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ADHD in Early Childhood: Predictors of Change Related to Treatment and Development

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ADHD in Early Childhood:

Predictors of Change Related to Treatment and Development

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Lehigh University

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

School Psychology

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Abstract

Attention-deficit/hyperactivity disorder (ADHD) affects up to 11% of individuals, causing impairment in academic, social, and work abilities. The trajectory of ADHD symptomology can be impacted by a myriad of factors, including caregiver parenting practices, levels of parent stress, and amount of support received. Symptoms of ADHD can change over time and this may be especially true in young children with or at-risk for ADHD. The current study evaluated the predictive relationship between parent-related variables at pre-treatment (positive parenting, parenting stress, and treatment receipt) and child behavior outcomes for children between the ages of 3 and 5 with ADHD following the completion of a behavioral parent training program. Participants included 47 families of young children with ADHD who were randomly assigned to one of two treatment groups or a wait-list-control group. Results indicate significant predictive power of parent pre-treatment competence and treatment receipt on child behavior outcomes. Specifically, the higher the level of parent pre-treatment competence and treatment dosage, the greater the improvement in parent ratings of child behavior and mood/affect. Implications for practice are discussed.

Chapter 1: Introduction and Review of the Literature

Early childhood is a time of many cognitive and behavioral changes. Thus, parents sometimes find it difficult to know if their children are merely active and excited or if their behaviors might be more concerning and impairing, such as those associated with attention-deficit/hyperactivity disorder (ADHD). Although at young ages ADHD may be more difficult to distinguish from normative behavior, it is considered to be the most common neurodevelopmental disorder of childhood (Barkley, 2016). In preschoolers, when ADHD symptoms are seen at such an early age, they typically persist into school age and beyond (Egger, Kondo, & Angold, 2006; Lahey et al., 2004; Strickland, Keller, Lavigne, Gouze, Hopkins, & LeBailly, 2011). Symptoms of ADHD include inattention, impulsivity, and hyperactivity (American Psychiatric Association, 2013) and are associated with an increased risk of impairment in social relationships with others, academic performance, and work-based performance (Barkley, 2016). Additionally, ADHD is a chronic condition; in preschoolers, 50% of those who exhibit symptoms will continue to experience those symptoms later in life; 11% of individuals are diagnosed with ADHD at some point in their life (Visser et al., 2014). Thus, early and consistent identification and treatment is presumed to be the most effective approach for the treatment of ADHD (DuPaul & Kern, 2011).

The prevalence of ADHD in preschool is estimated to be between 2% and 15.1% (Lavigne et al., 1996; 2009), with this range in prevalence estimates highlighting the ambiguity of the diagnosis at such an early age. As with older children and adults, symptoms of ADHD in young children are associated with behavioral and/or academic impairment (DuPaul et al., 2001; Lahey et al., 1998). When symptoms are present to the point of impairment, children with ADHD are at a greater than average risk for long-term psychological and social challenges (e.g.,

Posner et al., 2007; Rabiner, Godwin, & Dodge, 2016). When students present with behavioral and social impairments at such a young age, they often enter school about two standard deviations below their typically developing peers (DuPaul et al., 2001), especially when the behavioral impairments are associated with aggressive and defiant behaviors (Bendiksen et al., 2014; Visser et al., 2015). Duration of impairment due to ADHD-related symptoms can increase the likelihood of drop out as well as completing fewer years of education overall (Rabiner, Godwin, & Dodge, 2016). In addition to students losing access to school time, outcomes and impairment related to ADHD impose increased costs to families and to society at large, with estimates indicating the cost is 15 to 17.6 times higher than the cost for typically developing peers (Chorozoglou et al., 2015; Robb et al., 2011).

This elevated cost is one of the many reasons why starting ADHD treatment as early as possible may be the best strategy. For preschoolers, behavioral interventions are considered the first line of defense in the treatment of ADHD (American Academy of Pediatrics, 2011) such that these strategies should be used before medication is considered, given the potential for adverse side-effects from medication (Greenhill et al., 2006). Still, 9% of children between the ages of 2-5 with ADHD receive neither ADHD medicine nor psychological services, 49% receive only ADHD medicine, 27% receive both ADHD medicine and psychological services, and 15% receive psychological services only (Visser et al., 2016). DuPaul and Kern (2011) highlight the importance of including parents/families in behavioral treatment, including behavioral parent training (BPT), an intervention strategy used to teach parents or caregivers behavioral techniques (e.g., antecedent strategies, instructional strategies, response strategies) to manage problem behaviors. BPT is enhanced by focusing on cross-setting implementation, supporting the development of early academic skills, and teaching the importance of injury

prevention and safety techniques. Further, behavioral treatments for ADHD in general are shown to be efficacious by a wealth of literature (e.g., Fabiano et al., 2009). Couched within that area, BPT as a treatment for ADHD is the most researched and efficacious intervention for ADHD in young children (e.g., Bors, Sanders & Markie-Dadds, 2002; Thompson et al., 2009; Webster-Stratton, Reid & Beauchaine, 2011). Unfortunately, barriers to parent engagement can hinder attendance to BPT sessions (Kern et al., 2007), impacting the fidelity with which parents implement the interventions that they are taught (Chronis et al., 2004; Clarke et al., 2015). For example, Chacko, Wymbs, Chimilkis, Wymbs, and Pelham (2012) found that parents who completed a BPT program geared toward increasing engagement experienced better outcomes following intervention. This suggests that parent engagement in an education program predicts outcomes, which is not surprising. Nevertheless, there is a need to identify additional predictors of outcomes that may enhance understanding of development of ADHD in early childhood.

Parent engagement in a BPT program is, of course, not the only predictor for child outcomes. Additional research has identified numerous demographic predictors and parent-related mental health variables related to outcomes in BPT programs, including socioeconomic status (SES), parent marital status, and parent depressive symptoms. In general, children from families with lower SES, single parent families, and participant mothers presenting with elevated depressive symptoms experience poorer outcomes compared to children from higher SES families, nuclear families, and families without a history of depression (Nievar, Moske, Johnson, & Chen, 2014; Parent, Forehand, Long, & Jones, 2011).

For example, Nievar, Moske, Johnson, and Chen (2014) evaluated longitudinal data to better understand the family stress theory, or how depression, income, and home environment impact child attachment, parenting practices, self-regulation, and cognitive outcomes for young

children. Nievar et al. found that income and maternal depression predicted parenting practices, which in turn predicted toddler attachment, self-regulation, and cognitive outcomes during preschool years. This research suggests that these demographic variables are important in understanding the impact of parent variables on child outcomes. Alternatively, Mackenzie, Fites, and Bates (2004) found that for parents of children with significant behavior problems, less resistance to treatment was associated with more positive outcomes and single parenthood and lower income were associated with more positive outcomes. The latter results were unexpected and, although the study was completed with a small group of families ($n = 21$), they highlight the need for better understanding about variables predictive of early child development.

Parent, Forehand, Merchant, Long, and Jones (2011) assessed a group curriculum for parents of children between 3 and 6 years old with disruptive behavior disorders. Families were assigned to either the treatment group (group curriculum, GC) or a wait-list control group (WLC). Families who received the GC were enrolled in six 2-hour classes where they were taught behavioral strategies for managing disruptive behaviors. Parent et al. evaluated several parent personal/interpersonal and psychological/structural risk factors. These factors included parent depressive symptoms (personal/psychological), co-parent conflict (interpersonal/psychological), parent education (personal/structural), marital status (interpersonal/structural) and how these risk factors impacted engagement in the program (measured by the number of sessions attended), retention (measured by follow-up completion), and child outcomes. Parent depressive symptoms were found to predict change from baseline to follow-up in both the perception of and the intensity of child problem behaviors, with higher levels of depressive symptoms associated with greater reduction of child behavior problems at follow-up. Additionally, marital status and co-parent conflict significantly predicted engagement,

wherein families who were married and reported less conflict attended more sessions. Gardner, Hutchings, Bywater, and Whitaker (2010) also evaluated the impact of maternal depression on child outcomes in the context of a parent education program for preschoolers with conduct disorder (CD). Boys and younger children as well as those with more depressed mothers tended to show greater improvement in conduct problems as a result of the intervention. Alternatively, other risk factors, such as teen or single parenthood, very low income, and high initial levels of problem behavior were shown to have no predictive effects, suggesting that the intervention was at least as successful at helping the most disadvantaged families as with more advantaged families.

Forehand and colleagues (2016) compared the outcomes of three groups of families randomly assigned to parenting groups for disruptive preschool children. One program was designed specifically for children with ADHD (ADHDTx), and one was designed specifically for oppositional defiant disorder (ODD) (ODDTx). The third group was comprised of families enrolled in a wait-list control group. Forehand et al. evaluated how these different groups predicted outcomes in ODD diagnoses, ADHD symptoms, physical aggression, and defiant behaviors. Results showed ADHDTx and ODDTx were effective at reducing ADHD symptoms and disruptive behaviors; additionally, parents also reported fewer ODD-related behaviors. For ADHD symptoms, ADHDTx and ODDTx were equivalent regardless of ODD diagnosis; therefore, oppositional behavior may impede effectiveness of the ADHDTx.

Overall, these studies elucidate many demographic, family-related, and symptom-related variables that impact early child development in children with behavioral concerns. Unfortunately, these variables are often not malleable via BPT interventions that target teaching families specific behavioral strategies to improve child behavior and, hopefully, family relations.

Alternatively, although child outcomes are frequently studied in the literature, family relations research in the context of BPT is limited. Additionally, research exploring the impact of parenting practices on changes in early childhood behavior is sparse.

Parent Stress

There is extensive literature on the relationship between ADHD and stress in the family, the majority of this research focusing on school age children and adolescents. Overall, research suggests that families of children with ADHD experience higher rates of stress (Anastopolous, Guevremont, Shelton, & DuPaul, 1992; Theule, Winer, Tannock, & Jenkins, 2012). This stress can include a myriad of family-related factors, including divorce or marital discord and negative interactions within the family. Family-related factors associated with ADHD symptoms and impairment can lead to increased levels of stress in parents (Munoz-Silva, Lago-Urbano, Sanchez-Garcia, & Carmona-Marquez, 2017). Researchers suggest that an emphasis on decreasing family stress can improve outcomes overall (Gordon & Hinshaw, 2015)

Dadds, Schwartz, and Sanders (1987) assessed the role of family stress including marital discord with regards to outcomes of BPT program along with the effects of an added treatment, Partner Support Training (PST). This added training focused on the targeted family problems including marital conflict, communication, and problem solving. Families involved in this program had children diagnosed with behavior disorders (i.e., ODD and CD); they were assigned to groups based on their level of marital discord and then randomly assigned to a treatment group (child management treatment with or without PST). Dadds et al. measured child deviance, parenting behavior, and marital satisfaction pre- and post-intervention as well as at 6-month follow-up. There was a significant interaction between marital discord and treatment type; however, PST added little to the maintenance of change for families who were not experiencing

marital discord at baseline. PST did, however, produce significant gains in discordant families compared to those discordant families who received only child management training. This suggests that BPT programs that focus on also ameliorating parent stress by teaching positive practices can produce long-term positive outcomes above and beyond the effects of improving child behaviors. It is important to understand the impacts that treatment can have on family dynamics and subsequent child behaviors; however, this study failed to examine the natural progression of child behaviors related to or impacted by discord in the family setting in the absence of treatment.

Many empirical investigations have focused on the impact of parenting stress (including marital discord, divorce, and aversive parenting) on child development. Jouriles, Pfiffner, and O'Leary (1988) found that increased stress caused by marital conflict was associated with toddler misbehavior as well as parent-reported toddler conduct problems. Further, higher rates of marital conflict were correlated with increased disapproving statements from mothers to their children. Katzmann and colleagues (2017) evaluated the impact on child outcomes and family variables in two variations of a parent training program (non-directive parent training and behaviorally oriented parent training). Researchers found that enrollment in the behaviorally oriented parent-training program resulted in increased parent self-efficacy. Additionally, parents enrolled in the behaviorally oriented program had fewer negative attributions about their child's behavior at post-test, which was shown to be associated with lower levels of stress. Davies and Cummings (1998) reviewed studies that demonstrate the impact that stress caused by marital discord has on child adjustment, such as increased levels of parental and family distress and aggression (Cummings, Ianotti, & Zahn-Waxler, 1985), personality problems (Hershorn & Rosenbaum, 1985), withdrawal (Johnston, Gonzalez, & Campbell, 1987), and low cognitive and

social competence (Long, Forehand, Fauber, & Brody, 1987; Wierson, Forehand, & McCombs, 1988). Furthermore, Davies and Cummings present research that describes the impact of marital discord related stress on parenting practices, such that parents with greater marital discord are more likely to display negativity and intrusive control (Belsky, Youngblade, Rovine, & Volling, 1991), engage in greater rates of conflict with children (Christensen & Margolin, 1988), show less warmth and responsiveness to children (Cox, Own, Lewis, & Henderson, 1989), and exhibit higher parent stress and inconsistency in parenting practices (Heterington et al., 1992). Kitzmann (2000) directly evaluated the impact of parent stress related to marital conflict on parenting behaviors by observing families of 6- to 8-year old children directly following pleasant and conflictual discussions. Kitzmann observed that families used more democratic parenting procedures following a pleasant discussion and more coercive and misaligned parenting procedures following a conflictual discussion that presumably increased stress levels. McCoy, George, Cummings, and Davies (2013) found that conflict that was constructive – or resolved – did not have negative consequences for parenting practices of child adjustment. Alternatively, conflict that was destructive – or unresolved – was associated with more use of aversive parenting techniques and inconsistent discipline.

