen, J. (2003). A power primer. In A. E. Kazdin (Ed.), *Methodological issues and strategies in clinical research* (pp. 427-437). Washington, DC: American Psychological Association.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences (3rd Edition).* Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Conners, C. K. (1997). Conners' Rating Scales—Revised technical manual. New York: Multi-Health Systems, Inc.

Conners, C. K., Sitarenious, G., Parker, J. D. A., & Epstein, J. N. (1998). The revised Conners' parent rating scale (CPRS-R): Factor structure, reliability, and criterion validity. *Journal of Abnormal Child Psychology, 26 (4),* 257-268.

Connor, D. F. (2002). Preschool attention deficit hyperactivity disorder: A review of prevalence, diagnosis, neurobiology, and stimulant treatment. *Developmental and Behavioral Pediatrics, 23,* S1-S9.

Connor, D. F. (2006). Stimulants. In R. A. Barkley (Ed.), *Attention-Deficit Hyperactivity Disorder: A handbook for diagnosis and treatment* (3rd ed., pp. 608-647). New York: Guilford.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334.

Cunningham, C. E., Bremner, R., & Secord, M. (1998). *Community Parent Education program.* Ontario, Canada: Hamilton health Sciences Corp.

Dane, A. V., & Schneider, B. H. (1998). Program integrity in primary and early secondary prevention: Are implementation effects out of control? *Clinical Psychology Review, 18,* 23-45.

Deault, L. C. (2010). A systematic review of parenting in relation to the development of comorbidities and functional impairments in children with attention-deficit/hyperactivity disorder (ADHD). *Child Psychiatry and Human Development, 41,* 168-192.

Dinkmeyer, D., McKay, G. D., Dinkmeyer, J. S., Dinkmeyer, D., & McKay, J. L. (1997). Early Childhood Systematic Training for Effective Parenting (STEP). Circle Pines, MN: American Guidance Services.

Dishion, T. J., Connell, A., Weaver, C., Shaw, D., Gardner, F., Wilson, M. (2008). The family check-up with high-risk indigent families: Preventing problem behavior by increasing

parents' positive problem support in early childhood. *Child Development, 79*(5), 1395-1414.

DuPaul, G.J., Kern, L., Volpe, R., Caskie, G. L., Sokol, N., Arbolino, L., Van Brakle, J., & Pipan, M. (2013). Comparison of parent education and functional assessment-based intervention across 24 months for young children with Attention Deficit Hyperactivity Disorder. *School Psychology Review, 42,* 56-75.

DuPaul, G.J., & Stoner, G. (2003). *ADHD in the schools: Assessment and intervention strategies* (2nd ed.). New York: Guilford.

Egger, H. L., Kondo, D., & Angold, A. (2006). The epidemiology and diagnostic issues in preschool attention-deficit/hyperactivity disorder: A review. *Infants & Young Children, 19*(2), 109-122.

Elliott, C. D. (1990). *The Differential Abilities Scales*. San Antonio, TX: The Psychological Corporation.

Elliott, C. D. (1997). The differential abilities scales. In D. P. Flanagan, J. L. Genshaft, & P. L. Harrison (Eds.), *Contemporary intellectual assessment: theories, tests, and issues.* (183-208). New York, NY, US: Guilford Press

Eyberg, S., Nelson, M., & Boggs, S. (2008). Update on Empirically Supported psychosocial Treatments for Children and Adolescents with Disruptive Behavior. *Journal of Clinical Child and Adolescent Psychology, 37,* 215-237.

Fabiano, G. A., Pelham, W. E., & Cunningham, C. E. (2012). A waitlist-controlled trial of behavioral parent training for fathers of children with ADHD. *Journal of Clinical Child & Adolescent Psychology, 41*(3), 337-345.

Fabiano, G. A., Pelham, W. E., Coles, E. K., Gnagy, E. M., Chronis-Tuscano, A., & O'Connor, B. C. (2009). A meta-analysis of behavioral treatments for attention-deficit/hyperactivity disorder. *Clinical Psychology Review, 29,* 129-140.

Fabiano, G. A., Pelham, W. E., Gnagy, E. M., Burrows-MacLean, L., Chacko, A., Coles, E. K., et al. (2007). The single and combined effects of multiple intensities of behavior modification and multiple intensities of methylphenidate in the classroom setting. *School Psychology Review, 36*, 195-216.

Fantuzzo, J., Tighe, E., & Childs, S. (2000). Family involvement questionnaire: A multivariate assessment of family participation in early childhood education. *Journal of Educational Psychology, 92,* 367-376.

Firestone, P., Monteiro-Musten, L., Pisterman, S., Mercer, J., & Bennett, S. (1998). Short-term side effects of stimulant medication are increased in preschool children with attention-deficit/hyperactivity disorder: A double-blind placebo-controlled study. *Journal of Child and Adolescent Psychopharmacology, 8,* 13-25.

Fischer, M. (1990). Parenting stress and the child with attention deficit hyperactivity disorder. *Journal of Clinical Child Psychology, 19,* 337-346.

Fisher, P. W., Lucas, C., Shaffer et al. (1997). *Diagnostic Interview Schedule for Children, version IV 9DISC-IV): Test-retest reliability in a clinical sample.* Presented at the 44th Annual meeting of the American Academy of Child and Adolescent Psychiatry, Toronto.

Froehlich, T. E., Lanphear, B. P., Epstein, J. N., Barbaresi, W. J., Katusic, S. K., & Kahn, R. S. (2007). Prevalence, recognition, and treatment of Attention-Deficit/Hyperactivity Disorder in a national sample in US children. *Archives of Pediatric and Adolescent Medicine, 161,* 857-864.

Gilliam, J. E. (1995). *Gilliam Autism Rating Scale*. Austin, TX: Pro-Ed.

Greenhill, L. L., Halperin, J. M., & Abikoff, H. (1999). Stimulant medications. *Journal of the American Academy of Child and Adolescent Psychiatry, 38(5),* 503-512.

Greenhill, L. L, Jensen, P., Abikoff, H., Blumer, J. L., DeVeaugh-Geiss, J., Fisher, C., et al. (2003). Developing strategies for psychopharmacological studies in preschool children. *Journal of the American Academy of Child and Adolescent Psychiatry, 42 (4),* 406-414.

