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August 2014

THE RELATIONSHIP BETWEEN RACE/ETHNICITY AND OTHER
DEMOGRAPHIC VARIABLES AND LEVEL OF ADHD KNOWLEDGE:
COMPARING PRE-SERVICE AND IN-SERVICE TEACHERS

A Dissertation Proposal Presented to the
Faculty of the College of Education
University of Houston

In Partial Fulfillment
of the Requirements for the Degree

Doctor of Philosophy

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Acknowledgement

Many acknowledgements are due to all individuals who directly supported me through this process. First, I would like to praise my Lord and Savior for giving me the strength and perseverance to make it through this process. Next to my parents, Nanette and William Randall and Kenneth Frye and Beatrice Richie who supported me financially and always encouraged me to never give up. To my siblings Jeken and Shante, who also had plenty of motivating words to help me strive for excellence and much more! I would also like to acknowledge my program and internship cohort (Ashlie Llorens, Natasha Comeaux, Jennifer Blacksmith, Laura Middelberg, and Brettjet Cody) for helping me with edits and writing with me at weird hours of the night. Last but not least I would like to thank my sisters of Theta Nu Xi Multicultural Sorority, Incorporated for being my backbone throughout this process. Special shout out goes to Priscilla Suggs and Cindy Quintanilla for always willing to travel with me when I wanted to reward myself for finishing a huge milestone in my program.

This dissertation would have not been possible without my dissertation committee. First, I want to thank my chair and academic advisor, Dr. Milena Keller-Margulis for always supporting me and pushing me to the next level. Next, I would like to thank Dr. Thomas Kubiszn for taking over my project when my academic advisor went on maternity leave and providing me with resources to not only finish my project, but help me to improve my writing skills. I would also like to thank Dr. Sam McQuillin for pushing me to understand statistics, not only for my project, but in general. Additionally, I would like to thank Dr. Allen Warner for serving as my assistantship supervisor and

providing me with an avenue to recruit participants. Last but not least, I would like to thank Dr. Stephanie Hofer for providing me with expertise in the field of ADHD.

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Frye, Kennetha L. "The Relationship between Race/Ethnicity and Other Demographic Variables and Level of ADHD Knowledge: A Comparison between Pre-Service and In-Service Teachers." Unpublished Doctor of Philosophy Dissertation, University of Houston, August 2014.

Abstract

Attention-Deficit Hyperactivity Disorder is one of the most common psychiatric diagnoses in children (Pelham, Fabiano & Massetti, 2005). Teachers are often the primary source for ADHD referrals (Snider, Frankenger, & Aspen, 2000; Stroh, Frankenger, Wood & Pahl, 2008). Additionally, because children spend the majority of the day with their teachers, it is important to understand how teachers' knowledge and opinions about ADHD could be influenced by multiple demographic variables. The influence of these demographic variables on their knowledge and opinions about ADHD could be reflected in their ratings on ADHD rating scales. This in turn may influence a student's diagnosis, treatment and educational placement. Only a few studies have examined the impact of teacher demographics on their level of ADHD knowledge. These findings show that teachers with more years of experience are more knowledgeable about ADHD (Jerome et al., 1994; Sciutto, Terjesen & Bender-Frank, 2000). The research on the impact of other demographic variable is limited to single studies that show that race/ethnicity and specialty area are not significant predictors of teachers' level of ADHD knowledge (Frye, 2011; Snider, Busch & Arrowood, 2003).

The purpose of this study was to examine the relationships among multiple demographic variables and teacher knowledge and opinions about ADHD. These demographic variables included race/ethnicity, school level taught (early or late primary), specialty area (general, bilingual, and special education), and years of experience

teaching. Participants included 200 diverse in-service and pre-service teachers from local universities, who were recruited via departmental list-servs.

Teacher knowledge about ADHD was assessed by using the Knowledge about Attention Deficit Disorders Scale (KADDS; Sciutto & Feldhammer, 2000). Specific knowledge components of the scale include general information about ADHD, symptoms, and treatment. Teacher opinions about ADHD were assessed by employing a modification of the Teacher Opinions about ADHD scale which was adapted from a measure that originally assessed parental opinions about ADHD (ADHD Knowledge and Opinions Scale-Revised; AKOS-R, Bennett, Power, Rostain & Carr, 1996). Opinions collected included teachers' views and beliefs about medication acceptability, ADHD training session acceptability, ADHD training session feasibility, teacher coping ability, and opinions on student misbehavior. Results from the Teacher Opinions about ADHD scale revealed that there were no significant differences in teachers' opinions about medication acceptability, information session acceptability, or information session feasibility, based on the demographic variables. However, there were significant differences in teachers' opinions about their ability to cope with children with ADHD and student misbehavior based on the teachers' years of experience teaching.

Results from the KADDS revealed that there was a significant difference between pre-service and in-service teachers' level of ADHD knowledge, with in-service teachers being more knowledgeable about ADHD. Also, results revealed that about 82% of teachers reported that they were aware of specific resources available to them in the school for working with children with ADHD.

Additionally, a hierarchical regression (variables were: years of experience, school level, race/ethnicity, and specialty area) was conducted with ADHD knowledge as the dependent variable. Based on the results, the predictor that accounted for the most variance in level of ADHD knowledge was years of experience (explained 5.4% of the variance). A hierarchical linear regression was also conducted to determine if teachers' opinions about ADHD medication were a significant predictor of their knowledge about ADHD treatment. Results revealed that teachers' opinions about medication contributed significantly to the regression model (explained 2.3% variance). It is important to note that although the primary investigator found statistical significance in regards to the regression models, the practical significance is minimal.

Further research in this area should include a nationally-representative sample to assess teachers' level of ADHD knowledge and opinions based on additional demographic factors (e.g. university attended, which could account for differences in knowledge based on training curriculum). Additionally, the outcomes of this study may help school psychologists across the country tailor specific teacher-training sessions for teachers about working with children with ADHD.

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Chapter I

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) affects approximately 11%, or 6.4 million children in the United States (Visser et al., 2014), a number which reflects a 42% increase in prevalence from 2003 until 2011, making this particular condition among the most common childhood psychiatric diagnoses (Larson, Russ, Kahn & Halfon, 2011; Ogg et. al, 2011; Pelham, Fabiano & Massetti, 2005; Spencer, Biederman & Mick, 2007). Worldwide, the prevalence rates for ADHD are about 5% (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; DSM-V; American Psychiatric Association, 2013). The diagnostic criteria for ADHD have changed significantly over the past few decades. There is an extensive literature base that covers multiple ADHD domains, which include assessment, treatment, and teacher knowledge about ADHD.

Teachers play an integral role in the ADHD identification process. Therefore, it is important to understand specific teacher characteristics and their potential influence on teachers' level of ADHD knowledge and opinions. Moreover, research has demonstrated discrepancies in the degree to which teachers rate ADHD symptoms based on both teacher and student race/ethnicity. Caucasian teachers, for instance, rate African American students' behavior as more problematic than other pupils (Epstein et al. 2005). Dominguez de Ramirez and Shapiro (2005) found that Hispanic teachers reported higher mean scores on the hyperactivity rating scale, as compared to White teachers – but only for their ratings of Hispanic children. These findings suggest that race may be a factor associated with the over-identification of minority children in special education. Hence, given that teacher referrals are often integral to ADHD identification, clinicians should be

aware of the potential for teachers to rate ethnic minority children as more hyperactive than Caucasian children based on teacher race/ethnicity.

Purpose of the Current Study

The current study expanded on a previously conducted study (Frye, 2011), which examined the relationship between future teachers' race/ethnicity and school level to be taught (primary or secondary), and their level of ADHD knowledge. The current study: (a) examined additional demographic variables, including area of specialization (general, special, or bilingual education), and years of experience teaching to address the inconsistencies in the literature base (multiple studies have shown that years of experience is positively correlated with level of ADHD knowledge, however, there are several studies that are inconsistent with this finding); (b) included a measure to assess teachers' and future teachers' opinions about ADHD characteristics and treatments given that prior research has focused primarily on teacher knowledge rather than knowledge and opinions; (c) assessed the relationship between teachers' knowledge and opinions about ADHD; (d) compared pre-service and in-service teachers knowledge about ADHD; and (e) increased the sample size from the previous study in order to obtain a more representative sample in regard to race/ethnicity, school level to be taught, years of experience, and specialty area.

Chapter II

Literature Review

Changes in Diagnostic Definitions

This chapter will review the evolution of ADHD diagnostic criteria, the assessment and treatment of ADHD, disparities in the assessment and treatment of ADHD, ADHD in the school system, teacher training in regards to ADHD, overall ways in which opinions influence knowledge, and teacher level of ADHD knowledge.

The Evolution of ADHD Diagnostic Criteria

The Diagnostic and Statistical Manual, Second Edition (DSM-II; American Psychiatric Association, 1968) – a manual that provides classification criteria for mental health disorders – referred to ADHD as the “Hyperkinetic Reaction of Childhood” because hyperactivity was believed to be the core characteristic of the disorder.

According to the DSM-III (American Psychiatric Association, 1980), however, the disorder was renamed Attention Deficit Disorder (ADD) with or without hyperactivity.