Buehler and Gerard (2002) found that the impact of parent stress that is related to marital discord extends into adolescence. Specifically, the researchers outlined marital conflict and its relationship to adolescent maladjustment, finding that parents with greater conflict and increased stress were more likely to use harsh parenting and be less involved, resulting in greater parent-adolescent conflict and, subsequently, higher levels of maladjustment in children and adolescents. Alternatively, Graziano and colleagues (2017) saw that an increase in positive parenting practices lead to lower rates of negative traits associated with ADHD in adolescence,

indicating that the symptom-related stress that parents experience that may lead to more negative parenting practices can have a long-term impact on symptomology and impairment in adolescents with ADHD.

Baker and Sanders (2016) evaluated a web-based parenting intervention designed to teach parents positive parenting practices over the course of five online modules. The authors evaluated whether improvements in child and parent behavior could be predicted by both family-related factors (e.g., child behavior problems, parent age, family conflict/stress) and program-related factors malleable to intervention effects, including child behavior problems and conflict in the family. In total, 100 parents of 2- to 9-year-old children with disruptive behavior problems participated. Positive outcomes were predicted by higher baseline levels of child behavior problems, older parental age, and greater levels of conflict. Specifically, lower disagreement over parenting predicted completion of the recommended dosage, and higher disagreement was associated with greater dropout. Conflict was measured by assessing the amount of inter-parental conflict over childrearing that parents experienced, and in this sample 19% of children lived in single-parent households, which makes it difficult to assess that construct reliably. Alternatively, Dittman, Farruggia, Palmer, Sanders, and Keown (2014) found that neither parental anger nor parental conflict predicted treatment outcomes in a BPT program. Similarly, Reyno and McGrath (2006) conducted a meta-analysis of predictors of behavior change and treatment dropout with no significant relationship between parenting stress or marital satisfaction and either treatment dropout or treatment outcomes

Research suggests that clinicians can impact family dynamics in such a way that developmental trajectories can be modified. It is important, then, to understand the development of behavioral concerns and ADHD in pre-school aged children when experiencing family stress.

As a child with ADHD grows up, he or she may experience different ADHD symptom profiles; for example, as skills in behavioral inhibition increase, inattention symptoms may become the dominating type, as opposed to hyperactive symptoms; alternatively, all symptoms of ADHD may decrease as a child ages (Langberg, Epstein, Altave, Molina, Arnold, & Vitiello, 2008). Researchers should also understand the typical development that happens in 3- to 5-year-olds with ADHD, separate from ADHD and family discord to illuminate the changes that may be more closely related to intervening factors, such as stress in the family or engagement in a BPT program. Further, parenting stress may be more easily addressed by strategies taught in a BPT program (e.g., positive parenting strategies leading to more positive family interactions; self-help techniques for de-stressing), which makes it a variable that is malleable.

Positive Parenting Practices

Parents who feel more confident in their ability to provide care are typically more successful; parents with increased self-efficacy are likely to experience greater success related to child outcomes while those with low self-efficacy may find poorer child outcomes (Heath et al., 2015; Van den Hoofdakker et al., 2010). Further, parents who are more motivated in changing their children's behavior tend to feel that they would be more successful in managing disruptive behaviors (Heath et al, 2015; Semke, Garbacz, Kwon, Sheridan, & Woods, 2010;). Parent self-efficacy and motivation may be improved through education, skill building, and practice. Additionally, children exposed to positive family experiences are more likely to grow into trusting and self-reliant adults (Baumrind, 1967; Bowlby, 1973). As the previously cited research suggests, family stress can negatively impact parenting practices (e.g., Beuhler & Gerard, 2002; McCoy, George Cummings, & Davies, 2013) in such a way that child

development is adversely affected. Thus, explicating the impact that parenting practices have on child outcomes is important in understanding development overall.

Stormshak, Bierman, McMahon, and Lengua (2000) found that young children with behavioral profiles including aggression, opposition, and hyperactivity were more likely to have parents who displayed inconsistent parenting and elevated use of strategies aimed to punish than young children without these behavior profiles. These parents also exhibited less warmth toward their children. Parents who engaged in more aggressive behaviors were seen to have children who also engaged in more aggressive behaviors. In adolescence, negative parenting strategies such as failure to attend to children as opposed to monitoring and spending time with children can result in increased rates of adolescent risky behaviors such as smoking, using alcohol, and behaving in aggressive or illegal ways (Griffin, Botvin, Scheier, Diaz, & Miller, 2000).

Alternatively, the use of more positive strategies such as attending, which can include eating dinner together and monitoring child behavior (Griffin et al., 2000) as well as exhibiting warmth toward children and being involved in their activities (Stormshak et al., 2000) can lead to more positive outcomes for children and less disruptive and aggressive or delinquent behaviors.

Specifically related to ADHD, Ellis and Nigg (2010) found inconsistent parenting as well as limited involvement to be associated with ADHD in children between the ages of 6 and 12.

Chronis, Lahey, Pelham and colleagues (2007) found that early positive parenting is a protective factor in the development of conduct problems for children with ADHD, suggesting that a parent education program that focuses on increasing positive interactions for parents of preschool-aged children could help in ameliorating the negative trajectory of conduct problems so frequently seen in children with ADHD.

Understandably, it is theorized that change in parenting behavior is the mechanism through which change in child and adolescent externalizing problems occurs. To address this change in behavior problems in the context of parent training, Forehand, Lafko, Parent, and Burt (2014) evaluated eight intervention and 17 prevention studies focusing broadly on BPT that met criteria for testing mediation. Within these selected studies, parenting behaviors were classified as either positive, negative, discipline, monitoring/supervision, or a composite measure. Forty-five percent of the tests performed across studies to test mediation supported parenting practices as a mediator. A composite measure of parenting and discipline received the most support, whereas monitoring/supervision was rarely examined. More support for the mediating role of parenting emerged for prevention relative to intervention studies. These findings do not question the efficacy of BPT; however, they do suggest that more attention should be focused on examining parenting as a putative mediator in BPT.

These conclusions are likely to hold true for families of children with ADHD as well. For example, Haack, Villodas, McBurnett, Hinshaw, and Pfiffner (2017) evaluated the impact that improved parenting practices had on child outcomes, following involvement in a parent-focused treatment compared to a treatment as usual regimen. Haack et al. found that an increase in positive parenting and a decrease in negative parenting mediated the change in child outcomes, such that parents who exhibited improved parenting practices were more likely to see positive changes in their children with ADHD. Patterson's (1982) model of coercive family processes paints a clear picture in which negative parenting practices can influence the development of conduct problems via repeated unsuccessful interactions between mothers and difficult children who show behaviors related to the symptom profile of ADHD: inattention, hyperactivity, impulsivity, and, often, defiance and aggression. In these negative interactions,

the mother withdraws or responds negatively and, in reaction, the child behaves in a more aggressive or disorderly manner. Eventually, the pattern becomes so reinforced (i.e., mother escapes and/or child gets attention) that it becomes a part of daily routines, leading to ongoing negative or harsh parenting accompanied by conduct problems from the child. This pattern makes it easy to see how negative interactions can adversely impact the development of behavioral problems across the lifespan, and is supported by additional, yet dated, research (e.g., Forgatch & Degarmo, 1999; Martinez & Forgatch, 2001).

By understanding the impact of negative parenting practices on the natural development of child behavior problems in children with ADHD, it is important to also understand the impact of interventions that target positive parenting strategies and minimize the use of aversive techniques on child behavior outcomes to help practitioners create and deliver targeted and effective interventions at a crucial time in development. Gardner, Hutchings, Bywater, and Whitaker (2010), in their intervention study of parents of preschool children with CD, found that increase in positive parenting strategies such as praise and attending predicted improvement in conduct problems post-intervention. This finding supports the theory that early intervention targeting change in negative parenting practices (e.g., using punitive measures or withdrawing from the interaction entirely), and focusing parent efforts on positive interactions (e.g., attending and praise) can impact child outcomes even over a short period.

Unfortunately, few studies on BPT, which typically aim to improve parenting strategies for parents of children with disruptive behaviors, actually evaluate the impact of the specific variable of parenting practices on the development of behavioral problems in children with ADHD. Instead, these studies focus more on intervention effects on parent and child variables as a whole (e.g., Brotman et al., 2011). Although the connection between parenting practices and

child behavior is theoretically sound and supported by the developmental literature, the understanding of how early intervention in families of children with ADHD and conduct problems can impact child behavior is largely unknown.

Treatment and Dosage

Due to the vast developmental changes happening during the preschool years, expected or targeted changes in behavior may not be due to treatment but also to maturation or other developmental processes. For example, Churchack-Lichtin, Chacko, and Halperin (2013) studied ADHD symptom endorsement from pre-school to school age, finding that from a young age, symptoms of inattention were reported less frequently but by school age were more prominent. Additionally, symptoms of hyperactivity that were endorsed in early childhood became less prevalent in school age children. These findings highlight the trajectory of ADHD symptoms, but can also make it difficult for caregivers to successfully identify these behaviors as symptoms of ADHD. During the ages of 3 to 5 years old, children begin to engage in more social behaviors and become more active and independent (Berk, 2010), resulting in a myriad of behaviors that may resemble ADHD symptoms to those unfamiliar with the disorder. Thus, it is important to evaluate not only the impact of treatment components but also to understand the trajectory of young children with ADHD.

For parents involved in BPT programs, changes in child behavior may also be occurring because of treatment impacts. Many studies evaluate the impact of dosage and dropout on treatment outcomes (e.g., Chacko, Wymbs, Chimiklis, Wymbs, & Pelham, 2012); however, high variability in number of sessions (e.g., 5 to 20) makes comparisons of effective dosage across BPT programs very difficult; in some cases, families receive extensive support in multiple areas whereas in other programs, the support is focused on a very narrow area and/or for a limited

time. Similarly, not all families will receive all of the support that is possible, regardless of how much is available. Additionally, the literature on treatment dosage for BPT programs is mixed. For example, Forehand and colleagues (2011) describe a 12-session parent education program. In their study, the average number of sessions attended was only four (for a total of 8 hours of intervention content). Although, on average, families received less than half of the intervention content, positive outcomes in parent and child behavior were observed. Similarly, Parent and colleagues (2011) found that the number of sessions parents attended in a six-session program was not related to child outcomes. Lundahl, Risser, and Lovejoy (2005) completed a meta-analysis of 63 BPT programs and found no significant effect of time in treatment or number of sessions attended on parent or child outcomes. With that understanding, evaluating dosage across treatment groups (who may have received no support or full support) when compared to a control group (who received no support and did not have access to support) provides information regarding treatment impact versus developmental changes or maturation in young children with ADHD, which is particularly important at an early age when developmental changes are occurring rapidly. Thus, it is important to not only address these rarely studied areas (i.e., parenting stress and practices) but to also evaluate dosage.

In the study that the current investigation draws from, an existing BPT program for young children with ADHD was pared down from 20 sessions (that was associated with lower than desired attendance; Kern et al., 2007) to 10 sessions in order to provide sufficient treatment while increasing parent retention through completion. As stated, developmental changes during this time period are vast. Thus, to understand maturation in comparison to support provided via treatment as a variable, it is important to include assessment of outcomes for children in the control group over the same period of time. With that information, we can understand the unique

impact of the additional prediction variables related to treatment, knowing that families who are more engaged in their child's treatment typically see more positive outcomes (Chacko, Wymbs, Chimiklis, Wymbs, & Pelham, 2012).