Greenhill, L. L, Kollins, S., Abikoff, H., McCracken, J. Riddle, M., Swanson, J., et al. (2006). Efficacy and safety of immediate-release methylphenidate treatment for preschoolers with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 45,* 1284-1293.

Gresham, F. M. & Elliott, S. N. (1990). *Social Skills Rating System manual*. Circle Pines. MN: American Guidance Service.

Gresham, F. M., Gansle, K.A., Noell, G.H., Cohen, S., & Rosenblum, S. (1993). Treatment integrity of school-based behavioral intervention studies: 1980-1990. *School Psychology review, 22,* 254-272.

Hagermoser Sanetti, L. M. & Kratochwill, T. R. (2009). Toward developing a science of treatment integrity: Introduction to the special series. *School Psychology Review, 38,* 445-459.

Hollingshead, A. B., & Redlich, F. C. (1958). *Social class and mental illness*. New York: Wiley.

Huete, J. M. & Kurtz, P. F. (2010). Therapist effects on functional analysis outcomes with young children. *Research in Developmental Disabilities, 31,* 804-810.

Ingoldsby, E. M. (2010). Review of interventions to improve family engagement and retention in parent and child mental health programs. *Journal of Child and Family Studies, 19*(5), 629-645.

Ingram, K., Lewis-Palmer, T., & Sugai, G. (2005). Function-based intervention planning: Comparing the effectiveness of FBA indicated and contra-indicated intervention plans. *Journal of Positive behavior Interventions, 7,* 224-236.

Jensen, S.A., & Lowry, L. S. (2012). Payment schedules do not affect attendance/completion of group behavioral parent training. *Psychological Services, 9*(1), 101-109.

Johnson, S., Battett, P. M., Dadds, M. R., Fox, T., & Shortt, A. (1999). The Diagnostic Interview Schedule for Children, Adolescents, and Parent: Initial reliability and validity data. *Behaviour Change, 16,* 155-164.

Kahng, S. & Iwata, B. A. (1999). Correspondence between outcomes of brief and extended functional analyses. *Journal of Applied Behavior Analysis, 32,* 149-159.

Kazantzis, N. & Lampropoulos, G. K. (2002). Reflecting on homework in psychotherapy: What can we conclude from research and experience. *Journal of Clinical Psychology, 58(5),* 577-585.

Kazdin, A. E., Holland, L., & Crowley, M. (1997). Family experience of barriers to treatment and premature termination from child therapy. *Journal of Consulting and Clinical Psychology, 65,* 453-463.

Keenan, K., & Wakschlag, L. S. (2000). More than the terrible twos: the nature and severity of behavior problems in clinic-references preschool children. *Journal of Abnormal Child Psychology, 28,* 33-46.

Kern, L., DuPaul, G.J., Volpe, R. J., Solol, N. G., Lutz, J. G., Arbolono, L. A., Pipan, M., & VanBrakle, J. D. (2007). Multisetting assessment-based intervention for young children at risk for attention deficit hyperactivity disorder: initial effects on academic and behavioral functioning. *School Psychology Review, 36 (2),* 237-255.

Khanna, M. S., & Kendall, P. C. (2009). Exploring the role of parent training in the treatment of childhood anxiety. *Journal of Consulting and Clinical Psychology, 77,* 981-986.

Kline, P. (1999). *The handbook of psychological testing* (2nd ed.). London: Routledge.

Korfmacher, J., Green, B., Staerkel, F., Peterson, C., Cook, G., Roggman, L.,…Schiffman, R. (2008). Parent involvement in early childhood home visiting. *Child Youth Care Forum, 37,* 171-196.

Kratochwill, T. R., & Bergan, J. R. (1990). *Behavioral consultation in applied settings.* New York, NY: Plenum Press.

Lahey, B., B., Pelham, W. E., Loney, J., Kipp, H., Ehrhardt, A., Lee, S. S., et al. (2004). Three predictive validity of DSM-IV attention deficit hyperactivity disorder in children diagnosed at 4-6 years of age. *American Journal of Psychiatry, 161*(11), 2014-2020.

Lahey, B., B., Pelham, W. E., Loney, J., Lee, S. S., & Wilcutt, E. (2005). Instability of the DSM-IV subtypes of ADHD from preschool through elementary school. *Archives of General Psychiatry, 62,* 896-902.

Lahey, B., B., Pelham, W. E., Stein, M. A., Loney, J., Trapani, C., Nugent, K., et al. (1998). Validity of DSM-IV attention-deficit/hyperactivity disorder for younger children. *Journal of the American Academy of Child & Adolescent Psychiatry, 37,* 695-702.

Lakes, K. D., Vargas, D., Riggs, M., Schmidt, J., & Baird, M. (2011). Parenting intervention to reduce attention and behavior difficulties in preschoolers: A CUIDAR evaluation study. *Journal of Child and Family Studies,* 20, 648-659.

Lavigne, J. V., LeBailly, S. A., Grouze, K. R., Binns, H. J., Keller, J., & Pate, L. (2010). Predictors and collelates of completing behavioral parent training for the treatment of oppositional defiant disorder in pediatric primary care. *Behavior Therapy, 41*(2), 198-211.

Lavigne, J.V., LeBailly, S. A., Hopkins, J., Gouze, K. R., & Binns, H. J. (2009). The prevalence of ADHD, ODD, Depression, and Anxiety in a community sample of 4-year-olds. *Journal of Clinical Child & Adolescent Psychology, 38 (3),* 315-328.

Lecavalier, L. (2005). An evaluation of the Gilliam autism rating scale. *Journal of Autism and Developmental Disorders, 35,* 795-805.

Lee, P., Niew, W., Yang, H., Chen, V. C., & Lin, K. (2012). A meta-analysis of behavioral parent training for children with attention deficit hyperactivity disorder. *Research in Developmental Disabilities, 33,* 2040-2049.

Lee, S. S., Lahey, B. B., Owens, E. B., & Hinshaw, S. P. (2008). Few boys and girls with ADHD are well-adjusted during adolescence. *Journal of Abnormal Child Psychology, 36,* 373-383.