This change was instituted for two primary reasons: (a) to emphasize children with ADD had deficits in their ability to sustain attention, and (b) to show that children did not have to present symptoms of hyperactivity to have sustained attention deficits (Frick, Barry, & Kamphaus, 2010). Another change occurred when the DSM-III-R introduced the term “Attention Deficit Hyperactivity Disorder” to place equal emphasis on both the attention and hyperactivity components of the disorder (American Psychiatric Association, 1987).

From 1987 to 2000, debates continued with regard to ADHD’s core symptomatology, behavioral domains, and whether or not distinct subtypes exist, which led to the DSM-IV’s (American Psychiatric Association, 1994) definition of ADHD, a definition that included three subtypes: Inattentive, hyperactive-impulsive, and combined.

The DSM-IV-TR outlined three parameters for the diagnostic criteria. First, a child must display six or more symptoms from one or both of the two categories (i.e., inattentive or hyperactive-impulsive). If symptoms of both are present, a diagnosis of combined-type is given. In addition, symptoms must manifest themselves before the age of seven and present across at least two settings (e.g., school and home) as a method of ruling out that the child's behaviors are not simply in response to a single environmental circumstance (e.g. bad parenting, poor classroom management). There must also be evidence that the disorder is causing the individual clinically significant impairment and the symptoms are not better accounted for by another mental disorder (e.g. Mood Disorder, Anxiety Disorder).

Current ADHD Diagnostic Criteria

In 2013, the American Psychiatric Association released the 5th version of the DSM, which included a few significant changes. One difference from the previous version is that some examples have been added to the criterion items to adjust for how ADHD is applicable across the lifespan. Another is that instead of symptoms presenting in only two settings, symptoms must manifest in several settings. Third, the age of onset criterion has changed. Initially, the criterion was "symptoms that caused impairment were present before age 7 years." That has been changed to "several inattentive or hyperactive-impulsive symptoms were present prior to age 12." This change has been implemented to convey the significance of a clinical presentation of ADHD during childhood (DSM-V; American Psychiatric Association, 2013). The three subtypes have also been removed, and clinicians now have to specify whether the child presents with the combined, inattentive, or hyperactive features. Symptoms in each category must have been present

in the past six months. Also, clinicians have to specify if the child's symptoms are in partial remission. The clinician will give this specifier when despite having met the full criteria for the diagnosis previously, for the preceding six months the child has failed to meet the full criteria, but the present symptoms still result in holistic impairment. Lastly, the clinician must specify the severity of the child's symptoms. Symptom severity ranges from mild (symptoms result in no more than minor impairments) to severe (symptoms result in marked impairment in overall functioning). Additionally, comorbid diagnoses of ADHD and Autism spectrum disorders are now allowed.

ADHD: Impairment and Comorbidities

Children and adolescents with ADHD often have functional impairments in their relationships with parents, peers, and teachers (Ogg et al., 2013; Pelham, Fabiano & Massetti, 2005; Spencer, Biederman & Mick, 2007). These impairments are of particular importance, as they may predict if the child will have negative long-term outcomes and are potentially the reason the child is referred for an ADHD evaluation. For example, according to Bussing, Mason, Bell, Porter and Garvan, (2010) adolescents in their study who met criteria for ADHD were less likely to graduate and were more likely to have a history with the juvenile detention system, experience less family cohesion, come from low-income families, have parents who show minimal interest in his/her activities, and have parents who were likely to experience increased amounts of stress (Hertig et al., 2007). Given these impairments, clinicians should critically examine the child's family environment and how it may be contributing to and/or exacerbating the child's symptoms.

Additionally, children with ADHD have impaired educational performance (e.g. underachievement) and more negative relationships with their teachers compared to their non-ADHD peers (Marshall, Evans, Eiraldi, Becker & Power, 2014; Spencer, Biederman & Mick, 2007). Research has demonstrated that many teachers do not feel prepared to work with children with ADHD and often feel more stressed when working with children with ADHD (Rush & Harrison, 2008; Westling, 2010). Furthermore, the literature shows that teachers may act negatively towards the child, which could subsequently elicit negative behaviors in the child (Barkley, 2006; McKown & Weinstein, 2008).

In addition to lower educational achievement and negative interactions with teachers, most children with ADHD have problems interacting with their peers and are usually rated as non-friends by their popular peers (Hoza et al., 2005; Nijmeijer et al., 2008). Common reasons for problematic peer relationships are related to not following rules, complaining, teasing, being bossy, and their difficulty regulating emotions (Mrug et al. 2007; Walcott & Landau, 2004). McQuade and Hoza (2008) found that these negative interactions with peers are more problematic in children who have the Combined subtype of ADHD. These impairments in social interaction appear to be more complicated for children with ADHD and other comorbid disorders.

Students with ADHD are also at an increased risk for having comorbid conditions, such as conduct disorder, oppositional defiant disorder, Tourette's syndrome, learning disabilities, depression, and anxiety (Chronis, Jones & Raggi, 2006; Jarrett & Ollendick, 2008; Frick, Barry & Kamphaus, 2010; Rommelse et al., 2009; Sciberras et al., 2014). It is important for clinicians to be cognizant of comorbidities that affect children with ADHD, as well as the ways in which those comorbidities affect ADHD

symptom manifestation. The combination of ADHD and comorbid diagnoses makes it difficult for children and adolescents with the disorder to function in the classroom. Furthermore, this combination may exacerbate difficulties within the academic arena to a greater extent than would be the case if there were no comorbidity.

ADHD and Externalizing Disorders: Oppositional Defiant Disorder/Conduct Disorder. Oppositional Defiant Disorder (ODD) is a disorder in which a child exhibits a pattern of angry/hostile behaviors in their interactions with others for a period of at least six months (DSM-V; American Psychiatric Association, 2013). Additionally, in order for a child to receive a diagnosis of ODD, the child must meet at least four symptoms in one of the following categories: vindictiveness, angry/irritable mood, or argumentative/defiant behavior. Unlike those with Conduct Disorder, individuals with ODD are not aggressive towards others or property. Conduct Disorder is defined by a persistent pattern of negative behaviors that violate/harm the basic rights of other individuals. There are four behavioral categories under which individuals with conduct disorder behaviors fall, including aggression to people and animals, deceitfulness or theft, destruction of property, and violations of rules (DSM-V; American Psychiatric Association, 2013). According to the literature, the co-occurrence of ADHD with either ODD or CD ranges from 30 to 50% (Jarret & Ollendick, 2008; Spencer, 2006). Children with either comorbid ODD or CD are at an increased risk for negative social interactions with their peers and other individuals given more issues with aggression and rule breaking behaviors (Nijmeijer et al., 2006). Due to the marked difference in the manifestation of behaviors between children solely with ADHD and those with comorbid

externalizing disorders, it is important to assess for these comorbid disorders in order to address the type of treatment that the child may need (Hechtman et al., 2005).

ADHD and Internalizing Disorders: Depression and Anxiety. Although the comorbidity for ADHD and externalizing disorders is usually given much attention, there has been less attention given to the co-occurrence of ADHD and internalizing disorders (Sciberras et al., 2014). Common internalizing disorders include depression and anxiety. According to the DSM-V (APA, 2013), in order for an individual to meet the diagnostic criteria for Major Depressive disorder, the individual has to meet five or more symptoms related to depression (e.g. depressed mood most of the day, nearly every day, loss of interest in activities that used to be enjoyable, insomnia or hypersomnia), and the symptoms are not because of a substance or medical condition. Anxiety disorders are characterized by excessive fear and anxiety that cause impairments in an individuals' behavior (DSM-V; APA, 2013). Common anxiety disorders include generalized anxiety disorder (GAD), separation anxiety disorder, and social phobia.

The co-occurrence of ADHD and internalizing disorders ranges from 25% to 50% (Davis, 2008; Larson, Russ, Kahn & Halfon, 2007; Sciberra et al., 2014.) As with the externalizing disorders, it is important for clinicians to be aware of common comorbid conditions to inform both the assessment and treatment process. Children with ADHD suffer from depression-related symptoms at rates significantly higher than their peers without ADHD and are at an increased risk for more severe psychopathology and suicide than individuals who have either depression or ADHD alone (Biederman et al., 2008; Daviss, 2008). According to Biederman et al. (2008) females who have comorbid ADHD and depression are at an increased risk for an earlier onset of depressive symptoms and

higher rates of suicidality. Ostrander and Herman (2006) and Herman et al. (2007) suggest that there are various pathways in youth with ADHD that may account for the development of comorbid depression. Additionally, the impairment in functional relationships that were mentioned before (relationships with teachers, peers, and parents) combined with academic difficulties, may place children with ADHD at an increased risk for developing comorbid depression (Herman et al., 2007).

Anxiety disorders are another common co-occurring internalizing disorder with ADHD. Children with comorbid ADHD and anxiety are at an increased risk for social problems with their peers (Bowen, Chavira, Bailey, Stein & Stein, 2008; Sukhodolsky et al., 2011). Additionally, Sciberras et al. (2014) reported that children with ADHD who have two or more comorbid anxiety disorders have more trouble in their daily functioning and issues with problematic behavior than individuals with ADHD who only had one comorbid anxiety disorder. The results from this study show that holistic functioning in children with ADHD and comorbid anxiety may only be negatively influenced by pervasive levels of anxiety. Furthermore, children and adolescents with comorbid anxiety and ADHD are more likely to have parents who present with a mental health disorder (Pfiffner & McBurnett, 2006; Sciberras et al., 2014). This relationship could be due to shared genetic vulnerabilities between the parent and the child and/or the parent's mental health symptoms could be due to the child's behavior. Because of the genetic and environmental component of anxiety, it is important during the initial assessment of ADHD and comorbid disorders for clinicians to assess for a family history of mental health illnesses.