The Proposed Study

The proposed study aimed to address several gaps seen in the extant literature on preschoolers with ADHD. Currently, few published studies have identified parent-related and treatment-related predictors of change in child behavior over time for young children (3 to 5 years old) with ADHD. Most studies that address predictors evaluate demographic variables (e.g., SES, income, household status), suggesting that these barriers limit outcomes including response to BPT programs (e.g., Chacko, 2016). Demographic factors are important to understand, but from a practitioner point of view, these variables are not likely to be impacted by intervention. Thus, addressing variables related to treatment, such as use of parenting practices and stress, is an important area to explore. Further, due to the previously discussed developmental changes during this period, it is important to include a control group to account for developmental factors beyond treatment.

The current study aimed to address these understudied areas with three specific research questions regarding prediction of change in child behaviors related to ADHD. Namely,

- 1) Do positive parenting practices significantly predict change in child behaviors over approximately three months for young children with ADHD,
- 2) Does parenting stress significantly predict change in child behaviors over approximately three months for young children with ADHD, and

3) Does treatment receipt/dosage significantly predict change in child behaviors over approximately three months for young children with ADHD?

It was hypothesized that greater parent use of positive parenting practices (i.e., attending, praise) would predict positive changes in child behavior (Heath, Curtis, Fan, & McPherson, 2015; Semke, Garbacz, Kwon, Sheridan, & Woods, 2010; Van den Hoofdakker et al., 2010). Second, it was hypothesized that lower endorsement of parenting stress would predict positive changes in child behavior over time (Macoby & Martin, 1983; Vandewater & Landsford, 1998; Wallerstein & Kelly, 1980; Webster-Stratton, 1989). Third, despite equivocal prior findings regarding the impact of treatment dosage, it was hypothesized that amount of treatment received would predict changes in child behavior, specifically that more treatment (i.e., more sessions attended/completed) would predict positive child behavior change at the completion of data-collection (Chacko, Wymbs, Chimiklis, Wymbs, & Pelham, 2012).

Chapter II: Methods

Participants

Recruitment procedures. Parents of preschool children in northeastern Pennsylvania were recruited for participation in Project Promoting Engagement for ADHD pre-Kindergartners (PEAK) over the course of 2 years and four cohorts of families. Recruitment included the distribution of flyers to local daycare centers, preschools, pediatricians, dentist offices, and organizations that provide products or services aimed at preschoolers and parents of preschoolers; attendance at community fairs and festivals; contact with web-based mother groups; social media posts; Craigslist posts; and university e-mails.

Participants. In total, 100 families showed interest in Project PEAK. After eligibility screening and scheduling, a total of 47 families participated in four cohorts of 10 to 14 families. To be eligible to participate, children were required to be (1) between the ages of 3 years, 0 months and 5 years, 11 months; (2) enrolled in a preschool or daycare setting at least 2 days per week unless otherwise unable to enroll (e.g., behavioral problems, lack of services for unrelated disability); and (3) carry no diagnosis(es) of autism spectrum disorder (ASD), pervasive developmental disorder, intellectual disability, neurological damage, or significant motor or physical impairments. Additionally, parents were required to have an electronic device with Internet access and be willing to either attend face-to-face meetings or complete online sessions. Children must have met DSM-5 criteria for one of the three presentations of ADHD based on PEAK administered clinical interview and parent behavior ratings including parent report of elevated levels of symptoms at home (i.e., score greater than 90th percentile on one or more Conners Early Childhood Rating Scale subscales relevant to ADHD). Additional exclusion criteria included a Differential Ability Scale global cognitive ability score of less than 80.

After eligibility was determined and parent written consent was obtained, families were randomly assigned to the face-to-face program (F2F) ($n = 16$), the online program ($n = 15$), or the WLC group ($n = 16$), who received the online program at the conclusion of 15 weeks, after post-treatment assessment phase. Children were between the ages of 3-0 and 5-11 years of age ($M = 4.43$; $SD = .63$), and were predominantly male (63.8%) and White, non-Hispanic (78.7%). Children met DSM-5 criteria for all three ADHD presentations; however, the majority was identified with combined presentation (61.7%), and a majority also met criteria for ODD (53.2%). There were no significant between-group differences in demographic and diagnostic characteristics or cognitive ability prior to treatment (DuPaul et al., 2017); thus, face-to-face participants and online participants were combined into a treatment group for the purpose of this study. Complete demographics for the sample are in Table 1; these participant characteristics are comparable to demographics of pre-school aged participants with ADHD previously studied (e.g., Kern et al., 2007). Six children (F2F = 2, Online = 2, WLC = 2) were dropouts for the following reasons: Two families were randomized but did not participate, two families were lost to follow-up, and one family withdrew after losing custody of the child they had been fostering. Additionally, one family that had been assigned to the WLC group accidentally attended the first F2F session and consequently had to be withdrawn.

Child Participant Screening and Eligibility Measures

Conners Early Childhood Rating Scale (CERS; Conners, 2009). The parent version of the CERS includes six behavior scales containing 190 items. For screening purposes, scores at or beyond the 90th percentile on the Inattention/Overactivity subscale were used for inclusion in the study. The internal consistency, test-retest reliability, and criterion-related validity of the CERS are all at or beyond accepted standards (Conners, 2009). Reliability statistics for the Parent

Behavior Scales are as follows: internal consistency 0.86, test-retest 0.87, and inter-rater 0.72.

Barkley Semi-Structured Diagnostic Interview (Barkley, 2006). The Barkley diagnostic interview (Barkley & Murphy, 2006) was used to confirm eligibility for an ADHD diagnosis as well to assess for ODD and CD comorbidities. The Barkley diagnostic interview for ADHD consists of 23 items adapted from the diagnostic criteria in the DSM-IV-TR (American Psychiatric Association, 2000), which was further adapted to match DSM-5 (American Psychiatric Association, 2013) criteria. To qualify, caregivers had to endorse at least six symptoms within the inattentive and/or impulsive/hyperactive symptom domains, at least 6-month symptom duration, symptom presentation in at least two settings, and symptom-related impairment.

Developmental Ability Scale-II (DAS-II; Elliott, 2007). The DAS-II includes both preschool and school-age assessments of cognitive abilities. For the purpose of this study, the preschool range was used. This version of the scale is designed for children between the ages of 2:6 and 6:11 and consists of six core subtests that include verbal comprehension, picture similarities, naming vocabulary, pattern construction, matrices, and copying. From these subtest scores a General Conceptual Ability (GCA) is rendered, which is considered to be equivalent to a Weschler Full Scale IQ score. Children were excluded from participation in the study if they had a GCA that fell below 80. The DAS-II Preschool scale has acceptable psychometric properties making it appropriate for the interpretation of cognitive abilities (internal consistency = .76 – .96; interscorer agreement = .98 – .99; intercorrelations between subtests and GCA = .61 – .75). Further, the DAS-II is shown to have high correlations with school readiness scales as well as additional cognitive scales (.83 – .89) (Elliott, 2007).

Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003a). The SCQ is a 40-item parent-report questionnaire that measures the presence of abnormal social communication behaviors associated with ASD. The SCQ is based on the Autism Diagnostic Interview-Revised (ADI-R; Lord et al., 1994) and has established validity with the ADI-R and diagnosis of autism (Berument et al., 1999). The SCQ has demonstrated adequate specificity and sensitivity in identifying risk for ASD in children ages 3- to 5-years old (Allen, Silove, Williams, & Hutchins, 2007). Children scoring higher than the established cut-off score of 15 on the SCQ (Rutter et al., 2003b) were excluded from the study.

Process and Outcome Measures

Dosage.

Parent attendance or completion. Parent attendance to the face-to-face sessions or completion of the online sessions was recorded weekly. Attendance to the face-to-face program was documented as percentage of sessions completed (e.g., a parent who attended or completed 8 of 10 face-to-face sessions was recorded as having completed 80% of total possible treatment). For sessions to be considered complete, parent(s) had to physically attend the face-to-face meeting for the majority of the allotted time. For parents in the online group, there was more flexibility in how the program was completed (i.e., parents could complete the sessions within the window in which they were available online and could complete multiple sessions in a week, if needed), but all sessions were designed to mirror the face-to-face program. For these parents, completion of each online session, as documented via the online platform, was recorded as percentage of sessions completed in the same way as the face-to-face sessions were documented. For sessions to be considered complete, parent(s) had to enter the online program and be active in the program for a reasonable amount of time. In the online program, parents could not

proceed from one activity to the next without completing the first activity, ensuring that they were watching each section within the sessions. For families enrolled in the wait-list control group, no treatment was received and thus dosage = 0%.

Positive Parenting Practices.

Test of parent knowledge. A test of parent knowledge of behavioral strategies and information specifically taught in Project PEAK was developed and administered pre- and post-treatment to evaluate growth of knowledge. This 9-question test assessed parent understanding of behavioral techniques and basic information related to ADHD. The percentage correct score on this test at pre-test was used as a measure of knowledge of positive parenting practices. Sample items on this questionnaire include: First priority behaviors are those that are? A) Destructive, B) Disruptive, C) Distracting, D) Annoying; and Two possible functions of behavior include: A) out of the blue/to make you mad, B) trigger/response, C) there are no functions of behavior, D) to gain/to escape.

Pre-treatment Competence assessments: Implementation. Treatment fidelity was assessed for parent implementation of prescribed techniques. The in-home pre-treatment competence check consisted of nine items that aligned with program content. This included information related to setting expectations, identifying triggers and behaviors, and using specific strategies but excluded introductory content in week one; introductory content knowledge was captured by the knowledge assessment that was also administered. Graduate student observers completed the checks at each observation period (pre-, mid-, and post-treatment) by either observing the behavior or strategy addressed in each item or explicitly asking the caregiver for information regarding the behavior or strategy (e.g. “Can you describe [how you would use] a preventative strategy?”). The observer then rated the fidelity of the behavior/strategy with a

“yes,” “no,” or “partial”. Partial ratings were given when parents showed some pre-treatment competence in completing the behavior or strategy but missed some key elements (e.g., explaining bedtime reading routines but not using components of dialogic reading in that explanation). Total score on this measure could range from 0 to 18. When considering the overlap of knowledge and fidelity, it was seen that the fidelity measure captured more behavioral items, such as use of strategies and plans for transition. The previously described knowledge assessment did overlap frequently with the fidelity assessment; however, it uniquely captured information related to knowledge of intervention options for ADHD, triggers for behaviors, and functions of those behaviors.

Observations of parent implementation of strategies. Parents were observed in the home three times (pre-, mid-, and post-treatment) for 30 minutes using 30-second intervals within a partial interval recording system. During this time, parent-child interactions were observed and a variety of parent- and child-related variables were noted to occur or to not occur during the 60 intervals. Specifically, parent use of praise and attending at pre-treatment baseline was used. These two areas were identified as important predictors of child behavior change due to the frequency with which they are used, their ability to be observed reliably, and their meaningful impact on parent-child interactions. Praise was defined as the following: *Caregiver responded to an appropriate or desired child behavior in a positive way, specifying the appropriate or desired behavior the child exhibited. As long as some aspect of child's behavior or outcome of child behavior is noted allow flexibility in content.* Attending was defined as the following: *when child is engaging in desired or appropriate behavior, caregiver positions him or herself towards the child and/or verbally engages child about interests and activities, and/or engages in positive physical contact. These behaviors must occur for at least three seconds to be*

coded. Caregiver needs to be completely engaged with child; this can include engagement with other children/siblings, as long as the target child is not isolated. The percentage of intervals in which a behavior occurred was documented. Observations were conducted by graduate students in School Psychology or Special Education previously trained to at least 90% integrity via videotapes of participants from previous projects. Interobserver agreement data were collected by a second independent observer during a minimum of 25% of sessions across groups and across time points, resulting in acceptable kappa values of .84 (praise) and .72 (attending). Although only one 30-minute observation (60 intervals) were used as a predictor of outcomes, other studies have used similar methods to evaluate outcomes (Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001; Peris & Hinshaw, 2003; Werba et al., 2006). These studies used only brief, pre-test observations to predict outcomes over time, indicating that this is a method commonly used in the early childhood literature.

Parent Stress.