Leech, N. L, Barett, K. C., & Morgan, G. A. (2005). *SPSS for Intermediate Statistics: Use and Interpretation (2nd Edition).* Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.

Lonigan, C. J., Elbert, J. C., & Johnson, S. B. (1998). Empirically supported psychosocial interventions for children: An overview. *Journal of Clinical Child Psychology, 27,* 138-145.

Lundahl, B., Risser, H. J., & Lovejoy, M. C. (2006). A meta-analysis of parent training: Moderators and follow-up effects. *Clinical Psychology Review, 26,* 86-104.

Marcus, B. A., Swanson, V., & Vollmer, T. R. (2001). Effects of parent training on parent and child behavior using procedures based on functional analyses. *Behavioral Interventions, 16,* 87-104.

Mayes, R., Bagwell, C., & Erkulwater, J. (2008). ADHD and the raise in stimulant use among children. *Harvard Review of Psychiatry, 16* (3), 151-166.

McGoey, K. E., DuPaul, G. J., Eckert, T. L., Volpe, R. J., & Van Brakle, J. (2005). Outcomes of a multi-component intervention for preschool children at-risk for Attention-Deficit/ Hyperactivity Disorder. *Child and Family Behavior Therapy, 27,* 33-56.

McGoey, K. E., Eckert, T. L, & DuPaul, G. J (2002). Intervention for preschool-aged children with ADHD: A literature review. *Journal of Emotion and Behavior Disorders, 10,* 14-28.

McMahon, R. J., Wells, K. C., & Kotler, J. S. (2006). Conduct Problems. In E.J. <ash & R. A. Barkley (Eds.), *Treatment of childhood disorders* (pp.137-268), 3rd ed. New York: Guilford Press.

Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford.

MTA Cooperative Group. (2004). National Institute of Mental Health Multimodal Treatment Study of ADHD follow-up: 24-month outcomes of treatment strategies for attention-deficit/hyperactivity disorder. *Pediatrics, 113,* 754-761.

Myers, R. (1990). *Classical and modern regression with applications.* Boston: Duxbury Press.

Newborg, J., Stock, J. R., & Wnek, L. (1998). *Manual for the Battelle Developmental Inventory.* Boston, MA: Houghton Mifflin.

Newcomer, L. L., & Lewis, T. J. (2004) Functional behavioral assessment: An investigation of assessment reliability and effectiveness of function-based interventions. *Journal of Emotional and Behavioral Disorders, 12,* 168-181.

Nix, R. L., Nierman, K. L., McMahon, R. J., & The Conduct Problems Prevention Research Group. (2009). How attendance and quality of participation affect treatment response to parent management training. *Journal of Consulting and Clinical Psychology, 77,* 429-438.

Nock, M. K., & Ferriter, C. (2005). Parent management of attendance and adherence in child and adolescent therapy: A conceptual and empirical review. *Clinical Child and Family Psychology Review, 8,* 149-166.

Northup, J., Fusilier, I., Swanson, V., Huete, J., Bruce, T., Freeland, J., et al. (1999). Further analysis of the separate and interactive effects of methylphenidate and common classroom contingencies. *Journal of Applied Behavior Analysis, 32,* 35-50.

Northup, J., Wacker, D., Sasso, G., Steege, M., Cigrand, K., Cook, J., & DeRaad, A. (1991). A brief functional analysis of aggressive and alternate behavior in an outclinic setting. *Journal of Applied Behavior Analysis, 24,* 509-522.

Pelham, W. E., Burrows-MacLean, L., Gnagy, E. M., Fabiano, G. A., Coles, E. K., Wymbs, B. T., et al. (2008a). *A between groups study of behavioral, pharmacological, and combined treatment for children with ADHD.* Manuscript submitted for review.

Pelham, W. E., Burrows-MacLean, L., Gnagy, E. M., Fabiano, G. A., Coles, E. K., Wymbs, B. T., et al. (2008b). *A dose-ranging crossover study of behavioral, pharmacological, and combined treatment in a recreational setting for children with ADHD.* Manuscript submitted for review.

Pelham, W. E. & Fabiano, G. A. (2008). Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. *Journal of Clinical Child & Adolescent Psychology, 37* (1), 184-214.

Perepletchikova, F., & Kazdin, A. E. (2005). Treatment integrity and therapeutic change: Issues and research recommendations. *Clinical Psychology: Science and Practice, 12,* 365-383.

Pisterman, S., Firestone, P., McGrath, P., Goodman, J. T., Webster, I., Malloy, R., & Goffin, B. (1992). The role of parent training in treatment of preschoolers with ADHD. *American Journal of Orthopsychiatry, 62,* 397-408.

Power, T. J., Blom-Hoffman, J., Clarke, A. T., Riley-Tillman, T. C., Kelleher, C., & Manz, P. H. (2005). Reconceptualizing intervention integrity: A partnership-based framework for linking research with practice. *Psychology in the Schools, 42*(5), 495-507.

Power, T. J., Hughes, C. L., Helwig, J. R., Nissley-Tsiopinis, J., & Mautone, J. A. (2010). Getting to first base: promoting engagement in family-school intervention for children with ADHD in urban, primary care practice. *School Mental Health, 2,* 52-61. Doi:10.1007/s12310-10-9029-2

Robins, D. L., Fein, D., Barton, M. L., & Green, J. A. (2001) The Modified Checklist for Autism in Toddlers: An initial study investigating the early detection of autism and pervasive developmental disorders. *Journal of Autism and Developmental Disorders, 31,* 131-144.

Sanders, M. R. (1999). Triple-P positive parenting program: Towards an empirically validated multilevel parenting and family support strategy for the prevention of behavior and emotional problems in children. *Clinical Child and Family Psychology Review, 2*(2), 71-90.

Schwab-Stone, M. E., Shaffer, D., & Dulcan, M. K. (1996). Criteripn validity of the NIMH Diagnostic Interview Schedule for Children Version 2.3 (DISC 2.3). *Journal of the American Academy of Child and Adolescent Psychiatry, 35,* 878-888.