ADHD and Learning Disabilities. According to DuPaul and Stoner (2003), approximately 30% of children with ADHD meet diagnostic criteria for a learning disability (LD). However, some estimates suggest that the comorbidity between ADHD and LD is as high as 67% (Perets-Dubrovsky, Kaveh, Deusch-Castel, Cohen & Tirosh, 2010). Additionally, the research demonstrates that children with ADHD experience comorbid LD at three times the rate of their peers who do not have a diagnosis of ADHD (DuPaul, Gormley & Laracy, 2012). Compared to their peers who solely have a diagnosis of ADHD, children and adolescents with combined ADHD and LD holistically experience more severe impairments in their daily functioning (Langberg et al., 2010). Furthermore, Frazier, Youngstrom, Glutting and Watkins (2007) found that children with the two disorders were at an increased risk for obtaining significantly lower grades and standardized achievement scores.

Several theories have been developed to explain the LD/ADHD comorbidity. Wilcutt et al. (2005) suggest that ADHD and LD (specifically in reading) may share a similar biological etiology that genetically predisposes the individual to both disorders. DuPaul and Volpe (2009) suggest that individuals with comorbid ADHD and LD may have deficits in working memory and processing speed since deficits in both areas are common in individuals who solely have ADHD or LD. Regardless of the causes of the common comorbidities, it has been shown that individuals with ADHD and comorbid problems are at an increased risk for more severe impairment than their peers who do not have comorbid conditions. Due to the severity of symptoms and impairments that children with ADHD and comorbid disorders may exhibit, it is important for clinicians to adequately assess for these comorbid conditions to assist in the intervention planning

process. The next section will review the literature on current assessment practices for ADHD and their implications for clinical practice.

Current Assessment of ADHD

In order to accurately assess for ADHD it is recommended that clinicians complete a multi-informant and multi-method evaluation (DuPaul & Kern, 2011; Tobin, Schneider, Reck & Landau, 2008). Multi-informant assessments should be conducted in order to ensure that the behavior is present in multiple settings and is displayed with multiple individuals. This approach to assessment also helps to ensure that the behavior is not a manifestation of specific environments, or a response to specific individuals. Because one of the diagnostic criteria required for an ADHD diagnosis is that the symptoms manifest across multiple settings, it is important for clinicians to integrate information from multiple informants to provide a more holistic picture of the child's symptom presentation in varied environments. The assessment of ADHD must rely directly upon observable behaviors that are reported by individuals in the child's life, which includes parents and teachers. In order to address and evaluate the required criteria necessary for an ADHD diagnosis, multiple methods of assessment have been developed. Assessment methods include broadband rating scales, DSM-IV rating scales, interviews, and observation methods (Pelham et al., 2005). The following sections will review the purposes of assessment, assessment methods, and the implications for assessment.

Purpose of Assessment. There are five main purposes for assessment, which include screening, diagnosis, documenting impairment, developing interventions and evaluating treatment outcomes (Pelham, Fabiano & Masseti, 2005; Tobin, Schneider, Reck & Landau, 2008). Screening includes both universal screening (screening for all

students), and screening for students who are at risk for a diagnosis of ADHD (Brock, Jimerson & Hansen, 2009). Screening for ADHD in the school setting is important because it can provide more evidence to support ADHD diagnoses that may have been given outside of the school setting (e.g. by a primary care physician; Ogg et al., 2013). Additionally, when screening is completed accurately, it can decrease the number of comprehensive diagnostic evaluations that are necessary if children fail to meet the initial screening criteria. This decrease in full evaluations can save clinicians many resources (e.g. time and money) and possibly lessen the number of children in special education.

Another purpose for assessment is diagnosis. Accurate diagnoses are important for many reasons, which include obtaining the correct medication for a specific disorder and special education placement. Best practices for diagnosing a child with ADHD include using parent, teacher, and child interviews; parent and teacher rating scales; cognitive and achievement measures; behavioral observations; and using the Diagnostic and Statistical Manual of Mental Disorders, which is currently on its 5th edition (Brock & Clinton, 2007; Handler & DuPaul, 2005). Although these methods are considered best practices, Handler and DuPaul (2005) found that less than 20% of the participants in their study used the recommended best practices methods for diagnosing ADHD. Bridging the research to practice gap in this area should be a priority for ADHD researchers since ADHD is one of the most common psychiatric diagnoses.

Additionally, assessing the child's level of impairment (e.g. academic, social, family) is important in identifying and targeting behaviors for intervention planning. The researchers suggest that clinicians should use functional behavior assessments to identify certain antecedents in the environment that are exacerbating the child's undesirable

behaviors. The fourth purpose for assessment is intervention development. According to DuPaul and Kern (2011), data gathered during the assessment phase is crucial for intervention development and to determine if a specific intervention will or will not be effective for the target child. For example, results from a functional assessment can identify which stimuli in the child's environment are exacerbating and maintaining the undesired behavior. Clinicians can then develop interventions that replace the problem behavior with an acceptable behavior that serves the same function (e.g. obtain attention, escape) for the child.

The last purpose for assessment that will be discussed is outcome evaluation. According to Ogg et al. (2013), progress monitoring is necessary to assess the effectiveness of a specific intervention. DuPaul and Kern (2011) suggest collecting pre- and post-data (e.g. rating scales and observation data) to assess for reduction in impairment in the targeted areas. Interventions and treatments can then be modified to obtain desired effects if the current intervention is not effective. The next section will review the most common measures used in the assessment of ADHD, which include broadband rating scales, narrowband rating scales, interviews, and observation methods.

Broadband rating scales. The use of broadband rating scales allows the clinician to assess a broad range of behaviors, which is important in the assessment of ADHD, especially considering the disorder is usually comorbid with other disorders (DSM-V; APA, 2013). Data collected from broadband rating scales can also aid in differential diagnosis. Commonly used and well-validated broadband rating scales in the assessment of ADHD include the Child Behavior Checklist (CBCL; Achenbach, 2001) and Teacher Report Form (TRF; Achenbach, 2001), and the Behavior Assessment System for

Children Second edition (BASC-2; Reynolds & Kamphaus, 2002). The CBCL has both a parent and teacher form that assess for a range of externalizing and internalizing behaviors in children aged 4 to 18. Each form consists of 118 items that require the rater to identify if the behavior is not present, is sometimes exhibited by the child, or if the symptoms are frequently exhibited by the child. The CBCL has eight scales (Withdrawn, Somatic Complaints, Anxious/Depressed, Social Problems, Thought Problems, Attention Problems, Delinquent Behavior, and Aggressive Behavior). Reliability and validity evidence are well established for this instrument. Internal consistency reliabilities (parent form, .84; teacher form, .94) and test-retest data (parent, .73; teacher, .70) are moderate to high. Concurrent validity data demonstrates moderate correlations with the parent version of the Conners (CPRS, 1989; attention subscales, $r=.59$) and high correlations with the teacher version of the Conners (CTRS, 1989; total scale, $r=.80$).

Like the CBCL, the BASC-2 has both teacher and parent forms that assess a range of internalizing and externalizing problems for children and adolescents between the ages of 2 and 21. The teacher form contains 100 to 139 items, while the parent form contains 134 to 160 items. Responses are based on a 4-point scale that range from never to almost always. The BASC-2 has six adaptive scales (Activities of daily living, Adaptability, Functional Communication, Leadership, Social Skills, and Study Skills) and 10 clinical scales (Aggression, Anxiety, Attention Problems, Atypicality, Conduct Problems, Depression, Hyperactivity, Learning Problems, Somatization, and Withdrawal). Test-retest data is moderate to high, with scores ranging from .78 to .91. Coefficient alpha's for the different subscales range from .87 to .97. Concurrent validity between the BASC-2 (parent and teacher version) and the CPRS and CTRS were also established.

Correlations between the parent versions were high moderate (Hyperactivity, .77; Inattention, .71) while correlations between the teacher versions were high (Hyperactivity, .81; Inattention, .81).

While broadband instruments can be beneficial in the ADHD assessment process, these measures still present particular limitations. One limitation is broadband rating scales' inability to be sensitive to low base-rate behaviors (Pelham et al., 2005). Another limitation to broadband rating scales is that the scales are not useful in assessing the child's level of impairment, which leads to the need for additional information. Last, parent, teacher, and self-report forms are often weakly correlated (Wolraich et al., 2004). Although this is a limitation, these discrepancies would be expected due to the child behaving differently given different contexts.

ADHD-Specific rating scales. This section will review rating scales that are used to assess for ADHD symptoms. These scales are often used because they are an efficient method of gathering data related to ADHD symptoms (that are outlined in the DSM-IV-TR) from parents, teachers, the child, and other informants. They are also utilized because they are an effective means of differentiating between clinical and nonclinical samples. One example of an ADHD rating scale is the Vanderbilt rating scale (Wolraich, Feurer, Hannah, Baumgaertel, & Pinnock, 1998; Wolraich et al., 2003), with both a parent version and a teacher version of the scale. Each form consists of 43 items that assess for ADHD-related symptoms. Using a sample of 243 parents, teachers, and students, Wolraich et al. (2003) investigated the psychometric properties of the Vanderbilt rating scale. Internal consistency reliability for parents and teachers was very high with Cronbach's alpha greater than .90 in every case. The researchers also assessed

the concurrent validity of the Vanderbilt rating scale using additional measures, such as the Computerized Diagnostic Interview Schedule for Children - Fourth edition (C-DISC-IV; NIMH, 1997). A high correlation between both measures ($r = .79$) was obtained, suggesting that both measures assess similar symptoms.