Parent Stress Index – Short Form (PSI-SF; Abidin, 1995). This parent-completed measure included 36 items designed to assess parental stress related to child behavior and parent-child interactions. Items are completed using a 5-point Likert scale ranging from 1 (*Strongly Agree*) to 5 (*Strongly Disagree*). In addition to a total stress raw score, raw scores for three domains (Parental Distress, Difficult Child, and Parent-Child Dysfunctional Interactions) were used as dependent measures. The PSI has adequate reliability and validity (Abidin, 1995). All three subscales were used as predictors. The Parental Distress (PSI-PD) subscale yields a score indicating the level of distress a caregiver is experiencing. These include personal factors such as depression, conflict with a partner, and stressors due to the demands of child-rearing. The Difficult Child (PSI-DC) subscale yields a score indicating how difficult or easy the parent

perceives his or her child to be. The Parent-Child Dysfunctional Interactions (PSI-DI) subscale yields a score indicating the extent to which the parent believes that his or her child does not meet their expectations and their interactions are not satisfying. Haskett, Ahern, Ward and Allaire (2006) confirmed that all 12 of the PD subscale items loaded together on a scale they identified as personal distress. The items on this scale were significantly positively correlated with the Global Severity Index of the Symptom Check-list-90-Revised (Derogatis, 1983), the Eyeberg Child Behavior Inventory – Intensity Scale (Eyeberg & Pincus, 1999), and the Conflict Tactics Scale (Straus, 1979). Scores were also significantly negatively correlated with observed positive child behavior. Additionally, the internal consistency of the scale has been found to be between .74-.88, confirming Abidin’s original findings (1995). Test-retest reliability of the PD scale has been found to be between .80 - .84 (Barroso, Hungerford, Garcia, Graziano, & Bagner, 2015).

Child Behaviors.

Conners Early Childhood Rating Scale (CERS; Conners, 2009). Parent ratings using the CERS (see previous description) were collected prior to the first education session and immediately following the last session to document changes in child behavior as a function of the program. For this study, five behavior scales were of primary interest including Inattention/Overactivity (I/O), Defiant/Aggressive (D/A), Global Index-Restless Impulsive (GI-RI), Global Index-Total (GI-T), and Mood/Affect (M/A). As in DuPaul et al. (2016), standard scores on each scale were used as dependent variables. Growth was measured by computing a change variable, showing change in child behaviors on these subscales from pre-treatment to post-treatment. A change variable was calculated by subtracting the pre-treatment score from the post-treatment score. Thus, negative scores indicate reduction in problem behaviors from pre- to

post-treatment.

Procedures

Families enrolled in the treatment groups (F2F or online) were expected to participate in 10 BPT sessions spanning 10 to 12 weeks. These sessions covered introductory material (e.g., What is ADHD?) and progressed through intervention strategies typically included in BPT programs as well as an emphasis on parents using proactive problem-solving including prevention and instruction strategies (See Table 2 for a list of session topics). Both treatment groups received identical content, materials, and information. During the sessions, parents were provided with information via lecture, group discussion, role-play, brief quizzes, and videos. An advanced graduate-level student in school psychology or special education led BPT sessions. Fidelity of face-to-face BPT delivery across cohorts ranged from 90% to 100% ($M = 96.7\%$). Parents received a small stipend for completing measures in each assessment phase and treatment families were not compensated for attending or completing the sessions.

F2F program. Families enrolled in the F2F sessions were expected to attend all 10 sessions, each approximately 1.5 to 2 hours long, which were held at a local school that was accessible to families and the instructor. These sessions occurred across consecutive weeks unless inclement weather prohibited driving or holidays necessitated a break. At each session, childcare and food were provided to the families. During the face-to-face sessions, participants were led by an advanced graduate student in Special Education or School Psychology. Session content typically included didactic information, informative videos, discussion, role-play, and practicing of data collection and interpretation. At the end of each session, participants were asked to provide feedback on how the session went.

Online program. Families enrolled in the online program were expected to complete all 10 sessions, each approximately 1 hour to 1.5 hours. Unlike the F2F program, families in the online program had some flexibility in when the sessions were completed and the speed with which they progressed through the sessions. Online sessions were delivered through the university's course site by an advanced graduate student, and families were given unique and confidential login credentials. To ensure that families could successfully log in to the program, the first session was completed in person, along with the F2F families from the same cohort. Families from both groups received a brief introductory overview of the program together before separating to complete session one. Online families were provided technical assistance to log into the program prior to accessing session one. Subsequent sessions were released weekly and remained open for 2 weeks. Parents in the online program received weekly calls from a research assistant to check in and answer any questions regarding intervention procedures. Parent completion of each session was tracked electronically through the program. During the online sessions, participants accessed information and content that was identical to the face-to-face sessions. To increase engagement and understanding, questions were embedded throughout the sessions and answers to these questions were then used as talking points during the weekly calls, providing opportunity to participate in discussion and role-play, as needed. Like in the face-to-face sessions, at the end of each session, participants were asked to provide feedback on how the session went. Overall, treatment delivery methods did not differ with respect to primary outcome measures including child behavior, parent knowledge, and parent treatment fidelity (DuPaul et al., 2017).

Wait-List Control. Families enrolled in the *wait-list control group* were not provided with any treatment support during the pre- to post-treatment period but were given access to the

online program following the completion of all data collection (approximately 6 weeks after the treatment groups completed the sessions).

Session Fidelity. Each face-to-face parent session was audio recorded for assessment of staff fidelity in delivering session content and following prescribed session procedures. The co-principal investigator of the original study reviewed each recorded session using a fidelity checklist. Additionally, direct observations were conducted in the caregivers' homes to evaluate pre-treatment fidelity of parent implementation of intervention procedures.

Data Analyses

Using regression analyses conducted in SPSS (version 24), the following prediction variables were used:

- a) For the construct of Positive Parenting: Observed parenting practices (pre-treatment), parent knowledge (as assessed on 9-question knowledge assessment; pre-treatment), and parent pre-treatment competence in implementing positive parenting practices.
- b) For the construct of Parent Stress: Parent report of Parental Dysfunction (PSI-PD), Difficult Child (PSI-DC), and Parent-Child Dysfunctional Interactions (PSI-DI) all measured at pre-treatment. The Total Raw Score, measured at pre-treatment, was also used in analyses.
- c) For the construct of treatment receipt/dosage: percentage of sessions attended/completed

All predictor variables were analyzed with regards to child behavior outcomes using previously defined change scores for parent CERS ratings, including ratings on the following subscales: Inattention/Overactivity (I/O), Defiant/Aggressive (D/A), Global Index-Restless Impulsive (GI-RI), Global Index-Total (GI-T), and Mood/Affect (M/A). For each construct (i.e., Positive Parenting, Parent Stress, and treatment receipt/dosage), five regression analyses were

conducted (i.e., for each CERS change score) using the reported variables making up the constructs. For example, in the regression analysis of change in Inattention/Overactivity related to Positive Parenting, observed parenting practices, parent knowledge, and parent pre-treatment competence in implementation of parenting practices were used as predictors. Based on initial analyses, some variables were removed (observed positive parenting) or substituted (total stress score).

A power analysis was completed using G-Power (version 3.0.10) to determine whether the current sample size ($n = 37$) would be adequate to detect an effect. With a total sample size of 36, a multiple regression analysis with three predictors can detect a large effect size (.35). To detect a medium effect (.15), this analysis would need approximately 77 participants. Additionally, prior to analyses, the following assumptions were checked with regards to multiple regression analyses:

- 1) That a linear relationship exists between predictor variables and outcome variables, checked by evaluating the appropriate scatter plots.
- 2) That multivariate normality is obtained and the variables are normally distributed, checked by completing a goodness-of-fit test.
- 3) That there is no multicollinearity; that is, that the variables are not highly correlated with each other. This was checked by evaluating the correlation matrix (ideal = coefficients smaller than .80), examining tolerance and the Variation Inflation Factor, and examining the condition index (Mason & Perreault, 1991). And,
- 4) That the variance of the error terms is similar across the independent variables (homoscedasticity). This assumption was checked by conducting a Durbin-Watson test (Durbin & Watson, 1971).

Chapter III: Results

Overview and Tests of Assumptions

Using SPSS (version 24), 15 multiple regression analyses were completed (one analysis per set of predictors per change variable), using the prediction variables described previously (see Table 3 for summary of regression analyses). Descriptive statistics for all analyzed variables can be seen in Table 4. Prior to analyses, all assumptions were checked with regards to multiple regression analyses. Based on evaluation of skewness and kurtosis values, and scatter and P-P plots, the variables in question have a linear relationship and also meet the basic assumptions regarding multivariate normality. For Parent Knowledge, Parent Fidelity, and Parent attendance, Box's M values were all considered non-significant, which indicates that the equal variances assumption was not violated for these variables. Box's M values could not be computed for Observed Positive Parenting or any of the Parenting Stress variables. This could be due to the fact that for the variable of Observed Positive Parenting there were few observations completed and the data collected may have overlapped with other variables related to positive parenting. Similarly, the Parenting Stress variables all came from the same scale and may have been too highly correlated to detect distinct differences. In *ad hoc* analyses, these highly correlated variables were reduced or removed. Wilks' Lambda values were all in the desired range and were not considered statistically significant for any of the variables. Additionally, variables were shown to be normally distributed based on the conducted goodness-of-fit test. Regarding multicollinearity, some variables were more strongly correlated than suggested ($>.80$); however, correlations of this magnitude are expected due to the conceptual relationships between the variables (i.e., all related to parent variables). Tolerance measures, variance inflation index and condition index were in the desired range for all variables

suggesting that, overall, multicollinearity is not problematic. Finally, based on results of the Durbin-Watson test, all variables were in the desired range (1.5 – 2.5) which indicates that variances of the error terms are not problematic.

Positive Parenting, Parent Stress, and Treatment Receipt/Dosage

For the construct of Positive Parenting (i.e., observed parenting practices, parent knowledge, and parent pre-treatment competence in implementing positive parenting practices), the total model was shown to be statistically significant in predicting change in Inattention/Overactivity ($R^2 = .27$, $F[3,30] = 3.701$, $p = .022$), Global Index- Restless Impulsive ($R^2 = .127$, $F[3,30] = 3.252$, $p = .035$), and Global Index-Total ($R^2 = .106$, $F[3,30] = 3.746$, $p = .021$). Individually, only one of the three predictors, Parent Fidelity, was associated with a statistically significant regression weight for predicting change in child outcomes. Specifically, Parent Fidelity was significantly associated with a change in child outcomes on the Inattention/Overactivity scale ($\beta = -.514$, $t[3,30] = -3.125$, $p = .003$), the Defiance/Aggression scale ($\beta = -.357$, $t[3,30] = -2.403$, $p = .05$), the Global Index- Restless Impulsive scale ($\beta = -.451$, $t[3,30] = -2.773$, $p = .009$), and the Global Index – Total scale ($\beta = -.494$, $t[3,30] = -3.093$, $p = .004$) with higher parent pre-treatment competence associated with lower (i.e., improved) behavior ratings. To account for concerns related to multicollinearity, the variable of observed parenting practices was removed from the analysis. This removal resulted in the overall model being significant in the prediction of two subscales as opposed to three: Inattention/Overactivity ($R^2 = .175$, $F[2,32] = 3.403$, $p = .046$) and Global Index – Total ($R^2 = .19$, $F[2,32] = 3.763$, $p = .034$). In this model, Parent Fidelity, continued to be associated with a statistically significant regression weight for predicting change in child outcomes. As in the original model, Parent Fidelity was significantly associated with a change in child outcomes on the

Inattention/Overactivity scale ($\beta = -.427$, $t[2,32] = -2.585$, $p = .015$), the Defiance/Aggression scale ($\beta = -.36$, $t[2,32] = -2.118$, $p = .042$), the Global Index- Restless Impulsive scale ($\beta = -.368$, $t[2,32] = -2.191$, $p = .036$), and the Global Index – Total scale ($\beta = -.417$, $t[2,32] = -2.549$, $p = .016$) with higher parent pre-treatment competence associated with lower (i.e., improved) behavior ratings.

For the construct of Parent Stress (i.e., Parental Dysfunction, Difficult Child, and Parent-Child Dysfunctional Interactions), the total model was not statistically significant in predicting change in any of the five outcome variables. When this model was reduced to the Parent Stress total scale to account for multicollinearity in the subscales, these results were unchanged. At the individual level, none of the predictors were significantly associated with change in child outcome variables for either model.

For the construct of treatment receipt/dosage (i.e., percentage of sessions attended/completed), the total model, which included only one predictor was shown to be statistically significant for the prediction of change in child behaviors related to Inattention/Overactivity ($\beta = -.192$, $F[1,36] = 5.913$, $p = .02$), Defiance/Aggression ($\beta = -.31$, $F[1,36] = 5.02$, $p = .031$), Mood/Affect ($\beta = -.295$, $F[1,36] = 10.801$, $p = .002$), Global Index – Restless Impulsive ($\beta = -.064$, $F[1,36] = 6.832$, $p = .013$), and Global Index – Total ($\beta = -.145$, $F[1,36] = 6$, $p = .012$).