Scott, S., Spender, Q., Doolan, M., Jacobs, B., & Aspland, H. (2001). Multicentre controlled trial of parenting groups for children antisocial behaviour in clinical practice. *British Medical Journal, 323,* 1-7.

Shaffer, D., Fisher, P, Lucas, C. (1998). *Computerized diagnostic interview schedule for children (CDISC 4.0).* New York: New York State Psychiatric Institute.

Shaffer, D., Fisher, P., Lucas, C., Dulcan, M., & Schwab-Stone, M. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry, 39,* 28-38.

Shaw, D. S., Dishion, T. J., Supplee, L., Gardner, F. & Arnds, K. (2006). Randomized trial of family-entered approach to the prevention of early conduct problems: 2-year effects of the family-check-up in early childhood. *Journal of Consulting and Clinical Psychology, 74,* 1-9.

Snell-Johns, J., Mendez, J. L., & Smith, B. H. (2004). Evidence-based solutions for overcoming access barriers, decreasing attrition, and promoting change with underserved families. *Journal of Family Psychology, 18* (1), 19-35.

Sokol, N. G., Kern, L., Arbolino, L. A., Thomas, L. B. & DuPaul, G. J. (2009). A summary of home-based functional analysis data for young children with or at risk for attention-deficit/hyperactivity disorder. *Early Childhood Services: An Interdisciplinary Journal of Effectiveness, 3 (2),* 127-142.

Sonuga-Barke, E. J. S., Daley, D., Thompson, M., Laver-Bradbury, C., Weeks, A. (2001). Parent-based therapies for preschool attention-deficit/hyperactivity disorder: A randomized, controlled trial with a community sample. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(4), 402-408.

Sonuga-Barke, E. J. S., Thompson, M., Abikoff, H., Klein, R., & Brotman, L. M. (2006). Nonpharmacological intervention for preschoolers with ADHD: The case for specialized parent training. *Infants & Young Children, 19,* 142-153.

Swanson, J., Greenhill, L., Wigal, T., Kollins, S., Stehli, A., Davies, M., et a;. (2006). Stimulant-elated reductions for growth rates in the PATS. *Journal of the American Academy of Child and Adolescent Psychiatry, 45,* 1304-1313.

Tetley, A., Jinks, M., Huband, N., & Howells, K. (2011). A systematic review of measures of therapeutic engagement in psychosocial and psychological treatment. *Journal of Clinical Psychology, 67* (9), 927-941.

Treacy, L., Tripp, G., & Baird, A. (2005). Parent stress management training for attention-deficit/hyperactivity disorder. *Behavior Therapy, 36*(3), 223-233.

Taylor, E., Sandberg, S., Thorley, G., Giles, S. (1991). *The epidemiology of childhood hyperactivity.* Oxford University Press.

Umbreit, J. (1995). Functional assessment and intervention in a regular classroom setting for the disruptive behavior of a student with Attention Deficit Hyperactivity Disorder. *Behavioral Disorders, 20,* 267-278.

Vaughn, B. S. & Kratochvil, C. J. (2006). Pharmacotherapy of ADHD in young children. *Psychiatry, (3),* 36-45.

Visser, S. N., Bitsko, R. H., Danielson, M. L., Perou, R., & Blumber, S. J. (2010). Increasing prevalence of parent-reported attention-deficit/hyperactivity disorder among children: United States, 2003 and 2007. *Centers for Disease Control and Prevention: Morbidity and Mortality Weekly Report, 59 (44,* 1439-1443.

Wacker, D. P., Berg, W. K., Harding, J. W., Derby, K. M., Asmus, J. M., & Healy, A. (1998). Evaluation and long-term treatment of aberrant behavior displayed by young children with disabilities. *Journal of Developmental & Behavioral Pediatrics, 19,* 260-266.

Wacker, D., Steege, M., Northup, J., Reimers, T., Berg, W., & Saso, G. (1990). Use of functional analysis and acceptability measures to assess and treat severe behavior problems: An outpatient clinic model. In A. Rep & N. Singh (Eds.), *Perspectives on the use of nonaversive and aversive interventions for people with developmental disabilities* (pp. 349-359). Sycamore, IL: Sycamore.

Wallace, M. D., Doney, J. K., Mintz-Tesudek, C. M., & Tarbox, S. F. (2004). Training educators to implement functional analyses. *Journal of Applied Behavior Analysis, 37,* 89-92.

Wallace & Iwata, B. A. (1999) Effects of session duration on functional analysis outcomes. *Journal of Applied Behavior Analysis, 36,* 125-128.

Webster-Stratton, C. (1994). *The Parents and Children Series: A comprehensive course divided into four programs.* Seattle, WA: Author.

Webster-Stratton, C. & Hammond, M. (2004). Treating children with early-onset conduct problems: Intervention outcomes for parent, child, and teacher training. *Journal of Clinical Child and Adolescent Psychology, 33,* 105-124.

Webster-Stratton, C., Reid., M. J., & Beauchaine, T. (2011). Combining parent and child training for young children with ADHD. *Journal of Clinical Child and Adolescent Psychology, 40*(2), 191-203.

Webster-Stratton, C., Reid., M. J., & Hammond, M. (2004). Treating children with early conduct problems; intervention outcomes for parent-, child- and teacher training. *Journal of Clinical Child and Adolescent Psychology, 33,* 221-239.

Wilens, T. E., & Spencer, T. J. (2000). The stimulants revisited. *Child & Adolescent Psychiatric Clinics of North America, 9*(3), 573-603.

Wolraich, M. L. (2006). Attention-deficit/hyperactivity disorder. Can it be recognized and treated in children younger than 5 years? *Infants and Young Children, 19*(2), 86-93.

Zito, J. M., Safer, D. J., dosReis, S., Gardner, J. F., Boles. M., & Lynch, F. (2000) Trends in the prescribing of psychotropic medications to preschoolers. *Journal of the American Medical Association, 283(8),* 1025-1030.

Zito, J. M., Safer, D. J., dosReis, S., Gardner, J. F., Madger, L. S., Soeken, K., et al. (2003) Psychotropic practice patterns for youth: A 10-year perspective. *Archives of Pediatrics and Adolescent Medicine, 157,* 17-25.