The ADHD Rating Scale - Fourth Edition is another rating scale that assesses for DSM-IV symptoms of ADHD (ADHD-RS-IV; DuPaul, Power, Anastopolous & Reid, 1998). The ADHD-RS-IV has both home and school versions that consist of 18 items that assess for both inattentive and hyperactive symptoms on two separate scales. McGoey, DuPaul, Haley and Shelton (2007) investigated the psychometric properties for the ADHD-RS-IV Pre-school version with 902 parents and 977 teachers (children ranged from 3-to-5 years of age). The internal consistency coefficients for both the teacher version (Inattention: .93; Hyperactivity: .92) and parent version (Inattention: .88; Hyperactivity: .85) were high. Test-retest coefficients were also collected at four-week intervals for both versions, and ranged from .93 (Inattention) to .96 (Hyperactivity) for the teacher version, and from .80 (Hyperactivity) to .85 (Inattention) for the parent version. Concurrent validity correlations between the school version and the (CTRS) ranged from .85 (Inattention subscales) to .96 (Hyperactive/Impulsive). Similar correlations were also found for the home version and the (CPRS) with correlations ranging from .80 (Hyperactivity/Impulsivity) to .85 (Inattention).

In addition to the pre-school version there are also parent and teacher versions for school-aged children. Internal consistency coefficients for both the teacher (.88-.95) and parent version (.86-.92) were high. Test-retest coefficients were moderate to high for both the teacher (.55-.90) and parent (.70-.86) versions. Concurrent validity correlations

between the school version and the CTRS were high (.80). Similarly, the concurrent validity correlations between the parent version and the CTRS (.66, Inattention; .81, Hyperactivity) were also moderate to high (DuPaul et al., 1998).

The Attention Deficit Disorders Evaluation Scale - Second Edition (ADDES-2; McCarney, 1995) is a behavioral rating scale that has separate forms for parents (with 46 questions) and teachers (with 60 questions). The ADDES-2 has three main purposes: (a) screening for ADHD, (b) assessing for ADHD (in conjunction with other measures), and (c) helping with the development of intervention goals. Psychometric properties for the instrument reveal that internal consistency coefficients for both subscales (Inattentive and Hyperactive-Impulsive) on both the parent and teacher versions were above .90. Test-retest reliability coefficients (n=148 parents; n=481 teachers), with administrations thirty days apart, ranged from .88 to .97. The authors reported low moderate-to-high (.42-.90) correlations with instruments that assessed similar constructs, such as the CTRS and the CPRS.

Another common ADHD rating scale is the Conners Rating Scales-Revised (CRS-R; Conners, 1997). The CRS-R consists of both a parent (80 items) and teacher (59 items) version. The main purpose for the CRS-R is to aid in the evaluation of ADHD symptoms in children and adolescents. This measure includes seven subscales, which are Cognitive Problems/Inattention, Hyperactivity, Oppositional, Anxious-Shy, Perfectionism, Social Problems, and Psychosomatic (parent version only). Normative data for this measure are based on a diverse sample of 2,482 parents and 1,973 teachers of children (ages 3-17) in North America. The internal consistency data for the subscales range from moderate to high (.73-.94). Test-retest reliability (6-8 weeks) ranged from

poor to high moderate for the parent version (.13-.78) and moderate to high for the teacher version (.47-.88). According to Conners et al. (1998) discriminant validity for the CRS-R is evidenced by its ability to differentiate between children with and without ADHD.

The ADHD Symptom Checklist-4 (SC-4) consists of fifty items that assess for parent- and teacher-reported disruptive behavior (Gadow & Sprafkin, 1997). Additionally, the measure has both a Peer Conflict scale, which measures peer aggression, and a Stimulant Side Effects Checklist, which monitors medication use. The main purpose of the SC-4 is to screen for both ADHD and Oppositional Defiant Disorder (ODD). Psychometric properties for the scale were investigated with 103 children (ages 5-17). The internal consistency data for both parent and teacher ratings were moderate-to-excellent, with scores of .95 for both the Inattentive and Hyperactive Impulsive subscales, and scores between .78 (parent) and .79 (teacher) for the Attention-Arousal subscale. Concurrent validity was examined by comparing the subscales of the SC-4 with scales from the CBCL. With regard to the parent version, there was a moderate correlation between the Inattention subscale of the SC-4 and the Attention Problems subscale of the CBCL ($r=.62$), and the Hyperactive/Impulsive subscale was moderately correlated with the CBCL Aggression subscale ($r=.63$). With regard to the teacher version, there was a high correlation between the scales assessing for Attention problems ($r=.83$), and a moderate correlation was found between the Hyperactive-Impulsive scale on the SC-4 and the Externalizing scale on the CBCL ($r=.78$).

Although ADHD rating scales are integral in the ADHD assessment process, there are still notable limitations to these measures. For instance, these rating scales do not

capture the severity of functional impairments that a child may be displaying. Another limitation to the ADHD rating scales is that they do not assess for two important factors in the ADHD assessment process: age of onset, and symptom chronicity (Pelham et al., 2005).

Interviews. The interview method serves as another form of data collection that has been used in the ADHD assessment process. Interviews are beneficial for two reasons: (a) they allow the clinician to collect information on a range of problem behaviors displayed by the child, and (b) the clinician is able to obtain a detailed developmental history, which is integral to the assessment of ADHD, especially considering that symptoms must have been present before the age of twelve (DSM-V, 2013). The Diagnostic Interview Schedule for Children-Fourth Edition is an example of an interview that is used in the diagnosis of ADHD (DISC-IV; Jensen et al., 1996). The DISC-IV has both child and parent components, and is intended for use by highly qualified interviewers. The DISC-IV assesses approximately 30 childhood diagnoses and has moderate test-retest reliability for the parent version (.79). Wolraich et al. (2003) reported that the DISC-IV parent version had a moderate-to-high correlation (.79) with the Vanderbilt parent rating scale. A limitation to the DISC-IV, and other interview methods, such as the Diagnostic Interview for Children and Adolescents - Revised (DICA-R; Boyle et al., 1993; Reich, Shayka, & Taibleson, 1991), is that they are not practical for use in certain settings – especially those that require multiple administrations – as they can be overly time-consuming. Other limitations include the inability to address invalid responses given by a patient who may not understand the question, and the inability to assess for symptoms that may be atypical because the measure only

assesses for ADHD symptoms that are outlined in the DSM-IV-TR and the ICD-10 (Shaffer et al., 2000; World Health Organization, 1992).

Observations. In addition to using rating scales and interviews it is also important to include observations in a comprehensive assessment. Observations are important because both parent and teacher ratings have the potential to yield discrepant information. Thus, combining observations with another assessment methodology could help to alleviate such concerns. An example of an observational measure is the Individualized Target Behavior Evaluation (ITBE), which uses frequency counts for a child's behavior (Pelham et al., 2002). The ITBE has moderate-to-high levels of internal consistency (.77 to .88), and has been reported to be sensitive to behavioral and medication treatment effects.

Validity evidence suggests that the different versions of the ITBE (e.g. teacher and counselor) have moderate-to-high correlations with each other (.51 to .72). An additional observational code, the Playroom observations code (Milich et al., 1982) consists of having an observer rate the child in a natural or analog setting to code behaviors such as on-task and out-of-seat behavior. Inter-observer agreement ranges from .87 to .95. Convergent validity for this instrument is also established and has low to moderate correlations with parent (.30) and teacher (.57) ratings of hyperactivity. The Classroom Observations of Conduct and Attention Deficit Disorders (COCADD; Atkins et al., 1985; Atkins et al., 1988; Atkins et al., 1989) consists of thirty-two codes for classroom activities and thirty-two codes for playground activities that assess for certain behaviors such as overactivity, distractibility, off-task behavior, verbal aggression, and level of play activity. Inter-rater reliability ranges from .67 to 1.00 for all subscales of the

classroom codes, and from .79 to 1.00 for the playground codes. Concurrent validity for this observational code was not reported.

Although behavioral observations may contribute to the incremental validity of ADHD assessment, there are limitations to this assessment method as well, such as cost and time efficiency, as well as limited reliability and validity data. Additionally, because individuals are being observed, they may change their behavior, which would limit the validity of the observations.

Implications for clinical practice. Pelham et al. (2005) noted that using multiple, brief measures for ADHD assessment is sufficient to classify children with ADHD. Additionally, structured interviews and observation methods add little incremental validity in the ADHD diagnosis process. The use of brief measures in ADHD diagnosis is not only cost- and time-effective, but this approach also offers the clinician the opportunity to focus on the individual needs of each child, which include assessing impaired functioning domains, uncovering specific target behaviors, and defining the functions of problem behaviors. Defining the function of the target behavior is important in the treatment of ADHD because it provides information regarding the extent of how problematic the behavior is for the individual, as well as the function of the environment in maintaining the specific behavior. Understanding the cause and maintaining factor of the child's behavior also aids in the development of treatments and interventions that meet a child's individual needs.