Ad hoc Analyses

Ad hoc analyses were conducted using the two statistically significant predictors in the original models: Parent Fidelity and Treatment Receipt/Dosage. This decision was made based on the outcomes of original regression analyses that showed a significant predictive relationship between the prediction variables of Parent Fidelity and Treatment Receipt/Dosage and the

outcome variables. Thus, an *ad hoc* analysis using these two predictors was completed to better understand the relationship between these specific variables and the outcome variables. This total model was shown to be statistically significant for the following outcome variables: Change in child behaviors related to Inattention/Overactivity ($R^2 = .249$, $F[2,34]= 5.36$, $p = .008$), Mood/Affect ($R^2 = .154$, $F[2,34]= 4.944$, $p=.013$), Global Index – Restless Impulsive ($R^2 = .225$, $F[2,34] = 5.194$, $p = .011$), and Global Index – Total ($R^2 = .234$, $F[2,34] = 6.261$, $p=.005$). At the individual predictor level, Fidelity was a significant predictor of change related to Inattention/Overactivity ($\beta = -.359$, $t[2,34] = .1.814$, $p = .003$), and Global Index Total ($\beta = -.361$, $t[2,34] = -2.408$, $p = .022$). Treatment Receipt/Dosage was a significant predictor of change related to Mood/Affect ($\beta = -.0442$, $t[2,34] = -2.864$, $p = .007$) and Global Index – Restless Impulsive ($\beta = -.314$, $t[2,34] = -2.045$, $p = .049$). Higher levels of parent pre-treatment competence and treatment receipt were associated with lower (i.e., improved) behavior ratings.

Chapter IV: Discussion

Summary of Findings in Relation to Extant Literature

On average, there was a decrease in reported child challenging behaviors ($M = 4.02$) from pre-treatment to post-treatment, which indicates change in perception of behaviors that may be related to treatment effects (see Table 4 for descriptive statistics). Multiple regression analyses were conducted to identify more clearly the mechanism of change in these outcomes. Results indicate that pre-treatment competence of parenting practices as well as treatment receipt/dosage were significantly associated with change in child outcomes. Specifically, the higher the level of parent pre-treatment competence and treatment dosage, the greater the improvement in parent ratings of child behavior and mood/affect. Alternatively, negative pre-treatment parent variables such as dysfunctional parent-child interactions, stress, and perceived difficult child behavior did not predict change in child outcomes from pre-treatment to post-treatment. An *ad hoc* analysis revealed that pre-treatment competence and attendance were significant predictors of change for all examined child outcomes, except for the measure of Defiance/Aggression. Specifically, parent pre-treatment competence in the use of strategies was a significant predictor of change in child behaviors associated with Inattention/Hyperactivity and the Global Index – Total measure. Treatment receipt/dosage was a significant predictor of change in child behaviors measured by Mood/Affect and the Global Index – Restless/Impulsive subscales measure.

In evaluating the significant findings in the original models, pre-treatment competence in positive parenting accounted for 25% to 27% of the variance in behavior rating change; while attendance accounted for 12% to 23% of the variance. The *ad hoc* model including pre-treatment competence and attendance accounted for 15% to 27% of the variance in behavior rating change. In evaluating effect sizes of each significant predictor on specific outcome

measures, in the area of positive parenting, the effect sizes for pre-treatment competence ranged from -.24 to -.51 (small to medium range), suggesting that with increased pre-treatment competence, there was a decrease in the outcome measure scores (which was desired) that fall within the small to medium range. In the area of attendance, effect sizes ranged from -.295 to -.31, suggesting that with an increase in parent attendance, there was a decrease in the outcome measure scores falling in the small to medium range. For the *ad hoc* analysis that included both pre-treatment competence and attendance as predictors, small to medium effect sizes for significant predictors ranged from -.359 to -.361 (pre-treatment competence) and -.314 to -.442 (attendance).

There are many potential reasons for these findings. It is not surprising that greater parent pre-treatment competence with positive behavior strategies and the more frequently they attended meetings, the greater the child's improvement was over time. Previous research has identified parent use of strategies and interventions as the primary change mechanism in treatment of child disruptive behavior (Forehand, Lafko, Parent, & Burt, 2014). Additionally, although not directly assessed, it may be that parents who exhibit lower rates of pre-treatment competence before treatment ($M = 3$, range 0-18) have more to learn and improve upon, thus having more impact on their children's behaviors. Low pre-treatment competence and greater opportunity for change coupled with fairly high rates of baseline knowledge ($M = 70\%$) seen in this group of parents, may have led to child behavior change and better outcomes overall. In this sample, parents are assumed to already have a working knowledge of helpful strategies based on their average knowledge scores at baseline. By participating in a BPT program, this knowledge and subsequent strategy use may be reinforced, thereby promoting parent self-efficacy. Previous research on parent self-efficacy, defined by Heath, Curtis, Fan, and McPherson (2015, p. 119) as

“parents’ beliefs about their confidence and competence in carrying out parenting tasks”, has shown that, following the conclusion of a behavioral training program, parents who reported lower stress and higher self-efficacy were more likely to see clinically significant reductions in behavior problems in their children with ADHD (Health et al., 2015). This lends support to the fact that the parents in this program, who were fairly knowledgeable and had low levels of stress at the beginning of treatment, saw improvements in their children’s behaviors at the end of treatment, where they continued to report low levels of stress and even higher rates of knowledge ($M = 82\%$) and pre-treatment competence ($M = 11.03$). In addition, as stated previously, the time between 3 and 5 years of age includes rapid development in children’s cognitive, emotional, and social functioning. Thus, child behaviors during this time may be especially malleable and subject to change. For this reason, early intervention strategies including BPT are valuable and should be encouraged.

Alternatively, observed parenting behaviors as well as parent knowledge of ADHD and behavior management at pre-test were not shown to be significant in the prediction of child behavior change. This is confusing, as parent pre-treatment competence in implementing recommended strategies was predictive. It may be that neither the observations conducted at pre-test nor the knowledge assessment were encompassing enough to capture the full range of parent use of strategies and understanding, while parent pre-treatment competence (which was measured via observation as well as interview) reflects a more general knowledge and use of strategies across the board. For example, parents may be exposed to or have some understanding of the information surrounding the strategies but fail to implement those strategies with pre-treatment competence, which is consistent with baseline data. Our measure of knowledge indicated that parents, on average, scored a 82% at post-test and an 70% at pre-test, suggesting

that there was already a fairly high level of knowledge at pre-test, which may have resulted in a group of confident, self-efficacious parents, as described previously. On average, parents showed more growth in the area of fidelity than they did in knowledge. Additionally, the pre-treatment level of parent knowledge ($M = 70\%$) and the pre-treatment use of positive parenting strategies, praise and attending, ($M = 56\%$ of intervals), may have limited room for growth in general, whereas parent pre-treatment competence of implementation ($M = 3$, range 0-18) was open to greater change over time. Additionally, as mentioned previously, there was quite a bit of overlap in the information that was targeted in both the knowledge assessment and the fidelity assessments which may have obscured differences in these constructs.

Although only one of three positive parenting measures was shown to be predictive of child behavior change, attendance or completion of sessions was also seen to significantly predict change in child behavior over time, specifically child measures of mood and affect concerns. This finding coincides with many studies examining dosage impacts on treatment outcome (i.e., Hagen & Oden, 2017), and therefore is not surprising. The more sessions that parents attend, the more information they are provided to help their children, the more likely child behavior change is to occur. It may be that more use/understanding of positive strategies, feeling of support via group lessons and/or therapist support led to change in interactions with children (and/or, decreased negative behavioral attributions, as seen in research by Katzmann and colleagues [2017]) which led to increased (better) child mood and emotional control. In general, the focus of Project PEAK was to increase parent engagement in treatment by promoting positive family interactions that, in turn, help to modify problem behaviors. Chacko, Wymbs, Rajwan, Wymbs, Fiersen (2017) report characteristics of parents of children with ADHD enrolled in a BPT program who never attend or complete sessions, drop out, or complete

the entirety of the program. Results suggested that parents who never attended BPT were more likely to have lower parental efficacy and greater maladaptive attributions regarding their child compared to parents who dropped out from or completed BPT. Moreover, parents' perceptions of the relevance of BPT was lower in the never attended group and the dropped out from BPT group compared to the completed BPT group. Results of the Chacko et al. study and Katzmann et al. study have implications for tailoring engagement strategies focused on parental cognitions throughout the process of BPT, particularly for high-risk families. With these results in mind, the argument could be made that parent knowledge and pre-treatment competence are a proxy for self-efficacy, as described previously. Additionally, there was limited drop out in the current sample overall (and all control families received 0 sessions). Higher self-efficacy in families is typically related to lower stress (Heath et al, 2014), characteristics that were also seen in the current sample.

Similarly, there may also be differences in how parents perceive child behaviors pre-test and post-test that can influence the results of BPT evaluation studies (see Katzmann et al., 2017). At pre-test, it is likely that parents hold a highly negative perception of problem behaviors, perhaps due to their limited understanding of how to handle problem behaviors in real time. Perception of behaviors from pre- to post-treatment may improve, as parents learn strategies, interact other parents, and implement strategies in the home (e.g., more focus on positive behaviors limits focus on negative behaviors). This logic could explain the reason that there was predictive power for change in mood/affect related to positive parenting and attendance: the more treatment received can reasonably increase the positive interactions that parents engaged in with their children, leading to a more positive perception of their children and their children's behaviors to be, resulting in a change in child behavior related to an increase in positive mood.

Additionally, previous research suggests that children with higher ADHD symptom scores and lower social skills scores (i.e., indicating fewer social skills) at pre-treatment were more likely to show improvements (Hagen & Ogden, 2017). Project PEAK participants all had high ADHD symptom scores (over 90th percentile); although social skills were not directly analyzed, it should be noted that the mean *T*-score of PEAK participants in the area of social behaviors was barely in the at-risk range ($M = 60.54$).

Finally, pre-treatment parent stress was not predictive for any of the outcomes in either of the models that were analyzed. This could be due to the fact that these families had moderate to low levels of stress overall (possibly because they were a more self-efficacious group). Previous analyses with this sample show non-significant change from pre- to post-test with regards to stress levels (DuPaul, Kern, Belk, Custer, Daffner, Hatfield, & Peek, 2017). There could also be instrumentation-error involved, such that the measure used is not effectively capturing the predominant barriers to participation in this particular treatment. For example, there may be more specific stressors related to young children with ADHD, such as stress related to school and special education decisions, stress regarding medication implementation or management, or stress related to more nuanced family relationships, such as difficulty in going out with children. Research suggests that parents enrolled in a BPT program see decrease in stress over time (Heath et al. 2014); however, no significant change in levels of stress were seen in this sample.

Implications for Practice

The current findings have several implications for applied practice. The prediction power of parent pre-treatment competence and attendance suggests that these should be a primary focus of future BPT programs. Improving parent self-efficacy through enhancing the level of pre-treatment competence of intervention implementation should be helpful in increasing the

likelihood of child behavior change. In considering the consistency with which parents implemented strategies at pre-treatment, it was seen that most parents showed some level of partial fulfillment of implementation, meaning they had some basic understanding of strategies but were not implementing to the level of full fidelity, in the following areas: using or describing praise, attending, and expectations; and using or describing preventative techniques. This was not the case for: identifying high priority behaviors, producing a summary statement; using a teaching or response strategy; incorporating a community behavior support plan; using dialogic reading; or developing a plan to transition to kindergarten. These latter strategies may be potential areas to focus on when seeking to increase fidelity of implementation. Additionally, a focus on improving parent attendance, which was largely the goal of Project PEAK, should be considered. Most likely, the bulk of BPT programs already attempt to increase parent attendance to sessions. Although the current study does not directly suggest how that might be done, previous research (DuPaul, Kern, Belk, Custer, Daffner, Hatfield, & Peek, 2017b) outlines the success seen through minimizing mandatory sessions (i.e., decreasing the number of sessions from 20 to 10) as well as providing an online format that is more easily accessible to a diverse group of parents.

Other predictors of outcomes should also be considered when discussing implications. Although parent stress was not seen to be predictive of outcomes, the level of stress that parents of children with ADHD experience has consistently been shown to impact family dynamics and outcomes (Theule, Wiener, Tannock, & Jenkins, 2012). For that reason, particular attention should be paid to those families experiencing high levels of stress. It may also be valuable to consider the individual-level stressors or barriers, such as death of a loved one, divorce, relocation, or change in socio-economic status. In many ways, barriers such as these can impact

parent attendance to and engagement with training programs. Taking these barriers into account, clinicians can work to make materials and information more accessible, perhaps by providing a dual-modality approach to the program, that is, offering session content in-person or online, as needed. Additionally, the observed use of positive parenting (praise and attending) as well as parent knowledge of behavior and strategies, while not significantly predictive in this study, are important to understand. As these were pre-test measures, these variables may be most useful in understanding parent self-efficacy and can help to identify families who are less efficacious and in need of more supports moving forward. For example, a parent engaging in fewer positive strategies and also showing limited understanding of behavioral principles may need a more focused approach to treatment, starting with the basics of understanding the disorder as well as the fundamentals of behavior change. In this study, parents were seen to grow more in terms of fidelity than in terms of knowledge. As discussed previously, this could be due to the high rates of baseline knowledge these families had coupled with relatively low rates of pre-treatment competence.