Table 1

Participant Demographics

Variable	Percentage of Sample
Ethnicity	
White	68%
Hispanic	13%
Other	13%
African American	3%
Information not provided	2%
Parents' Marital Status	
Married	66%
Not married, living together	13%
Separated	7%
Never married, not living with someone	8%
Information not provided	7%
Parents' Employment Status	
Full-time	61%
Part-time	7%
Unemployed	13%
Disabled	3%
Student	1%
Other	2%
Information not provided	7%
Parents' Employment Position	
Clerical or sales	19%
Administration or personnel	18%
Skilled manual employment	17%
Business management	14%
Higher executive	6%
Machine operators	4%
Unskilled employee	2%
Information not provided	19%
Parents' Education Level	
Some college	28%
High school graduate	26%
Graduated college	23%
Advanced degree or certification	7%
Did not complete high school	7%
Information not provided	9%

Table 2

Means and Standard Deviations for Predictors and Oppositional Defiance and Conduct Problems as the Criterion Measure at 1-Year Post-Enrollment (N=20)

Measure	Mean	Standard Deviation
CBCL ODD + CD 1- Year Post Baseline[a]	9.85	5.95
CBCL Attention Deficit/Hyperactivity Problems at Baseline[b]	10.40	2.97
SES Risk Factor[c]	0.35	0.49
Family Education Sessions[d]	10.05	7.06
Family Consultation[e]	11.13	6.25

Note: [a]Raw Scores combined. [b]Raw Score. [c]Assigned score of 0, 1, or 2 based on income and ethnicity. [d]Number of Family Education Sessions Attended. [e]Total Number of Home Consultation Hours Received.

Table 3

Means and Standard Deviations for Predictors and Social Skills as the Criterion Measure at 1-Year Post Baseline (N=30)

Measure	Mean	Standard Deviation
SSRS Social Skills at 1-Year Post Baseline[a]	45.83	10.85
CBCL Attention Deficit/Hyperactivity Problems at Baseline[a]	10.55	3.19
SES Risk Factor[b]	0.66	0.72
Family Education Sessions[c]	7.83	7.04
Family Consultation[d]	9.00	6.72

Note: [a]Raw Score. [b]Assigned score of 0, 1, or 2 based on income and ethnicity. [c]Number of Family Education Sessions Attended. [d]Total Number of Home Consultation Hours Received.

Table 4

Means and Standard Deviations for Predictors and Parent-Child Interactions as the Criterion Measure at 1-Year Post-Enrollment (N=35)

Measure	Mean	Standard Deviation
Parent-Child Interaction [a]	13.59	8.62
CBCL Attention Deficit/Hyperactivity Problems at Baseline [b]	10.37	3.06
SES Risk Factor [c]	0.57	0.65
Family Education Sessions [d]	8.77	6.91
Family Consultation [e]	9.31	6.71

Note: [a]Derived Composite Score. [b]Raw Score. [c]Assigned score of 0, 1, or 2 based on income and ethnicity. [d]Number of Family Education Sessions Attended. [e]Total Number of Home Consultation Hours Received.

Table 5

Correlations among Predictor Variables and Oppositional Defiant Disorder and Conduct Disorder 1-Year Post-Enrollment

Variable	1	2	3	4	5
1. ODD/CD at 1-Year	-	.07	.09	-.01	-.04
2. Severity of Symptoms		-	.15	-.21	.04
3. SES Risk Factor			-	-.55	-.51*
4. Number of Family Education sessions				-	.53**
5. Dosage of Consultation					-

Note: *$p < .05$; **$p < .01$

Table 6

Summary of Hierarchical Regression Analysis for Oppositional Behavior and Conduct Problems 1-Year Post-Enrollment

Model	Predictor	β	R^2	F	ΔF
Base Model			.01	.09	.09
	Severity of Symptoms	.07			
Step 2			.01	.10	.12
	Severity of Symptoms	.06			
	SES Risk Factor	.08			
Step 3			.02	.08	.05
	Severity of Symptoms	.67			
	SES Risk Factor	.12			
	Parent Education Sessions Attended	.07			
Step 4			.02	.06	.01
	Severity of Symptoms	.07			
	SES Risk Factor	.11			
	Parent Education Sessions Attended	.08			
	Dosage of Consultation	-.05			

Note: * $p < 0.05$, **$p<.01$

Table 7

Correlations among Predictor Variables and Social Skills 1-Year Post-Enrollment

Variable	1	2	3	4	5
1. Social Skills at 1-Year	-	-.09	.19	.08	.09
2. Severity of Symptoms		-	.06	-.23	-.06
3. SES Risk Factor			-	-.50**	-.51**
4. Number of Family Education sessions				-	.57**
5. Dosage of Consultation					-

Note: *$p < .05$; **$p < .01$

Table 8

Summary of Hierarchical Regression Analysis for Social Skills 1-Year Post-Enrollment

Model	Predictor	β	R^2	F	ΔF
Base Model			.01	.20	.20
	Severity of Symptoms	-.09			
Step 2			.05	.63	1.07
	Severity of Symptoms	-.10			
	SES Risk Factor	.20			
Step 3			.08	.74	.95
	Severity of Symptoms	-.05			
	SES Risk Factor	.31			
	Parent Education Sessions Attended	.22			
Step 4			.10	.69	.57
	Severity of Symptoms	-.06			
	SES Risk Factor	.36			
	Parent Education Sessions Attended	.14			
	Dosage of Consultation	.19			

Note: * $p < 0.05$, **$p<.01$

Table 9

Correlations among Predictor Variables and Parent-Child Interactions 1-Year Post-Enrollment

Variable	1	2	3	4	5
1. Parent-Child Interactions at 1-Year	-	.21	-.04	-.11	.15
2. Severity of Symptoms		-	.05	-.13	.07
3. SES Risk Factor			-	-.40*	-.41**
4. Number of Family Education sessions				-	.60**
5. Dosage of Consultation					-

Note: *$p < .05$; **$p < .01$

Table 10

Summary of Hierarchical Regression Analysis for Parent-Child Interactions 1-Year Post-Enrollment