Pros and cons of the ADHD assessment approaches. The advantages presented in the literature of using structured interviews and observational methods should be weighed against the disadvantages – primarily cost and time related – of using those

methods. For example, as stated previously, rating scales do not capture the onset or chronicity of symptoms, which are important factors in the assessment process that may be in fact captured by structured interviews. During initial assessments for ADHD, it is crucial that information on age of onset and symptom chronicity be collected, mainly since these are criteria outlined in the DSM. Additionally, the child's level of impairment is assessed when using interviews, which is important because it provides the clinician information on which areas to target for intervention without having to use any additional measures to assess for impairment. Although using interviews may be beneficial for obtaining information from the child's parent in settings other than the school, most diagnostic interviews fail to provide interview formats to collect information from teachers – thus requiring the clinician to only use rating scales with the teacher. Due to cost, time, and other disadvantages of the interview method, Frick et al. (2010) recommend limiting the use of interviews to more comprehensive assessments of ADHD.

Observations performed by skilled clinicians help to address discrepancies in parent and teacher ratings, which could aid in a more accurate assessment and identification process (McConaughy et al., 2009). Direct observations also provide clinicians with opportunities to assess possible environmental contingencies that may contribute to, or even maintain, specific behaviors, which may be beneficial in implementing interventions for behavior change. While these features address the importance of observational systems, researchers are concerned with the cost and time investments involved in implementing these formal observations in addition to the potentiality for misuse and inability to capture an adequate sample of the child's behavioral problems. In conclusion, McConaughy et al. (2009) suggest that observations

may be best used in comprehensive assessments in cases where there is significant disagreement between parents and teachers on rating scales and to monitor the effects of treatment and interventions on a child's behavior.

Treatment of ADHD

Various options have been proposed for efficacious ADHD treatment. Two of the most well studied options include medication and psychosocial treatment. Prior to reviewing the literature about ADHD in the school system and teacher experiences with ADHD, the next section will review the literature on medication and psychosocial treatment.

Medication treatment. According to Visser et al. (2014), approximately 69% of children – 3.5 million – were consuming medication for ADHD, which is a 28% increase in medication consumption from 2007 to 2011. Groups that saw significant increases in medication consumption were females, young children (ages 4-10), and Caucasian children. It is interesting to note, however, that medication consumption actually decreased over this time period for children who were mixed-race or children who were members of a racial minority group. This trend is similar to previous research, which shows that African American and Hispanic children are less likely to consume medication than their Caucasian peers (Safer & Malever, 2010; Winterstein et al., 2008). Contrary to the findings in the Visser et al. (2014) study about the decrease in medication use amongst minority children, Zuvekas and Vitello (2012) found that there had been an increase in the use of stimulant medications with African American and Hispanic children. A possible explanation for the increase in medication use among families from ethnic minority groups could be due to an increased recognition of ADHD. Although

there was an increase in medication use with these two minority groups, it is important to note that there was still a disparity between the use of medication with these groups and Caucasian children, with the latter consuming medication at a higher rate.

Stimulant ADHD medications. Medication used to treat ADHD includes both stimulant and non-stimulants. The Multimodal Treatment of Attention-Deficit Hyperactivity Disorder Study is one of the most comprehensive treatment studies on ADHD (MTA Cooperative Group, 1999). In total, 579 children ranging from 7 to 9.9 years of age were randomly assigned to various treatment groups in the MTA Cooperative study, which included methylphenidate, standard community care, a behavioral treatment, and a combination of both medication and behavior treatment. Participants who were randomly assigned to the behavioral treatment group received three intervention components, which included parent training (eight sessions), child-focused treatment (eight week summer treatment program), and school-based treatment (10-16 weeks of teacher consultation).

According to the MTA Cooperative Group, “[m]edication management began with a 28-day, double-blind, daily-switch titration of methylphenidate hydrochloride, using 5 randomly ordered repeats each of placebo, 5mg, 10mg, and 15 or 20mg (p. 1075)”. Each of the doses above was administered at breakfast and lunch, with a half-dose given in the afternoon. No differences were found between the combined and medication groups in the proportion of participants maintained on the different medications.

The combined treatment group included both the medication management and behavioral treatment. Titration was followed by medication management on a monthly

basis and was combined with individual and group parenting sessions, teacher consultation, and the summer treatment program. Participants in the community care group received an initial assessment report and a referral list for mental health services. All medication treatments that were used by individuals in the community care group – 67% of whom received stimulants – were documented; however, psychotherapeutic treatment usage was not coded in the initial study. While all participants demonstrated improvement from the pre-test, participants in the medication and combined treatment groups improved significantly more than individuals in both the behavioral treatment group and the standard community care group ($p < .05$). Yet, by the time of their 10-month follow-up, half of the initial improvements had dissipated for the combined and medication treatments (MTA Cooperative Group, 2004). Additionally, by the six- to eight-year follow-up study, there was a 62% decrease in medication use (Molina et al., 2009), which shows that type of treatment in the initial 14-month study does not predict level of functioning six to eight years later. Common side effects to methylphenidate include insomnia, decreased appetite, and weight loss. (Cascade, Kalai & Wigal, 2010; Johnson et al., 2013; Lee et al., 2013).

Besides methylphenidate, there are other stimulants commonly prescribed for ADHD treatment including dextroamphetamine (Dexedrine), and amphetamine salts (Adderall, DeSantis & Hane, 2010; Jensen, 2009). In a 4-week, randomized, double-blind, multi-center, placebo-controlled study, Spencer et al. (2006) investigated the efficacy and safety for mixed amphetamine salts extended release (MAS XR) in adolescents. The study included 287 adolescent participants (ages 13 to 17). To be included in the study, individuals needed a DSM-IV-TR diagnosis of ADHD combined-

type, normal blood pressure, obtained an IQ score equal to or higher than 80 and obtained normal electrocardiographic scores. Individuals were excluded from the study if they had a comorbid mental or physical illness that could possibly affect their participation in the study, were non-responsive to stimulant medication, allergic to the medication used in the study, had a current psychiatric illness (other than ODD) and a family or personal history with drug abuse.

At the beginning of the study, the adolescents participated in an initial washout phase that lasted between one to four weeks (depending on the prior medication that the individual consumed). After the washout phase, the participants were randomized into one of five groups, which included four treatment groups (MAS XR 10, 20, 30 or 40 mg/d) and one group that received a placebo. Regardless of the treatment group each participant consumed his/her medication in the morning. According to the researchers, a forced-dose-titration design was used for a 4-week period. Participants who were randomized to the 10 mg/d group received 10 mg/d for the entire four weeks. Individuals who were randomized to the 20mg/d group began with 10mg/d for the first week and consumed 20mg/d for the remaining three weeks. Individuals in the 30mg/d and 40mg/d groups followed a similar pattern until they reached the required dosage for their treatment group.

The primary outcome measure used to assess the efficacy of the medication was the ADHD-RS-IV. Additionally, the Clinical Global Impressions-Improvement (CGI-I; Guy, 1976) was used as a secondary outcome measure. Results revealed that there were statistically significant improvements ($p < 0.001$) in ADHD-RS-IV total scores for all treatment groups when compared to the placebo group. For individuals who had a low

baseline score based on the ADHD-RS-IV, statistically significant improvements ($p < 0.01$) were observed over placebo in all treatment groups except for the individuals in the 10mg/d group. For individuals who had obtained a high baseline score on the ADHD-RS-IV, statistically significant improvements were observed over placebo in all treatment groups. Additionally, individuals who consumed MAS XR (in any group) improved at a higher percentage than individuals who were in the placebo group. Results also revealed that the most common side effects were decreased appetite, abdominal pain, and weight loss. Overall results of the study provide evidence for the efficacy and overall tolerability of Adderall XR in the adolescent population. Although this study provided efficacy data for the use of this medication in the adolescent population, it should be noted that the results were based only on one primary and one secondary measure. Additional measures and methods of data collection could have been used to support the findings from this study. In addition to methylphenidate, dextroamphetamine, and amphetamine salts, methylphenidate extended release (Concerta) and Lisdexamfetamine (Vyvanse) are two other stimulant medications that have been used to effectively treat ADHD (Antonucci, Kunins, Manos, Lopez & Kerney, 2010; Najib, 2009; Wigal et al., 2009; Williamson, Murray, Damaraju, Ascher & Starr, 2014)

Non-stimulant ADHD medications. According to Clark, Barry, McCarthy, Selikowitz, and Johnstone (2008), approximately 20% of children do not respond to stimulants. For those children who cannot tolerate stimulants, or whom have a limited response to stimulant medications, there are different medication options for children that include atomoxetine, tricyclic antidepressants, antihypertensive drugs, and atypical antipsychotics (Banaschewski, Roessner, Dittman, Santosh & Rothenberger, 2004;

Faraone, Wigal & Hodgkins, 2007; Faraone, 2009). Before reviewing the literature on these different non-stimulant medications, the efficacy of stimulant and non-stimulant medications for ADHD will be compared.