Limitations of Current Study

In moving forward with this line of research, it is also important to address the limitations of the current study. For one, the use of change or difference scores, as outcome measures have been deemed unreliable in previous research (Lord, 1956; Rogosa & Willett, 1983), yet this has also been shown to be the case only in extreme circumstances (Rogosa, Brandt, and Zimowski, 1982). For the current study, a change score was desired to account for the difference seen in child behavior outcomes from pre-test to post-test, as predicted by the described models. Use of change scores helps to answer the relevant question: How does X predict *change* in Y over time? as opposed to answering the question: How does X predict Y? What is important in this sample

is the reduction in child behavior concerns over time. The small sample size also limits the power for data analyses to reveal statistically significant effects. Although there were enough participants to detect large effects, a larger sample would have allowed a more precise analysis of predictions and outcomes, particularly those of small to medium magnitude. Additionally, the data available for this analysis was sufficient; however, the use of only one observation and only one pre-treatment competence check at pre-test does limit inferences that can be made due to a potentially lack of generalizability (Marcoulides, 1993). Ideally, multiple observations and pre-treatment competence checks would be completed and then averaged as a measure of pre-test levels of positive parenting. This would increase understanding of the levels of child and parent behavior at pre-treatment measures and allow for more sound inferences. Similarly, although attendance/dosage was shown to be a significant predictor of change in child behaviors, the measure of dosage in this study did not take into consideration other dimensions of attendance/dosage. This limitation can be addressed by incorporating other dimensions of attendance, such as the level of parent engagement during sessions and the amount of time spent in sessions.

Directions for Future Research

The results of this study can certainly be extended with additional investigations. Future research may benefit from expanding on the idea of pre-treatment parent self-efficacy as it relates to knowledge, stress/barriers, and actual implementation. Self-efficacy itself was not examined in this study; however, by evaluating parent confidence and competence more completely at the onset of treatment, one may be better able to streamline interventions to the appropriate intensity. For example, a highly self-efficacious parent may be a valuable counterpart in supporting other parents (e.g., modeling confidence and optimism for using recommended

strategies). Alternatively, a parent with little confidence and lower competence will likely benefit more from increased individualized attention from a therapist or group leader. Although Project PEAK worked to provide individualized attention to parent needs, this targeting was primarily focused on behavioral concerns (e.g., tantrums, refusal), but did not often take into account the individual confidence or competence of the group attendees. Future BPT programs may add components of self-efficacy training by using motivational interviewing techniques (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010; Miller & Rollnick, 2002), which engages parents in a consultative but parent-driven approach to change; or optimistic parenting programs (Durand, Hieneman, Clarke, Wang, & Rinaldi, 2012; Durand, Hieneman, Clarke, & Zona, 2009) which aim to decrease parent pessimism related to child problem behavior and change in that area. As noted, research clearly indicates a positive relationship between parenting self-efficacy and parent perception and desired child behavior outcomes (e.g., Jones & Prinz, 2005; Sanders & Woolley, 2005). Additionally, future programs may benefit from an added component that allows families to become the teachers within BPT programs. Fox, Dunlap, Hemmeter, Joseph, and Strain (2003) describe a Teaching Pyramid in which pre-school teachers help to implement specific strategies to improve social-emotional competence as well as reduce challenging behaviors. This model could be modified to fit in the context of a BPT program, allowing parents to eventually take over in the teaching of skills, thus reinforcing their knowledge and understanding of the strategies.

Another area for future research includes the evaluation of specific stress concerns. In this program, but not in this individual study, treatment families (online and face-to-face) completed a scale measuring barriers to treatment that asked them to rate the potential impact of various potential barriers to treatment receipt (e.g., parking was difficult to find). This measure

was geared to collect information regarding explicit barriers to treatment; however, it could be tailored more broadly to discern different barriers and stressors that are occurring in both treatment and control conditions. These stressful events and barriers can certainly make it difficult for treatment parents to attend or view sessions, but the same events can increase stress and negative family interactions in parents regardless of treatment status. For example, although treatment and control families will not share barriers related to access to the specific treatment, they could share other barriers that are not related to treatment access, such as divorce, change in job, a move, etc. Understanding unique barriers that parents of young children with ADHD may experience can help improve program development and delivery.

Similarly, collecting additional information regarding child outcomes would also be valuable. Although there were significant findings related to child behavior outcomes, there may be areas that are not addressed by assessing these narrow outcomes only. For example, change in academic readiness was not studied here, although it was measured within the program. The children in this study were enrolled in pre-schools at various stages (i.e., soon transitioning to kindergarten, just starting pre-school). Following the completion of a BPT program that includes a focus on promoting academics, it would be useful to evaluate academic progress at a time when the children are formally enrolled in a school setting. Preliminary analyses suggest little change in academic ability in this sample (DuPaul et al., 2017); however, only one session was devoted to academics and it was delivered at the end of the program. Increasing focus on academic skill development along with positive parenting strategies, and evaluating long-term outcomes would help in streamlining intervention development and focus. Additionally, it would be interesting to examine the trajectory of involvement in special education for preschoolers who are identified as at-risk for ADHD and whose parents are enrolled in a brief

BPT program. Parents in this project received a brief overview of the special education process that they may encounter. Increasing focus on how to navigate the special education system as their child moves forward may be a valuable direction.

Finally, future research would benefit from addressing the limitations that were discussed previously. This would include assessment employing more observation points and lengthier observation times. It would also involve increased treatment fidelity checks that are more sensitive to parent understanding and accurate implementation. Additionally, a larger sample size would potentially provide a more generalizable study.

Conclusions

In sum, the outcomes of this study better illuminate the parent-related variables that can predict child outcomes. Positive variables, such as the pre-treatment competence with which parents implement behavior management strategies and the number of sessions they attend, allowed for significant prediction of child outcomes related to ADHD. Understanding this may prompt clinicians to focus on increasing engagement as well as the fidelity with which strategies are used. At the same time, parent knowledge of strategies as well as observed parent use of strategies was not seen to be a significant predictor of outcomes, possibly because these particular families had fairly high knowledge scores at pre-test and thus less room for improvement. Additionally, parents frequently used positive parenting practices such as attending and praise during pre-test observations. By increasing knowledge as well as fidelity, clinicians can improve upon parent self-efficacy, in turn likely increasing parent confidence and impacting the rate at which parents are observed using the strategies they are taught.

Negative parenting variables, such as stress, were not predictive of outcomes either good or bad. This finding can be seen in a positive light, primarily highlighting that a well-developed BPT can be an equal opportunity treatment, i.e., even parents with difficult conditions can obtain positive child outcomes particularly if they attend sessions and follow through on recommended strategies. Other research has also supported this conclusion, showing that even the most disadvantaged families can benefit from BPT (Hutchings, Bywater, & Whitaker, 2010). Researchers and clinicians are encouraged to focus on increasing parent fidelity and engagement in treatment, which may be accomplished by more closely evaluating the individual levels of knowledge and understanding of behavioral principles prior to beginning treatment and, as treatment progresses, individually tailoring treatment as much as possible to address specific needs.

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Table 1*Demographic Data for Overall Sample and Treatment Groups*

	Overall	F2F	Online	WLC
Age				
Age in Years M (SD)	4.43 (0.63)	4.51 (0.63)	4.52 (0.55)	4.27 (0.68)
Gender N (%)				
Male	30 (63.8)	8 (50.0)	9 (60.0)	13 (81.25)
Female	17 (36.2)	8 (50.0)	6 (40.0)	3 (18.75)
Race/Ethnicity N (%)				
White	37 (78.72)	13 (81.25)	10 (66.67)	14 (87.5)
Black	3 (6.38)	0 (0.0)	3 (20.0)	0 (0.0)
Hispanic	2 (4.25)	1 (6.25)	1 (6.67)	0 (0.0)
Other	2 (4.25)	1 (6.25)	0 (0.0)	1 (6.25)
Mixed	3 (6.38)	1 (6.25)	1 (6.67)	1 (6.25)
Parent Education N (%)				
completed post grad	19 (40.42)	6 (37.5)	5 (33.33)	8 (50.0)
completed college, four year degree	10 (21.28)	5 (31.25)	3 (20.0)	2 (12.5)
attended college, no four year degree	13 (27.66)	3 (18.75)	5 (33.33)	5 (31.25)
completed high school or trade school	3 (6.38)	1 (6.25)	2 (13.33)	0 (0.0)
partial high school	2 (4.25)	1 (6.25)	0 (0.0)	1 (6.25)
Income				
Income M (SD)	50,363.64 (28,617.98)	47,083.33 (32,508.62)	46,818.18 (25,771.37)	58,200 (28,007.14)
Parent Conners				
Inattention/Hyp Subscale M (SD)	80.47 (8.22)	81.31 (8.68)	80.6 (7.29)	79.5 (8.97)
Teacher Conners				
Inattention/Hyp Subscale M (SD)	67.34 (13.62)	63.31 (13.06)	70.36 (13.9)	68.07 (13.96)
DAS-II				
DAS GCA M (SD)	97.95 (14.73)	101.19 (12.65)	102.37 (14.03)	90.07(15.14)
Presentation N (%)				
ADHD-C	29 (61.7)	10 (62.5)	8 (53.33)	11 (68.75)
ADHD-IA	2 (4.3)	0 (0.0)	1 (6.67)	1 (6.25)
ADHD-HI	16 (34.0)	6 (37.5)	6 (40.0)	4 (25.0)
Comorbidity N (%)				
ODD Only	25 (53.2)	7 (43.75)	10 (66.67)	8 (50.0)
CD Only	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
ODD + CD	3 (6.4)	2 (12.5)	0 (0.0)	1 (6.25)

Note. F2F = Face-to-face. WLC = Wait-list control. DAS-II = Differential Abilities Scale-II.

ADHD-C = ADHD combined. ADHD-IA = ADHD Inattentive. ADHD-HI = ADHD

Hyperactive-Impulsive. ODD = Oppositional defiant disorder. CD = Conduct disorder.

Table 2*Promoting Engagement for ADHD pre-Kindergartners (PEAK) Session Content and Activities*

<u>Session Content</u>	<u>Session Activities</u>
Welcome and Introduction to ADHD	Introductions & ice breakers, self-rating of ADHD symptoms, identification of priority behaviors
Intentional Attention and Other Powerful Caregiver Responses	10 things my child does well, examples/role play of praise and encouragement; examples/role play of intentional attending
General Strategies: A Look at Structure, Routines and Expectations	Discussion and examples of organization of space and time; examples of using a reward chart effectively
Introduction to the Problem Solving Approach	Overview of problem identification, triggers, identification of the function or behavior, and intervention selection
Expanding Your Skill Set: Prevention Strategies (1 of 3 part series)	Examples and role plays of how prevention strategies can address escape- or attention-related behaviors and how the strategies can work for specific families
Expanding Your Skill Set: Instructive Strategies (2 of 3 part series)	Examples and role plays of how instructive strategies can address escape- or attention-related behaviors and how the strategies can work for specific families
Expanding Your Skill Set: Response Strategies (3 of 3 part series)	Examples and role plays of how response strategies can address escape- or attention-related behaviors and how the strategies can work for specific families
Extending What Works Across Settings	Examples and role play of community behavior plans; small group work with families to design individualized plans
Setting Up Your Child for Success: Pre-academic Skills; Early Reading Skills	Group reading of sample book to explain dialogic reading; examples and role play of early numeracy activities
Using Effective Communication; Preparing for the Transition to Kindergarten and Program Conclusion	Discussion of how to best communicate with child's school; tips and strategies for successful communication