Model	Predictor	β	R^2	F	ΔF
Base Model			.04	1.5	1.52
	Severity of Symptoms	.21			
Step 2		.	.05	.78	.09
	Severity of Symptoms	21			
	SES Risk Factor	-.05			
Step 3			.06	.69	.53
	Severity of Symptoms	.23			
	SES Risk Factor	.00			
	Parent Education Sessions Attended	.14			
Step 4			.07	.54	.16
	Severity of Symptoms	.21			
	SES Risk Factor	.02			
	Parent Education Sessions Attended	.09			
	Dosage of Consultation	.09			

Note: * $p < 0.05$, **$p<.01$

Table 11

Means and Standard Deviations for Predictors and Oppositional Defiance and Conduct Problems as the Criterion Measure at 6-Months Post-Enrollment (N=36)

Measure	Mean	Standard Deviation
CBCL ODD + CD 6-Months Post-Enrollment	11.06	6.90
CBCL Attention Deficit/Hyperactivity Problems at Enrollment [b]	10.28	3.02
SES Risk Factor [c]	0.56	0.65
Family Education Sessions [d]	4.18	3.74
Family Consultation [e]	4.5	3.37

Note: [a]Raw Scores combined. [b]Raw Score. [c]Assigned score of 0, 1, or 2 based on income and ethnicity. [d]Number of Family Education Sessions Attended. [e]Total Number of Home Consultation Hours Received.

Table 12

Means and Standard Deviations for Predictors and Social Skills as the Criterion Measure at 6-Months Post-Enrollment (N=37)

Measure	Mean	Standard Deviation
SSRS Social Skills at 1-Year Post Baseline[a]	44.57	9.26
CBCL Attention Deficit/Hyperactivity Problems at Baseline [a]	10.08	3.21
SES Risk Factor [b]	0.59	0.69
Family Education Sessions [c]	4.18	3.67
Family Consultation [d]	4.50	3.33

Note: [a]Raw Score. [b]Assigned score of 0, 1, or 2 based on income and ethnicity. [c]Number of Family Education Sessions Attended. [d]Total Number of Home Consultation Hours Received.

Table 13

Means and Standard Deviations for Predictors and Parent-Child Interactions as the Criterion Measure at 6-Months Post-Enrollment (N=31)

Measure	Mean	Standard Deviation
Parent-Child Interaction [a]	-1.21	5.14
CBCL Attention Deficit/Hyperactivity Problems at Baseline [b]	10.35	3.01
SES Risk Factor [c]	0.65	0.71
Family Education Sessions [d]	4.13	3.67
Family Consultation [e]	4.66	3.28

Note: [a]Derived Composite Score. [b]Raw Score. [c]Assigned score of 0, 1, or 2 based on income and ethnicity. [d]Number of Family Education Sessions Attended. [e]Total Number of Home Consultation Hours Received.

Table 14

Correlations among Predictor Variables and Oppositional Defiant Disorder and Conduct Disorder 6-Months Post-Enrollment

Variable	1	2	3	4	5
1. ODD/CD at 6-Months	-	.46**	.05	-.27	-.07
2. Severity of Symptoms		-	.18	-.06	.18
3. SES Risk Factor			-	-.53	-.38*
4. Number of Family Education sessions				-	.65**
5. Dosage of Consultation					-

Note: *$p < .05$; **$p < .01$

Table 15

Summary of Hierarchical Regression Analysis for Oppositional Behavior and Conduct Problems 6-Months Post-Enrollment

Model	Predictor	β	R^2	F	ΔF
Base Model			.21	9.02**	9.02
	Severity of Symptoms	.46			
Step 2			.00	4.40	.05
	Severity of Symptoms	.46			
	SES Risk Factor	-.03			
Step 3			.31	4.72**	4.44
	Severity of Symptoms	.48			
	SES Risk Factor	-.23			
	Parent Education Sessions Attended	-.37			
Step 4			.31	3.43	.00
	Severity of Symptoms	1.10**			
	SES Risk Factor	-2.44			
	Parent Education Sessions Attended	-.33			
	Dosage of Consultation	-.01*			

Note: * $p < 0.05$, **$p<.01$

Table 16

Correlations among Predictor Variables and Social Skills 6-Months Post-Enrollment

Variable	1	2	3	4	5
1. Social Skills at 6-Months	-	-.11	.27	-.11	-.13
2. Severity of Symptoms		-	.03	-.05	.16
3. SES Risk Factor			-	-.50**	-.36*
4. Number of Family Education sessions				-	.65**
5. Dosage of Consultation					-

Note: *$p < .05$; **$p < .01$

Table 17

Summary of Hierarchical Regression Analysis for Social Skills 6-Months Post-Enrollment

Model	Predictor	β	R^2	F	ΔF
Base Model			.01	.45	.45
	Severity of Symptoms	-.11			
Step 2			.07	1.57	2.67
	Severity of Symptoms	-.12			
	SES Risk Factor	.27			
Step 3			.00	1.03	.03
	Severity of Symptoms	-.12			
	SES Risk Factor	.28			
	Parent Education Sessions Attended	.03			
Step 4			.00	.76	.05
	Severity of Symptoms	-.11			
	SES Risk Factor	.28			
	Parent Education Sessions Attended	.06			
	Dosage of Consultation	-.05			

Note: * $p < 0.05$, **$p<.01$

Table 18

Correlations among Predictor Variables and Parent-Child Interactions 6-Months Post-Enrollment

Variable	1	2	3	4	5
1. Parent-Child Interactions at 6-Months	-	.00	-.00	.08	-.30
2. Severity of Symptoms		-	-.11	-.13	.12
3. SES Risk Factor			-	-.51**	-.49**
4. Number of Family Education sessions				-	.62**
5. Dosage of Consultation					-

Note: *$p < .05$; **$p < .01$

Table 19

Summary of Hierarchical Regression Analysis for Parent-Child Interactions 6-Months Post-Enrollment