Faraone (2009) conducted a meta-analysis (which included thirty-two trials) to compare the efficacy of medications used to treat ADHD. There were three classes of drugs used in this study, which include non-stimulants (atomoxetine, bupropion, clonidine), immediate-release stimulants (methylphenidate (MPH), dextroamphetamine, and mixed amphetamine salts (MAS)), and long-acting stimulants (MAS-extended release, d-Amph extended release, and MPH modified release). Effect sizes for the non-stimulant medications were significantly less than those for the two stimulant groups (IR stimulants: $F\{1,31\}=25$; $p < .0001$; LA stimulants: $F\{1,31\}=15$; $p = .001$). It is interesting to note, however, that there was no significant difference between the two classes of stimulant drugs ($F\{1,31\}=3$; $p = 0.62$). Results from this study were similar with studies that compared the efficacy between atomoxetine and methylphenidate (Kemner et al., 2005; Newcorn et al., 2008; Starr & Kemner, 2005;), and between atomoxetine and MAS (Faraone, Wigal & Hodgkins, 2007; Wigal et al., 2005).

Atomoxetine, also known as Strattera, is a selective norepinephrine reuptake inhibitor that has been approved by the Food and Drug Administration (FDA) for use in the treatment of ADHD. Atomoxetine has been demonstrated to be effective and superior to placebo in the treatment of children with ADHD in multiple double-blind placebo-controlled studies (Cheng et al, 2007; Newcorn et al., 2005). Also atomoxetine has been found to have similar effects to methylphenidate on core ADHD symptom improvement (Buitelaar & Medovi, 2008; Hazell et al., 2007).

Weiss et al. (2005) conducted a randomized, placebo-controlled study to assess the efficacy of once-daily atomoxetine based on teacher reports. This study was conducted at eight different sites, including locations in the United States and Puerto Rico. Participants (ages 8 to 12) had diagnoses of ADHD (any subtype). An initial comprehensive evaluation was conducted to assess for baseline functioning, and teachers were given packets that provided detailed information about their role in the study. Initially, 241 patients were screened, but only 153 participants met inclusion criteria (e.g. had a teacher willing to participate, no serious medical illness). Participants were randomized to receive either once-daily atomoxetine (up to 1.8mg/kg/day) or a placebo for seven weeks in a 2:1 ratio. Initial doses started at .8mg/day (for three days in the morning) and were gradually increased over the course of the seven weeks. Individuals assigned to the placebo group, received medication that was identical (in appearance) to atomoxetine.

Treatment evaluation was based on teacher and parent report, and the primary outcome measure for the study was the ADHD-RS-IV teacher version. A significant difference was found between those individuals who responded to medication (20% reduction on scores in the ADHD-RS-IV) in the atomoxetine group (69%), as compared to only 43.1% of patients in the placebo group ($p=.003$). Other outcome measures showed significant changes over the placebo as well, including increase in the use of appropriate social skills and a decrease in students' problem behaviors in the classroom. The researchers reported that there were no serious safety concerns, but individuals in the atomoxetine group experienced a decrease in their appetite (24% vs. 3.8%).

The results of this study are consistent with those from earlier studies (Michelson et al., 2002; Newcorn et al., 2005), which found that once-daily atomoxetine is effective in improving behaviors of children with ADHD. One notable limitation was that the teacher measures being used to assess disruptive behaviors may have been more sensitive to treatment effects than measures of academic performance and pro-social behavior. For example, the researchers reported that teachers may be better at looking out for misbehavior instead of “catching a child being good”. Additional side effects to atomoxetine have also been reported, which include the potential for suicide ideation (FDA, 2005) and hepatotoxicity, which is chemical-driven liver damage (FDA, 2004).

Tricyclic antidepressants (TCAs) have also been used for the management of ADHD symptoms. Benefits of TCAs include that they are longer acting than stimulants; that they have been shown to decrease impulsivity and sustain attention, and that they improve mood in some cases (Barkley, 2004). In a 6-week randomized double-blind study Jafarinia et al. (2012) compared the efficacy and safety of bupropion to methylphenidate with 44 participants (ages 6 to 17). In order to participate in the study, individuals had to have a diagnosis of ADHD confirmed by a psychiatrist. All children underwent a psychiatric assessment and medical evaluation. Exclusion criteria included psychiatric comorbidities such as mental retardation, high suicide risk, drug abuse, and an abnormal electrocardiogram. Half of the participants were assigned to receive bupropion, while the other half received methylphenidate.

Based on their weight, individuals in the bupropion group received 100-150 mg/day, while individuals in the methylphenidate group received 20-30 mg/day. Bupropion was started at 50 mg/day, while methylphenidate was initially started at 10

mg/day. The outcome measures included the parent and teacher versions of the ADHD-RS-IV. Results revealed that there were no significant differences in parent and teacher scores on the ADHD-RS-IV. Additionally, with the exception of headaches, which were more common in the methylphenidate group, there were no significant differences between the groups in regards to the other ten side effects that were detected that include, decreased appetite, insomnia, and nervousness. Although this study showed that both drugs were safe and efficacious for children with ADHD, it is important to note that there are some limitations to this study. One limitation was that the study only utilized one outcome measure (parent and teacher ADHD-RS-IV). It would have been beneficial to have multiple measures to assess the safety and efficacy of the medications. It is important to note, however, that although the use of TCAs for ADHD were more common in the past and TCAs were the first antidepressant to be used with children and adolescents, they are no longer recommended for the pediatric population due to their anticholinergic effects (e.g. dry mouth), increased risk for suicidality, and potential cardiotoxicity, which is a delay in normal heart rhythms that may lead to death (Birmaher & Brent, 2003; Hammad, Laughren & Racoosin, 2006; Schneeweiss et al., 2013).

Since the late 1980s and early 1990s, research findings have illustrated that antihypertensive drugs, such as clonidine (Catapres) and guanfacine (Tenex) (Biederman et al., 2008; Sikirica et al., 2012), both alpha-2 adrenergic agonists, may be useful in managing symptoms of ADHD. Possible benefits appear to be related to improvements in reducing hyperactivity and activity regulation. However, limited research related to this class of drugs suggests that they are less effective than stimulants at improving attention and school productivity (Barkley, 2004). Biederman et al. (2008) compared the efficacy

of guanfacine extended release to placebo for children with ADHD in a multi-center randomized controlled study. Participants included 345 children (ages 6 to 17) who met the DSM-IV-TR diagnostic criteria for ADHD (any subtype). In order to participate, the children had to function intellectually at their appropriate age level and not have a comorbid psychiatric diagnosis that caused them to experience significant symptoms (e.g. Axis II disorder).

The study was conducted in three stages. The first stage was the screening stage, which lasted for 14 days and consisted of ensuring that patients met the inclusionary criteria for the study. The next phase was the washout phase, which lasted for a minimum of one week, and was initiated to ensure that the patient's current medication was discontinued. The third phase consisted of a double-blind treatment period that lasted for a total of 16 weeks. Participants were assigned to one of four groups, three of which received different levels of guanfacine per day (2, 3, or 4 mg/day) and a placebo group. Treatment response was evaluated by one primary outcome measure, the ADHD-RS-IV, and multiple secondary outcome measures, which include the CPRS-R and the CTRS-R. The overall results revealed significant mean reductions (based on ADHD-RS-IV score) from baseline to the end of the study for all groups of children who were administered guanfacine (-16.7), as compared to the placebo (-8.9) (2mg, $p=.0002$; 3mg, $p=.0001$; 4mg, $p<.0001$), thus supporting the notion that guanfacine is more effective than placebo in reducing ADHD symptoms, which is similar to the results found by Sallee et al. (2009). As for safety results overall guanfacine was found to be well tolerated when compared with the placebo. The most common side effects were fatigue, upper abdominal pain, and somnolence, which were mild or moderate in intensity.

Atypical antipsychotics (AAPs) are also commonly prescribed (although not FDA indicated) for children with ADHD (Sikirica et al., 2012). According to Alexander, Gallagher, Mascola, Moloney and Stafford (2011), the use of atypical antipsychotics for children with ADHD increased from 2% in 1995 to 5% in 2007. Doey, Handelman, Seabrook and Steele (2007) reported that 12% of all atypical antipsychotic prescriptions in Canada were for children under the age of eight. However, the majority of the studies that have been conducted assessing the effectiveness of AAPs for children with ADHD were studies where the majority of the children had severe comorbid conditions, such as bipolar disorder (Tramontina et al., 2009 & Zeni et al., 2009). In a study conducted by Gunther, Herpertz-Dahlmann, Jolles, and Konrad (2006) the researchers examined the influence of risperidone on attentional functions and inhibitory control in children with ADHD and comorbid Disruptive Behavior Disorders (DBD).

A total of 46 children (ages 8 to 15) participated in this study. Half of the participants had lifetime diagnoses of ADHD, while the other half did not have a diagnosis of ADHD. Before the study, all participants underwent a psychiatric examination. Participants were excluded from the study if they had an IQ below 80 and if they had consumed a neuroleptic medication prior to the study. Of the 23 participants who had a lifetime diagnosis of ADHD, they all had common characteristics, which include attention problems, hyperactivity, and aggressive or defiant behavior. Individuals in the control group were recruited from elementary and junior high schools. All of the participants were Caucasian.

The children in the ADHD and DBD group showed issues with aggressive and impulsive behavior. Individuals in this group, received risperidone, cognitive behavioral

therapy, skills training (parents), behavioral interventions and peer group training.

Participants started consuming risperidone at 0.25 mg/day (the dosage increased until a positive clinical response was obtained or the participant began to have side effects).