Table 3*Outcome Data for Overall Models and Individual Predictors*

	Overall (R^2, F)	Predictor 1 (β, t)	Predictor 2 (β, t)	Predictor 3 (β, t)
Model 1				
(Positive Parenting)				
		Knowledge	Fidelity	Parenting
Change in IO	.27, 3.701*	.017, .107	.514, *-3.125	-.064, -.082
Change in DA	.127, 1.454	.11, .11	-.357, -2.043	-.048, -.281
Change in MA	.106, 1.184	-.168, -.945	-.24, -1.358	-.025, -.141
Change in GI-RI	.245, 3.252*	-.092, -.564	-.451, *-2.773	.1821, .137
Change in GI-T	.273, 3.746*	-.1, -.625	-.494, *-3.093	.045, .288
Model 2				
(Parent Stress₁)				
		PSI-PD	PSI-PCDI	PSI-DC
Change in IO	.102, 1.254	-.164, .812	.055, -.24	.308, 1.372
Change in DA	.093, 1.124	-1.202, -.244	-.148, -.64	.076, .339
Change in MA	.024, .276	-.324, .068	.026, .11	-.129, -.553
Change in GI-RI	.098, 1.198	-1.534, -.31	-.127, -.549	.215, .346
Change in GI-T	.058, .672	-.907, -.187	-.101, -.429	.028, .124
Model 3				
(Treatment Receipt/Dosage)				
		Treatment Receipt		
Change in IO	.141, 5.913*			
Change in DA	.122, 5.02*			
Change in MA	.231, 10.81*			
Change in GI-RI	.16, 6.832*			
Change in GI-T	.162, 6.984*			
Model 4 (ad hoc; Fidelity and Treatment Receipt/Dosage)				
		Fidelity	Treatment Receipt	
Change in IO	.249, 5.36*	-.359, 1.814*	.279, -1.834	
Change in DA	.154, 3.087	-.223, -1.382	-.279, -1.725	
Change in MA	.225, 4.944*	.102, -.661	-.442, -2.864*	
Change in GI-RI	.225, 5.194*	-.307, -2.001	-.314, -2.045*	
Change in GI-T	.269, 6.261*	-.361, -2.408*	-.304, -2.024	

Note. *Denotes significant at alpha = .05,); IO = Inattention/Overactivity Subscale, DA =

Defiance/Aggression Subscale, MA = Mood/Affect Subscale, GI-RI = Global Index – Restless

Impulsive, GI-T = Global Index – Total (all from Conners - Early Childhood; Conners, 2009).

PSI-PD = Parent Stress Inventory – Parental Distress; PSI-PCDI = Parent Stress Inventory –

Parent-Child Dysfunctional Interactions; PSI-DC = Parent Stress Inventory – Difficult Child (all

from Parent Stress Inventory – Short Form, Abidin, 1995).

₁ Data in this table reflects the results from the initial analysis, before variables were adjusted.

Table 4*Descriptive Statistics for Outcome and Predictor Variables*

<i>Outcome Variables</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Pre-Test I/O	42	56	90	76.43	8.884
Post-Test I/O	40	50	90	72.9	10.332
Pre-Test DA	42	47	90	75.07	13.934
Post-Test DA	40	41	90	71.03	15.043
Pre-Test MA	42	44	90	71.45	12.74
Post-Test MA	40	39	90	66.35	13.135
Pre-Test GI-RI	42	52	90	75.57	9.412
Post-Test GI-RI	40	45	90	72.33	10.913
Pre-Test GI-T	42	49	90	75.19	10.047
Post-Test GI-T	40	44	90	71	11.658
<i>Predictors</i>	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Parent Knowledge	42	11.00%	100.00%	69.76%	19.51%
Parent Fidelity	43	1	8	3.7442	1.55981
Parenting: Praise	43	0%	18.3%	3.29%	4.89%
Parenting: Attending	43	0%	100%	53.52%	29.91%
PSI- PD	42	14	52	30.48	8.769
PSI - PCDI	42	14	43	26.26	6.932
PSI - DC	42	31	19	50	36.02
Tx Receipt/Dosage	45	0%	100%	51.6%	44.7%

Note. IO = Inattention/Overactivity Subscale, DA = Defiance/Aggression Subscale, MA =

Mood/Affect Subscale, GI-RI = Global Index – Restless Impulsive, GI-T = Global Index – Total (all T-scores from Conners - Early Childhood; Conners, 2009); PSI-PD = Parent Stress Inventory – Parental Distress raw score; PSI-PCDI = Parent Stress Inventory – Parent-Child Dysfunctional Interactions raw score; PSI-DC = Parent Stress Inventory – Difficult Child raw score (all from Parent Stress Inventory – Short Form, Abidin, 1995).

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Education

Lehigh University, Bethlehem, PA

Fall 2013 – Present

Masters of Education, Human Development (2015)
Doctorate of Philosophy, School Psychology (anticipated: 2019)
State Certified School Psychologist
GPA: 3.89

Hendrix College, Conway, AR

Fall 2009 – 2013

Bachelor of Arts, Psychology
Psychology GPA: 3.85
Overall GPA: 3.85

Professional Interests

Impact of positive behavior supports in the home and school setting; Effective provision of school-based mental health for adolescents; Effects of parent training in behavioral techniques for parents of children with attention-deficit/hyperactivity disorder (ADHD) and/or disruptive behavioral disorders; Effects of self-management and organizational skills-training for students with ADHD; Behavioral treatments and academic interventions for children with ADHD

Clinical Experience

Doctoral Intern School Psychologist at Lehigh Valley Charter High School for the Arts, Bethlehem, PA (January 2018 – Present)

This role includes work as a full-time certified school psychologist doctoral intern for Lehigh Valley Charter High School for the Arts. Intern school psychologist duties primarily include support for student mental health, psychoeducational evaluations (behavioral assessments, IQ, achievement, psychopathology screenings, etc.), report writing using IEPWriter, holding team meetings at the secondary level, consultation with teachers/staff, leading or facilitating skills groups for students, support for administrative goals (including implementation of MTSS and mental health supports), participation on student support team, conducting risk assessments, and engaging in weekly supervision.

School Psychologist in Bethlehem Area School District, Bethlehem, PA (September 2017 – December 2017)

This role included work as a part-time certified school psychologist for the Bethlehem Area School District. School psychologist duties primarily included full psychoeducational evaluations (behavioral assessments, IQ, achievement, psychopathology screenings, etc.), report writing using IEPPlus, and holding team meetings at the secondary level. Additional duties include filling in at the elementary level, consultation with teachers/staff, and leading groups with guidance counselors/interns.

Interim School Psychologist in Pittston Area School District, Pittston, PA (May 2017-June 2017)

This role included work as a temporary school psychologist for the Pittston Area School District's middle school and primary school. Responsibilities included completing full evaluations (behavioral assessments, IQ, achievement, psychopathology screenings, etc.), completing reports using IEP writer, and making special education determinations. Achievement tests and IQ tests were primarily completed via iPad. Supervision was provided by the Director of Special Education.

Centennial School of Lehigh University, Bethlehem, PA (August 2016 – Present)

Centennial School of Lehigh operates as an approved private school for children with emotional and behavioral disorders and Autism Spectrum Disorder and utilizes a comprehensive school-wide positive behavior support program that systematically addresses behavioral, emotional, and academic problems and uses data-based decision making as an integral component. As part of the counseling internship program (2016-2017) and a graduate assistantship (2017-present), this experience included working closely with the counselor, the school psychologist, and the teachers to promote student mental health as well as behavioral and academic success. Work as a counselor included weekly behavioral therapy sessions with children in grades kindergarten to 12th grade. Additional activities included teacher training, professional development, teacher consultation, classroom observations, assessment provision and report writing, and research activities.

Bridges to Educational Success for Teens (BEST Project; Lehigh University; September 2016 – Present)

Clinical experience on the BEST Project included Interpersonal Skills Group training with adolescents with ADHD. This was completed in a group format weekly for ten weeks. Students selected personal social goals (e.g., to be seen as friendly) and each week worked toward those goals in the sessions. During session, I provided individual feedback to adolescents regarding their progress toward goals and reflected on how adolescents could work toward achieving those goals in and out of session.

Promoting Engagement for ADHD pre-Kindergarteners (Project PEAK; August 2013-August 2016)

Project PEAK was an IES funded grant to promote engagement in parents of pre-school children with ADHD through the use of a behavioral parent training program, designed both face-to-face and online. This grant provided experience working with parents of pre-school children with ADHD to develop skills and strategies regarding behavior management and supporting the implementation of these skills and strategies in the home and community. Clinical experience included teaching behavioral management strategies (10-week program), assessment of child behaviors through parent interviews as well as direct assessment of children's academic and cognitive abilities. Extensive experience with in-home systematic observations of parent and child behaviors as well as help assisting parents with technical and intervention issues that may have arisen during treatment.

Fountain Hill Elementary, Bethlehem, PA (Fall, 2014 – Summer, 2015)

Fountain Hill Elementary is a community school in the Bethlehem Area School District. Supervision occurred under a licensed school psychologist. Clinical experience included working with children in kindergarten to fifth grade conducting special education

eligibility evaluations and re-evaluations, report writing, multiple classroom behavioral observations, leading and participating in data evaluation and review meetings, consulting with teachers, and completing academic and behavioral assessments along with implementation of classroom interventions.

SPIN, Lehigh Valley, PA (Fall, 2013 – Spring 2014)

SPIN is a support provider for individuals with Autism and developmental disability as well as a provider for inclusive early childhood education. Clinical experience included working with adults with disabilities, including conducting a functional behavior analysis for an adult female with intellectual disability and ADHD and subsequently designing and implementing a community-based intervention with the goal of improving daily function in the community.

Center for Children and Families, Florida International University (Summer 2012)

Summer Treatment Program for Adolescents (STP-A), Paraprofessional Counselor; Stand-in Lead Counselor. The STP is a research-based summer camp designed to treat children with ADHD by using behavioral strategies and social learning theory in a day camp context. Clinical experience included implementing behavior modification principles as seen in the STP-A training manual to children with ADHD, CD, and ODD; over 150 hours of intensive training and 360 hours of one-on-one clinical experience including the delivery of treatment to approximately 20 adolescents who were part of the STP-A's study group. Additional experience included providing one-on-one emotional regulation counseling sessions ("Coping Powers" workbook) as well as feedback to parents about daily activities and management of paperwork (as stand-in Lead counselor).

Research Experience

Bridges to Educational Success for Teens (BEST Project; Lehigh University; September 2016 – Present)

Graduate-level research assistant to Dr. George DuPaul assisting in the implementation of a multi-component school-based intervention for high school students with ADHD. Major responsibilities include scheduling and completion of data collection with parents and students as well as working with students to develop social skills in small groups. Additional responsibilities include working with other research assistants to input and code data for publication and dissemination as well as assistance with data analysis, manuscript preparation, and conference presentations.

Promoting Engagement for ADHD pre-Kindergarteners (Project PEAK; August 2013-August 2016)

Graduate-level research assistant to Drs. George DuPaul and Lee Kern assisting in the development and implementation of a parent education program focusing on behavioral management strategies. Responsibilities include teaching behavioral strategies to parents through a 10-week course; direct behavioral observation of parents and children; assessment of children and parents on academic, behavioral, and other relevant variables; data collection and analysis; development of online training program and program materials; organization of program operations and data; as well as manuscript preparation and conference presentations.

Self-Regulation of Organizational Skills: Intervention Effects on Academic Performance for Adolescents with ADHD (Fall 2014 – Present)

Doctoral Qualifying Project completed under the supervision of Dr. George DuPaul. Evaluated the use of an organization checklist delivered via phone application on students' organizational skills and academic performance. Study was completed in local Eastern Pennsylvania high school with three male students. Responsibilities included intervention design, training of data collectors, extensive student/parent/teacher assessment, analysis/interpretation of results, and written documentation of methods, procedures, and results.

Arkansas Children's Hospital Complex Brain Function Lab (Spring 2011 –Spring 2013)

Research assistant to Dr. John Chelonis (in conjunction with the Food and Drug Administration), assisting in behavioral research on learning, memory, and decision-making in children with and without various psychopathological disorders.

Relevant Employment and Volunteer Experience

Psychology Departmental Assistant, Hendrix College (Fall 2011- Spring 2013)

Assisted in lab set up and lab activities, proctored tests, data entry and department management

Literacy Program, Boys and Girls Club of Faulkner County, Conway, AR (Fall 2009, Fall 2012)

Assisted in promoting early literacy in school aged children (kindergarten-third grade) by monitoring reading and providing incentives to complete reading

Tutor, Bob Courtway Elementary School, Conway, AR (Fall 2010-2012)

Assisted students with class work (children ages 12-14) as well as one-on-one assistance (child aged 13)

Tutor, Pine Street Outreach Center, Conway, AR (Fall 2009-Fall 2010)

Assisted students with class work (children ages 9-15)

Tutor, Ida Burns Elementary School, Conway, AR (Fall 2009)

Assisted in class work with children ages 7-8

Teacher: SMART Girls, Boys and Girls Club, Conway, AR (Summer 2010, 2011)

Taught a life skills class (issues such as healthy eating, career choices, puberty, healthy relationships, body image, etc.) for 50 to 60 girls, ages 5 to 16 in Faulkner County (three locations)

Boys and Girls Club of Faulkner County (Conway, AR) Internship (Summer 2010)

Operated under the programs director by organizing programs such as field trips, art activities, tournaments and sports events; overseeing program activities, handling monetary influx.