Model	Predictor	β	R^2	F	ΔF
Base Model			.00	.00	.00
	Severity of Symptoms	.00			
Step 2			.00	.00	.00
	Severity of Symptoms	-.00			
	SES Risk Factor	-.00			
Step 3			.01	.07	.21
	Severity of Symptoms	.02			
	SES Risk Factor	.05			
	Parent Education Sessions Attended	.11			
Step 4			.22	1.79	6.89
	Severity of Symptoms	.12			
	SES Risk Factor	-.07			
	Parent Education Sessions Attended	.43			
	Dosage of Consultation	-.61			

Note: * $p < 0.05$, ** $p < .01$

Appendix A

Parent-Child Interaction Observation (PCI) Operational Definitions

Behavioral Code	Definition
Alpha Command, Demand, Request (AC)	Any command like statement (directive in which child is given a clear message to directly engage in some specific behavior or cease some specific behavior. Command is appropriate and feasible (able to comply within 5 seconds) For all Alpha commands there was either an act of compliance or non-compliance
Beta Command, Demand, Request (BC)	Unclear instructions, commands, demands, or requests to which the child has no opportunity to demonstrate compliance. Child is unable to comply within 5 seconds Action is interrupted by further parental verbiage Action is restricted by parental force
Repeat Command (RC)	All commands, demands, requests that are identical to original commands, demands, and requests not previously complied with.
Compliance (+)	Target child complies to parent command, demand, request within 5 seconds of request
Non-compliance (-)	Target child does not comply to parent command, demand, request 5 seconds after request
Positive parental response (Pos)	Positive verbal, physical or gestural behaviors by a parent contingent upon the target child's response to a command.
Negative parental response (Neg)	Negative verbal, physical or gestural behaviors by a parent contingent upon target child non-compliance or inappropriate behavior. Examples: Threats, physical punishments, cursing, restraints.

Positive Social Behavior (+)	Gestural, physical and vocal-verbal behaviors of the target child directed at other family members that are generally appropriate. Also includes child who is visually orienting to someone talking
Negative Social Behavior (-)	Gestural, physical, and vocal-behavior of the target child directed at other family members that are generally inappropriate. Examples: Refusing to comply, hitting, throwing objects, insults, negative statements
Appropriate Non-Social (App N-S)	Behaviors that are appropriate in the home setting, but do not involve direct interaction with another family member.
Inappropriate Non-Social (Inapp N-S)	Behaviors that reflect non-participation in ongoing activity or breaking obvious rules of conducts Includes: Leaving table without permission and banging fork on dish repeatedly

April 2014

CURRICULUM VITA

Name: Lauren Dullum-Moulton, M.Ed.
Address: 502 General Steuben Rd.
King of Prussia, PA 19406

E-Mail: lcd3@lehigh.edu
Citizenship: United States of America
Telephone: (732) 310-3967

Educational History:

Lehigh University, Bethlehem, Pennsylvania
B.A. Psychology, June 2001
With Honors

Lehigh University, Bethlehem, Pennsylvania
M.Ed. Human Development, January, 2003, GPA 3.90
N.A.S.P. & APA approved

Pennsylvania School Psychology Certification, July 2005

Clinical Experience:

School Psychologist, Upper Merion Area School District, King of Prussia, PA, August 2008-present. Responsibilities: Consult with MDE team to conduct psycho-educational evaluations to determine individual student eligibility and need for specially designed instruction, conduct behavioral and academic assessments, develop assessment-based interventions grounded within empirically-supported literature, monitor for progress, and consult with school facility, parents, and attorneys concerning behavioral and academic difficulties. Supervisor: Katheryn Ashbridge, Assistant Superintendent of Student Services, Upper Merion Area School District.

APA Pre-Doctorial Psychology Intern, Devereux, Center for Effective Schools, King of Prussia, PA, August 2007- 2008. Responsibilities: Consult with urban schools to develop and sustain

capacity to support Positive Behavior Supports within the school. School-wide assessments are delivered to identify individual need on a primary, secondary, and/or tertiary level from which trainings are developed and facilitated followed by consultation; participation in research and grant writing supporting school-wide Positive Behavior Support interventions and capacity building within schools. Supervisor: Barry McCurdy, Ph.D, Clinical Director.

Behavioral Consultant, ABC Consultants, LLP**,** Medford, NJ, April 2007- present. Responsibilities: Conduct Functional Behavioral Assessments and develop subsequent Behavior Support Plans in the home setting for children demonstrating challenging behaviors. Consultation around these plans is provided on an on-going basis. Supervisor: Lisa Marie Angello, Ph.D., Director/owner.

School Psychologist, Bangor Area School District, Bangor, PA, July 2005- August 2007. Responsibilities: Conduct psychoeducational evaluations to ascertain appropriate placement and educational programming for children suspected of exceptionality, conduct behavioral and academic assessments, develop assessment-based interventions, monitor for progress, and consult with school facility, parents, and attorneys concerning behavioral and academic difficulties; designed and implemented a school-wide positive behavior support system though a teaming process in an elementary school followed by consultative services. Supervisor: William Horvath, Ph. D., Director of Secondary Education, Bangor Area School District.

Behavior Specialist, Bangor Area School District, Bangor, PA, August 2004- July 2005. Responsibilities: Partnered with teachers and administrators from grades K-12 within a

behavioral consultation framework conducting Functional Behavioral Assessments and developing individual intervention plans for students with challenging behaviors; collaborated in the creation and implementation of a positive behavior support system within alternative education classrooms and offered consistent consultation and feedback to faculty members in these classrooms; and conducted district wide trainings on evidenced-based practice for promoting positive behaviors. Supervisor: William Horvath, Ph.D., Director of Secondary Education, Bangor Area School District.

School Psychologist Intern, Bangor Area School District, Bangor, PA, August 2003-August 2004. Responsibilities: Administered cognitive, achievement, and behavioral assessments to students presenting with academic and/or behavior difficulties, presented assessment results and recommendations in a written evaluation report, and facilitated MDE meetings to present findings to parents and suggest modifications and accommodations based on collected data; conducted district-wide training on structured behavioral observation systems, and functioned in a consultative role offering behavioral strategies to teachers of students presenting challenging behavior. Supervisor: Rosemary Mentesana, Ed.S., School Psychologist.