Daily doses ranged between 1 mg and 2.5 mg. Of the children in this group, 18 were treated with both risperidone and stimulant medication. Outcome measures included a standard neuropsychological assessment (before being treated with risperidone and four weeks after). Intensity of attention was measured by the Sustained Attention task, while selectivity of attention, was measured by the Divided Attention task. Additionally the IOWA Conners rating scale (Pelham et al. 1989) was used by trained staff to assess for behavioral changes.

Results revealed that overall scores on the IOWA Conners scale decreased significantly for individuals in the combined ADHD and DBD group ($p=.003$). No group differences were found between the two groups in regards to intensity of attention or selectivity of attention. Additionally although it was hypothesized that risperidone would cause a cognitive slowing in attention tasks, no negative influence was found. The most common side effect to risperidone in this study was sedative effects (mainly after the first administration). Other common side effects to risperidone and other atypical antipsychotics in children include weight gain and extrapyramidal side effects, such as parkinsonian side effects (Correll, Penzner, & Parikh, 2006).

Psychosocial treatments. Psychosocial treatments do not pose the same safety and long-term side effect risks to children as pharmacological treatments. Currently, there exist three well-established psychosocial treatments for ADHD: (a) behavior parent training, (b) behavior classroom management, and (c) summer treatment programs

(behavior peer interventions in recreational settings). Each of these treatments will now be reviewed.

Behavioral parent training. Behavioral parent training (BPT) is a treatment in which a clinician works with the parent to teach him or her to effectively manage his or her child's behavior. BPT also includes psycho-education and group training sessions that help parents understand their child's behavior (Maughan et al., 2005). Fabiano et al. (2009) conducted a meta-analysis, which included 114 papers of behavioral treatments for ADHD. Overall, the researchers found that for both pre-post studies and between group studies in their meta-analysis, effect sizes ranged from .70 to .83 – thus suggesting that behavioral treatments are effective.

Van den Hoofdakker et al. (2009) conducted a study to investigate the effects of behavioral parent-training as an adjunct to routine care with children with ADHD. The sample was composed of 94 children with ADHD and their parents. Study participants were randomly assigned to one of two groups: (a) behavioral parent-training with routine care or (b) behavior parent-training. Inclusion criteria required that children meet the DSM-IV-TR diagnostic criteria for ADHD, obtained a full-scale IQ greater than 80, were between the ages of 4 and 12, and their parents had to be willing to participate in the BPT program. The BPT program was based on principles from Barkley's (1987) and Forehand and McMahon's manuals, which focused on helping parents set rules, give instructions, effectively communicate, positively reinforce their child's desired behaviors, and use punishment effectively. Parents in the BPT group received the intervention for 12 weeks (2 hours per session over 20 weeks). The parents who received the routine care intervention only received counseling, behavioral management, psycho-education, and

pharmacotherapy, and were able to contact their clinician when they deemed necessary. Parents were assessed using multiple measures, including the Child Behavioral Checklist (CBCL; Achenbach, 1991), Conners' Parent Rating Scale-Revised: Short Form (CPRS-R:S; Conners, 2001), the Adult ADHD Rating Scale (AARS; (Barkley & Murphey, 1998) the General Health Questionnaire 12 (GHQ-12; Goldberg, 1972), and the Competence subscale of the Parenting Stress Index (PSI; Abidin, 1983).

Results revealed that the scores on the CBCL (Externalizing) decreased significantly more for individuals who were receiving adjunctive BPT and routine community care ($p=.02$) than for those individuals only receiving routine community care. Additionally, scores on the ADHD index decreased significantly pre- and post-intervention; however, there was no significant difference found between the two treatment groups, which shows that for this particular sample, there was no additional benefit for BPT over routine community care. An interesting limitation to this study is that all data used to assess the efficacy of the treatment program was from the mothers of the participants. Because symptoms of ADHD usually affect the entire family system, future studies should include fathers' outcome data as well.

Limitations to BPT include the cost (expensive) associated with implementing behavior intervention programs, which may cause BPT to be overlooked as a potential treatment for children with ADHD. Moreover, BPT is not sufficient to improve the child's behavior in the classroom and his/her interactions with peers. Hence, this notion supports the best practice approach that BPT should be used in combination with behavioral classroom management techniques.

Behavior classroom management. Behavioral Classroom Management (BCM) is another well-established behavior modification procedure for ADHD. Most children who receive an ADHD diagnosis are initially identified within the school system; hence, behavior intervention techniques in the school system are also necessary. Although there is no agreed-upon definition of what constitutes classroom management, Evertson and Weinstein (2006) offer a framework that is widely accepted. In their model they outline five instructions for teachers for classroom management: (a) develop caring, supportive relationships with and among students, (b) organize and implement instruction that optimizes student learning, (c) use group management techniques so that students are encouraged to be engaged in academic tasks, (d) promote the development of social skills and self-regulation, and (e) use appropriate interventions to assist with behavior problems.

Additionally, contingency management procedures are used within the classroom in which individuals' behaviors are reinforced in accordance and correlation with their behavior. Specific examples of this approach include behavior contracts and daily report cards with the intent to reinforce positive and desired behaviors (DuPaul & Weyandt, 2006). Fabiano et al. (2010) investigated the effectiveness of daily report cards on improving student behavior and academic achievement to assist in classroom management. According to the literature, daily report cards (DRC) have been established as evidence-based interventions for ADHD (Owens et al., 2005; Pelham & Fabiano, 2008). DRCs help the target child stay on task by providing a list of operationalized goals and providing specific criteria to help the child meet the goals on a daily basis. Within this approach, the DRC is sent home and the parent rewards the child (based on the

reward system set up at home) on a consistent basis – thus promoting a home-school collaboration that may result in the child having a better outlook on school (Fabiano et al., 2010). This study included 63 child participants between (ages 6 to 12) who were randomly assigned to either an intervention group of 33 participants, which consisted of individuals receiving an individually-developed daily report card, or assigned to a “business as usual” control group (BAU) of 30 participants, from October to May.

In the DRC group, the teacher completed a report card and provided the child and parent with feedback based on the child’s progress for the day. In the BAU condition, children received an individualized target behavioral evaluation (ITBE) that was based on the child’s IEP goals (Pelham et al., 2005). Although the children in this group received an ITBE, this approach was only used as a rating scale to monitor functioning, rather than an intervention. Outcome measures included the following: the Woodcock-Johnson III Tests of Achievement (WJ-III) to measure academic achievement; the Academic Performance Rating Scale (APRS) to measure teacher perceptions of student academic performance; the Impairment Rating Scale (IRS) to measure teachers’ perceptions of children’s problems; behavior observations; and researcher-developed parent and teacher satisfaction surveys (DuPaul, Rapport, & Perriello, 1991; Evans, Allen, Moore, & Strauss, 2005; Woodcock et al. 2001).

Based on frequency counts of classroom rule violations at pre- and post-intervention, there were significant mean differences ($p=.0007$) between the reduction in classroom violations for children in the DRC group (baseline: 12.0; end-point: 7.6) and children in the BAU group (baseline: 9.51; end-point: 12.02). Significant improvements

in both academic achievement ($p=.043$) and IEP goal attainment ($p=.013$) were also found for children in the DRC group versus children in the BAU group.

As noted in the previous study, DRCs are a very effective behavioral classroom management technique for behavior change with children who suffer from ADHD. However, there are notable limitations to this approach and other techniques. In order for behavioral classroom management techniques to be beneficial, for instance, consistent implementation is necessary. Unfortunately, teachers are not always willing or able to implement programs with fidelity, which decreases the effectiveness of the intervention (Chronis et al., 2006). Lastly, because the majority of a child's daily activities take place in the home and school environment, interventions should be implemented in both environments. Multiple studies have found that when implemented effectively, the combination of BPT and BCM techniques can have small to large significant effects on children's academic performance at school and their behaviors within the home and school environment (Corkum, Mckinnon, & Mulane, 2005; Cox, 2005; Shepard & Carlson, 2003).

Combination of behavior parent training and behavior classroom management.

Because the majority of a child's daily activities take place in the home and school environment, it is important to highlight the effects of combining behavior parent training and behavior classroom management on the child's functioning. Cox (2005) conducted a meta-analysis to investigate the effectiveness of combined BPT and BCM. The meta-analysis included 18 empirical studies that were conducted between 1980 and 2002 in the United States. The studies were evaluated according to the American Psychological Association's Division 16 Task Force on Evidence Based Interventions in

School Psychology (Kratochwill & Stoiber, 2002). Cox reported that overall home-school interventions are most effective when there is constant communication between parents and teachers and when both parties effectively implement the intervention and reward systems on a consistent basis. In addition, when implemented effectively, the combination of BPT and BCM can have small to large significant effects on children's academic performance (effect sizes ranging from .007-.45) and behaviors (effect sizes ranging from .22-3.85) within the school environment.

Corkum, McKinnon, and Mullane (2005) conducted a study to examine whether including a behavior classroom management component would result in additional behavioral benefits over a traditional behavioral parent-training program. The researchers recruited parents and teachers of 6-12 year old children ($n=30$) who met diagnostic criteria for ADHD according to the DSM-IV-TR. These participants were randomly assigned to either a 10-week parent training session only or parent training plus teacher training. In both groups, parents received training related to general information about ADHD, parenting stress, and effective use of behavioral management strategies (e.g. time-out and chart/point systems). Teachers also received information on how to effectively manage classrooms with disruptive children through the utilization of behavior management techniques (similar to techniques that were discussed in parent sessions).