Staff at Boys and Girls Club of Faulkner County (Summer 2010)

Program Staff: Supervised and directed activities of club members (children ages 5-17)

Service to the World (Odyssey Project for Hendrix College. Fall 2009 and Spring 2010)

Performed 30+ hours of service work tutoring children in Conway, AR at the Pine Street Academic Outreach as well as at the Boys and Girls Club

Staff at Boys and Girls Club of Crittenden County, West Memphis, AR (Spring 2007-Summer 2009)

Program Staff: Supervised and directed activities of club members (children ages 5-17)

Concluded Research Projects

“Bridges to Educational Success for Teens” (BEST Project; *September 2016 – Present*)

See previous description in Research Experience

“Self-Regulation of Organizational Skills: Intervention Effects on Academic Performance for Adolescents with ADHD” (*October 2014-Present*)

See previous description in Research Experience

“Promoting Engagement for ADHD pre-Kindergarteners” (*Project PEAK; August 2013-Present*)

See previous description in Research Experience

“Effects of Anxiety on Complex Brain Function in Children” (*April 2010 – May 2013*)

This research at the Complex Brain Function Lab, under the direction of Dr. John Chelonis Laboratory examined whether the presence of a childhood anxiety disorder affects the ability of children to perform tasks that have been used successfully in animals to determine the effects of psychoactive agents on a variety of psychological constructs. Responsibility for recruiting subjects, testing them on the behavioral apparatus (the Operant Test Battery), scoring psychological assessment tests, and data entry/management.

“Development and Validation of an Interspecies Cognitive Assessment” (*April 2010 – Spring 2013*)

This research at the Complex Brain Function Lab, under the direction of Dr. John Chelonis, examined children’s performance on various operant tasks used to assess drug effects in animals compared to their performance on neuropsychological tests used in clinical settings that are thought to measure similar functions. Responsibility for recruiting subjects, testing them on the behavioral apparatus (the Operant Test Battery), scoring psychological assessment tests, and data entry/management.

“Complex Brain Function in Children with Major Depression” (*April 2010 – Spring 2013*)

This research at the Complex Brain Function Laboratory, under the direction of Dr. John Chelonis, examined whether the presence of childhood depression affects the ability of children to perform tasks that have been used successfully in animals to determine the effects of psychoactive agents on a variety of psychological constructs. Responsibility for recruiting subjects, testing them on the behavioral apparatus (the Operant Test Battery), scoring psychological assessment tests, and data entry/management

“Social Anxiety Correlates with a Bias toward Perception of Fear in a Crowd” (*Fall 2011 – Spring 2013*)

This research at Hendrix College, under the direction of Dr. Amrita Puri, examined the ability of participants to extract average emotion from a crowd with regards to levels of anxiety and the presence of fearful faces within the crowd. Responsibility for testing participants, literature searches, and presenting the research.

“Emotional Recognition and Social Functioning in Children with and without Attention Deficit Hyperactivity Disorder” (*Summer 2011*)

This research at Arkansas Children’s Hospital, under the direction of Rebecca Flake, examined emotional recognition in children with and without ADHD by administering multiple assessments. Responsibility for a majority of the recruitment as well as discussion of protocol and research background.

“The Effects of Perceptually Fluent Names on Attractiveness Ratings” (*Spring 2011*)

This research at Hendrix College, under the direction of Dr. Amrita Puri, examined the effect of names (high fluency or low fluency) on attractiveness ratings. Responsibility for the development of an online survey to obtain data, data collection/analysis, and reporting and presenting results.

“Sexual Harassment: The Effects of the Situation on Perception” (Fall 2010)

This research at Hendrix College, under the direction of Dr. Jennifer Penner, examined the broad topic of sexual harassment. Assistance in the creation of questions and survey of the Hendrix school body, presentation of the results of the study based on the how the situation effects a person’s perception of a potentially sexual interaction.

Book Chapters

DuPaul, G.J., **Belk, G.D.**, Puzino, K. (2016). Interventions for attention-deficit hyperactivity disorder in children and adolescents. L. Theodore (Ed.), *Handbook of Applied Interventions for Children and Adolescents*. New York: Springer.

Manuscripts

DuPaul, G.J., Kern, L., **Belk, G.D.**, Custer, B., Daffner, M., Hatfield, A., & Peek, D. (2017). Face-to-face vs. online behavioral parent training for young children with ADHD: Treatment engagement and child outcomes. *Journal of Clinical Child and Adolescent Psychology*, 1-15.

DuPaul, G.J., Kern, L., **Belk, G.D.**, Custer, B., Daffner, M., Hatfield, A., & Peek, D. (2016). Promoting parent engagement in early intervention for young children with ADHD: Iterative treatment development. *Manuscript in preparation*.

Posters/Presentations

Bomgardner, G.D., Kipperman, K.L., DuPaul, G.J., Cleminshaw, C. (2019, February). *Homework and organizational skills: Relationship to achievement in ADHD adolescents*. Paper to be presented at the annual convention of the National Association of School Psychologists, Atlanta, GA.

Cleminshaw, C. L., DuPaul, G.J., Evans, S.W., Owens, J.S, **Bomgardner, G.D.**, Kipperman, K.L., Jaffe Sass, A.R. (2019, February). *The effects of a multi-component intervention and positive illusory bias on social outcomes of adolescents with ADHD*. Poster to be presented at the annual convention of the National Association of School Psychologists, Atlanta, GA.

Belk, G.D., Daffner, M., Peek, D., DuPaul, G.J., Kern, L., Hatfield, A., & Custer, B. (2017, February). *Participation in behavioral parent education: Flexibility as a barrier*. Poster to be presented at the annual convention of the National Association of School Psychologists, San Antonio TX.

DuPaul, G.J., **Belk, G.D.**, Daffner, M., Peek, D., Kern, L., Custer, B., & Hatfield, A. (2017, February). *Parent education for young children with ADHD: Treatment response predictors*. Paper to be presented at the annual convention of the National Association of School Psychologists, San Antonio, TX.

Belk, G.D., & DuPaul, G.J. (2017, February). *Self-Regulation of Organization: Intervention Effects for Adolescents with ADHD*. Poster presented at the annual convention of the National Association of School Psychologists, San Antonio, TX.

- DuPaul, G.J., Kern, L., **Belk, G.D.**, Custer, B., Daffner, M., Hatfield, A., Peek, D., & Cleminshaw, C. (2016, December). *Face-to-face vs. online behavioral parent training for young children with ADHD: Treatment engagement and child outcomes*. Poster to be presented at the 2016 IES Principal Investigators Meeting, Washington, DC.
- Kern, L., DuPaul, G.J., **Belk, G.D.**, Custer, B., Hatfield, A., Daffner, M., & Peek, D. (2016, October). *PEAK parent education for young children with ADHD: Relative effects of face-to-face vs. online delivery*. Paper presented at the annual convention of the Association for Behavioral and Cognitive Therapies, New York, NY.
- DuPaul, G.J., Kern, L., **Belk, G.D.**, Dabashinsky, A., Patches, S. (2014, November). *Parent education for ADHD preschoolers: Treatment development process and outcomes*. Paper presented at the annual convention of the Association for Behavioral and Cognitive Therapies, Philadelphia, Pennsylvania.
- DuPaul, G.J., Kern, L., **Belk, G.D.**, Olson, C., Thomas, A., Patches, S. (2015, February). *Web-based parent education for ADHD preschoolers: Treatment development process and outcomes*. Paper presented at the annual convention of the National Association of School Psychologists, Orlando, FL.
- Chelonis, J.J., **Belk, G.D.**, Baldwin, S., Sutton, A., & Paule, M.G. (2014, April). *Use of Progressive Ratio Tasks to Assess Anhedonia Across Species*. Poster presented at the meeting of the Southwestern Psychological Association, San Antonio, TX.
- Belk, G.D.**, Chelonis, J.J., Aaron, H., Baldwin, S., & Paule, M.G. (2013, May) *The effects of anxiety on anhedonia in children*. Presented the Association for Behavioral Analysis International, Minneapolis, MN.
- Chelonis, J.J., Aaron, H., **Belk, G.D.**, Baldwin, M.D., & Paule, M.G., Castro, J. (2012, June). *Effects of anxiety on motivation in children as measured by a progressive ratio task*. Poster Presented at Neurobehavioral Teratology Society, Baltimore, MD.
- Casalman, E., Cox, E., **Belk, G.D.** (2012, May). *Social anxiety correlates with a bias toward perception of fear in a crowd*. Paper Presented at Mid-South Psychology Conference, Memphis, TN.
- Belk, G.D.** (2012, April). *ADHD: Intervening in the classroom without medication*. Paper presented at Arkansas Symposium for Psychology Students, Conway, AR.
- Aaron, H., **Belk, G.D.** (2012, April). *Effects of anxiety on motivation in children*. Paper presented at Arkansas Symposium for Psychology Students, Conway, AR.

Publication Proposal Review Experience and Grant Writing Experience

- Assisted in grant writing for IES RO1 grant (2016)
- Assisted in grant writing for NIMH grant (2016)
- Assisted in the review of one manuscript submitted to the Journal of Child Neuropsychology for publication (2012)

Training

- Student Assistance Program (SAP) trained and certified
- 2017 PSTAT Training Certified
- Naloxone Administration Certified
- Trained in CPR and First Aid
- BOSS (Behavioral Observation of Students in Schools) Certified

Trained to administer FBA, FAI

Experienced at administering and scoring various psychological assessment tests (WRAT3; WRAT4; KBIT; KBIT2; MASC; RCMAS; CADS; CDI; CSI; WCST; BRIEF; CBRS; CBCL; DAS; IGDIs; PNIs; Conners Early Childhood-Parent/Teacher; Barkley's Diagnostic Interview; PSI-SF; SCQ; CIS; WISC-IV; WAIS-IV; WJ-III; WJ-Cog-III; WIAT; KTEA; SSIS; ADHD-5 home/school, child and adolescent; Bracken Receptive; BASC-2-Parent; Teacher, Child/Adolescent; Children's Organizational Skills Scale; Classroom Performance Survey; Adolescent Academic Problems Checklist)
Teacher Development Certification, Level 1 (x2) and Level 2, Lehigh University (Spring 2015/Spring 2016 and Fall 2016)

Additional Skills and Qualifications

Experienced in conducting risk assessments for at-risk behaviors
Experienced with data entry and analysis using analytical software SPSS
Familiarity with data analysis using SAS
Competent with Microsoft Office programs
Familiarity with graphing programs such as Prism
Experienced at preparing and/or using online surveys for research purposes through Qualtrix, Survey Monkey, Google Forms, and Redcap
Familiarity with using EBSCO and other databases to conduct literature searches
Trained in administering various neuropsychological tests (WRAT3, KBIT2, Motor Free Visual Perception Test, Finger Windows Test, WCST, and Computerized Temporal Response Differentiation)
Experience with online course design on Moodle (Coursesite) for an Introduction to Special Education course and a Parent Education course

Professional Memberships

Member of American Psychological Association (APA), Student Affiliation of APA: Division 16
Member of Association for Behavioral and Cognitive Therapies (ABCT)
Member of Association for Positive Behavior Support (APBS)
Member of Pennsylvania Association for Positive Behavior Support (PAPBS)
Member of National Association of School Psychologists (NASP)

Honors and Awards

Leiser Scholar, Lehigh University (May 2016)
Dean's List, Hendrix College (2011, 2012)
Psychology Search Committee to Appoint a New Professor, Hendrix College (2011, 2012)
President's Ambassador, Hendrix College (2011 – 2013)
Psi Chi (2010- present)
Hendrix Experience Ambassador Team (2009- 2013)
Miller Center Service Scholarship, Hendrix College (2009- 2013)
Governor's Distinguished Scholarship (2009 - 2013)
Robert C. Byrd Scholarship (2009-2012)
Hendrix Academic Scholarship (2009 - 2013)
Odyssey Distinction Scholarship, Hendrix College (2009- 2013)
Hendrix College Scholarship (2009 – 2013)

References

Dr. George DuPaul, PhD, School Psychology

Academic Advisor, Lehigh University

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Dr. Janine Wargo, PsyD, School Psychologist

Supervisor, Lehigh Valley Charter High School for the Arts

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Dr. Julie Fogt, Ed.D, Ed.S

Associate Director/School Psychologist at Centennial School of Lehigh University

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