Teaching Experience:

Adjunct Professor, Rider University, Lawrenceville, NJ, 2007- 2010. Designed class syllabus to meet class objectives, create class lecture and identify assignments to meet learning objectives informed by the National Association of School Psychology (NASP) guidelines for a graduate course in school psychology titled, Home and School Interventions. Instructor and course

reviews are available upon request. Supervisor: Lisa Marie Angello, Ph.D., Assistant Professor, Rider University.

Adjunct Professor, Albright College, Reading, PA, 2005-2009. Responsibilities: Create class objectives, design lecture, class notes, tests, and projects aimed to facilitate and evaluate student attainment of these objectives for an undergraduate level course titled, Child and Adolescent Psychopathology. Instructor and course reviews are available upon request. Supervisor: Sally Farley, Ph.D., Assistant Professor, Albright College.

Research Experience:

Behavioral Consultant, Project ACHIEVE, Lehigh University, Department of Education and Human Services, August 2003-August 2004. Responsibilities: Lead weekly parent education trainings for parents of children at risk for ADHD; conduct functional behavioral assessments in both the home as well as school settings consisting of direct observations, problem identification interviews, as well as a functional analyses to determine the function of behavior; develop functional behavior reports as well as individual intervention plans consisting of evidence-based practices based on functional behavioral assessment results; consult with both schools and families on the implementation of the behavior plans as well as making data-driven changes in the intervention plans. Supervisors: George DuPaul, Ph.D. and Lee Kern, Ph.D.

Consultant, Project PASS, Lehigh University, Department of Education and Human Services, August 2002- present. Responsibilities: Conduct diagnostic interviews with parents of children at-risk for ADHD, data entry for large scale research project, progress monitor intervention

success for children with ADHD experiencing academic trouble in either reading or math, and conduct treatment integrity on academic interventions implemented for a National Institute of Mental Health (NIMH) grant. Supervisor: George DuPaul, Ph.D.

Masters Thesis, Lehigh University, Department of Education and Human Services, January 2002-April 2005. The efficacy of using brief functional analysis procedures with parents in the home setting for preschool children at-risk for Attention Deficit Hyperactivity Disorder (ADHD) was assessed. Participants in this study were 4 children aged 3-0 to 4-11 who participated in a larger National Institute of Mental Health (NIMH) study investigating the effects of a multi-component early intervention protocol for young children at risk for ADHD. These four children shared similar target behaviors (e.g. noncompliance and aggression). Results highlight the utility and practicality of implementing functional assessment procedures with parents, in the home setting, as a means of early intervention for preschool children identified as at-risk for ADHD. Supervisor: George DuPaul, Ph.D.

Data Collector, Project PASS, Lehigh University, Department of Education and Human Services, August 2001- June 2001. Duties: interact with teachers to schedule appointments, administer educational assessments to elementary-age children including math and reading curriculum based assessments and the WJ-III for a National Institute of Mental Health (NIMH) grant. Supervisor: George DuPaul, Ph.D.

Professional Presentations:

Dullum-Moulton, L.C., Jeffrey, J. L., McCurdy, B. (2009, February). *Gotcha! Caught Being Good Game: Classwide Intervention to Increase On-Task Behavior.* Presentation at the annual National Association of School Psychologists (NASP) conference, Boston, MA.

Jeffrey, J. L., **Dullum-Moulton, L. C.,** & Ritvalsky, K. (2009, February). *RtI Strategic Literacy Interventions: Peer Tutoring and Internet-Based Instruction.* Presentation at the annual National Association of School Psychologists (NASP) conference, Boston, MA.

Sokol, N. G., & Reilly, K. D., **Dullum, L. C**. (2004, May). *Creating a classroom for young children that promotes positive behavior.* Presentation at the annual conference of the Lehigh and Northampton Association for the Education of Young Children, Bethlehem, PA.

Sokol, N. G., Reilly, K. D., **Dullum, L. C.**, & DuPaul, G. J. (2004, November). *Creating a classroom that promotes positive behavior.* Presentation at the Pennsylvania Federation Council for Exceptional Children (PACEC), Grantville, PA.

Sokol, N. G. & **Dullum, L. C.** (2004, October). *Assessment and Interventions for Daily Transitions.* Presentation at the National Head Start Association's 8th Annual Transition Conference: Getting on Board and Staying on Track, Arlington, VA.

Sokol, N. G., Kern, L., DuPaul, G. J., & **Dullum, L. C**. (2005, March). *Partnering with parents to develop assessment based interventions.* Presentation at the 2nd annual international conference on Positive Behavior Support, Tampa, FL.

Sokol, N. G. & **Dullum, L. C.** (2005, April). *Functional behavioral assessment and intervention for young children with ADHD.* Presentation at the annual conference for the Council for Exceptional Children, Baltimore, MD.

Manuscripts:

Yurman, B., **Dullum, L. C.**, & Zirkel, P. (2006). *Legal Requirements for Manifestation determinations Under IDEA 2004: Questions and Answers.* NASP Communique', 35 (6).

Professional Affiliations and Honors Societies:

Association for Positive Behavior Support (Student Affiliate)

American Psychological Association, Division 16 (Student Affiliate)

Council for Exceptional Children (Student Affiliate)

National Association of School Psychology (Student Affiliate)

Psi Chi, National Honors Society in Psychology

Student Affiliates in School Psychology (Student Liaison)

References:

George DuPaul, Ph.D., Professor, Department of Education and Human Services, Lehigh University, Bethlehem, PA 18015. Voice: (610) 758-3252; e-mail: gjd3@lehigh.edu

Katheryn Ashbridge, Assistant Superintendent, Upper Merion Area School District, King of Prussia, PA 19406. Voice: (610) 205-3644; e-mail: kashbridge@umasd.org

Barry McCurdy, Ph.D., Director, Devereux Foundation's Center for Effective Schools, King of Prussia, PA 19406. Voice: (610) 542-3123; e-mail: bmccurdy@devereux.org

Rosemary Mentesana, Ed.S., Director of Pupil Services, Nazareth Area School District, Nazareth, PA 18064. Voice: (610) 759-1170 ex. 1104; e-mail: rmentesana@nazarethasd.org