Parents and teachers were pre- and post-tested with multiple measures including the CPRS and the CTRS, the AKOS-R (parents) and the Teacher Feedback Questionnaire (TFQ; McKinnon, 2000). The study results revealed that parents in both groups reported a reduction in their children's level of ADHD symptoms and oppositional behaviors (p

<.001) from pre- to post-intervention; yet, there was no significant difference found in regard to parent knowledge from pre to post intervention ($p > .05$). The results also revealed that, when compared with children whose teachers did not participate in the study, children whose teachers participated in the study reported increased reductions in ADHD symptoms compared ($p < .01$) to children whose teachers did not participate in the intervention. These results suggest that combining parent and teacher training programs may yield beneficial outcomes in both the home and school setting. As with BPT and BCM used as an individual intervention, there are also limitations to the combination of both methods. The most notable limitation relates to whether the interventions are not implemented on a consistent basis and there is a lack of communication between parents and teachers, thus the interventions may not produce improved outcomes. The integration of both methods, therefore, requires a significant amount of time and resources; but, if implemented correctly, the combination of both methods suggests a higher level of effectiveness (Cox, 2005).

Summer Treatment Programs. The implementation of peer-oriented interventions in peer and recreational settings is a well-established psychosocial treatment. The most studied behavior peer interventions include summer treatment programs. These programs are intense programs that consist of hours of skill building, promoting positive peer interactions, building social skills, improving academic functioning, and helping children learn to manage their own behaviors (Chronis et al., 2004). Sibley, Smith, Evans, Pelham and Gnagy (2012) conducted a study that examined the efficacy of a summer treatment program with 34 adolescents. In order to be included in the study, participants had to have a diagnosis of ADHD, were at least 12 years of age,

obtained a Verbal IQ higher than 80, and had no conditions that would restrict them from consuming stimulant medication or participating in the summer treatment program activities. The program lasted for eight weeks and consisted of learning academic, organizational, leadership, career, and social skills that are necessary for success in the secondary school setting. Additionally, the researchers ensured that the parents of the adolescents were heavily involved in the program to help with parent-teen collaboration and that there was also time for parents to participate in group-parenting sessions. Adolescents were divided into six medium groups (8-13 individuals), which were chaperoned by lead counselors and undergraduate students.

In order to examine the efficacy of the summer treatment program, the researchers used the Improvement Rating Scale (Pelham et al., 2000), which assesses the parent's rating of their adolescents' degree of improvement on a 7-point Likert scale. Additionally, the IOWA Conners' Rating scale (Pelham, Milich, Murphy, & Murphy, 1989) was used to obtain parents' ratings for their child's hyperactive and oppositional behavior. Results revealed that overall all parents rated their child as having improved in all domains

Although the summer treatment program was found to be effective in improving behavior, it should also be noted that effects are not maintained unless the treatment program is implemented on a consistent basis. Researchers reported that the removal of the consistent behavior modification techniques for even a day decreased the effectiveness of the program (Chronis et al, 2004). Another limitation to summer treatment programs is that they are relatively brief interventions, which may not be able to have an effect on the individual's maladaptive behavior patterns that have developed

over the course of their life. Because children and adolescents spend the majority of the time with his or her parents and teachers, clinicians should focus on the effects of both behavioral parent interventions and behavioral classroom management strategies in the long-term management of ADHD symptoms. Last, it is also important to note that these summer treatment programs are very expensive (Pelham & Fabiano, 2008), which may deter some parents from seeking this service for their child or adolescent.

Combination of medication and psychosocial treatments. The combination of medication and psychosocial treatments and medication treatment alone have been demonstrated to be the most efficacious treatments for reducing the core symptoms of ADHD, which include inattentive and hyperactive/impulsive behaviors (Pelham et al., 2014; Van Der Oord et al., 2008). Furthermore, results from the MTA study demonstrate that the combination of treatments provided more benefits than the community care treatment group in the domains of disruptive behaviors, social skills, and parent-child relationships. Similarly, DuPaul and White (2006) found that the combination of medication and psychosocial treatments yielded the greatest improvement in children's school performance and their social skills. Although the research supports the combination of medication and psychosocial treatments as the most effective treatment for ADHD, the majority of individuals do not initially begin with a combined treatment. The research shows that only 14% of individuals begin their treatment regimen with the combination of both medication and psychosocial treatments (Stein, Klein, Greenhouse & Kogan, 2012), which is minimal considering the extensive research base that supports the combination of medication and psychosocial treatments.

Fabiano et al. (2007) used a within-subjects design to investigate the single effects of behavior modification, methylphenidate, and the combination of both treatments on 48 children with ADHD (ages 6 to 12) in an analogue classroom. Children who were in the high behavior modification group received all standard behavioral treatments, which included learning classroom rules, the implementation of a point system, time-out, social reinforcement, daily report cards, classroom recess, and an individualized behavior program. Children who were in the low behavior modification group received a modified version of the behavioral treatment (e.g. instead of receiving rewards from their parents on a daily basis, they received rewards on a weekly basis). Children in the no behavior modification group received the same classroom rules, but they were not rewarded, nor could they lose points if they violated rules, and most of their rewards were awarded noncontingently. These three levels of behavior modification were crossed with placebo and three levels of methylphenidate (0.15, 0.30, and 0.60 mg/kg per dose). All doses were given three times a day and varied daily. Drug conditions were randomized to ensure that each child received each drug condition once per week. Children received the three lowest doses of medication four times when crossed with each behavioral condition and received the .60mg/kg three times within each behavioral condition.

Results revealed that a combination of low dose behavior management and a low dose of medication (15 mg) were just as effective as either a high dose of medication alone or high behavior medication alone, which is similar to results found in the literature (Pelham et al., 2014). Both studies show that parents may be able to lower the dose of medication used for children if they work with the child's teacher to implement effective behavior interventions. One potential limitation to this study is once the participants

received a higher dose of medication alone, a ceiling effect may have been reached, limiting the effectiveness of the high drug dose, which could have impacted the results. Up until now, the literature review has focused on the overall assessment and treatment of ADHD. The next section will focus on the disparities in diagnosis in ADHD between Caucasian children and children who belong to ethnic minority groups.

Disparities in ADHD Diagnosis and Treatment

Consideration of cultural factors (certain belief systems) that may influence diagnosis and treatment of ADHD is important for school psychologists serving an extremely diverse population of students (Flanagan & Ortiz, 2002). In addition to cultural factors that may influence an individual's beliefs about ADHD, there are other culture-related explanations that may affect service utilization in ethnic minority groups including mistrust of medical professionals and previous mental health services that were of low quality. This section will review the existing literature about the disparities in ADHD diagnosis and treatment.

The impact of racial and ethnic differences on the assessment and treatment of ADHD is an area that requires additional research (Morgan, Staff, Hillemeier, Farkas & Maczuga, 2013; Pelham et al., 2005; Pham, Carlson & Kosciulek, 2010). According to Froelich et al. (2007), approximately 8.7% of African American children, 6% of Hispanic American children, 5% of Asian American Children, and 9.8% of Caucasian American children were diagnosed with ADHD ($n=3082$; age range: 8-15). A number of studies have examined racial/ethnic differences on rating scales (e.g. Conners) and provide evidence for differences between groups, suggesting that African American children have

higher scores on certain rating scales based on teacher report in regard to ADHD than European American children (Bussing et al., 2008; Epstein et al., 2005).

In contrast to teacher reports, African American and Hispanic American parents are less likely to rate their child as having ADHD symptoms. Pastor and Reuben (2005) as well as Stevens et al. (2005) investigated the influence of racial and ethnic differences in ADHD identification and found that African American and Hispanic American children were less likely to be diagnosed with ADHD based on parent report. These parents were also less likely to use medication for their child with ADHD. In addition, African American parents hold the belief that African American and Hispanic American children are diagnosed too quickly with ADHD by professionals compared to their White peers (Olaniyan et al., 2005). It has also been reported that African Americans are less aware about symptoms of ADHD and, subsequently, attribute their child's functioning to certain things like levels of sugar intake and exercise level (Bussing, Gary, Mills, & Garvan, 2007).

Schmitz and Velez (2003) reported that Mexican American mothers and Puerto Rican American mothers are more likely to report their children as having hyperactive symptoms than are Mexican mothers; thus providing evidence that the degree to which parents have assimilated within the American culture may have an influence on their perceptions of ADHD. The limited research reports Asian American families are more likely to have negative attitudes towards a diagnosis of ADHD, report that their children are not responsible for their ADHD related impairments, and in some cases parents were reported to be in denial about their children having an ADHD diagnosis (Mah et al., 2007; Walker et al., 2008).

Caucasian American parents are more likely to rate their child as having ADHD symptoms than parents from other groups, and are more likely to seek information about the disorder (Hillemeier, Foster, Heinrichs, & Heier, 2007; Stevens et al., 2005). Taken together, this research highlights the need for clinicians to be aware of these variations in ADHD knowledge, awareness, acceptance and attitudes across racial/ethnic groups if they are to incorporate consideration of these factors into the ADHD identification process.

There are racial/ethnic differences in treatment seeking and adherence as well as disparities in ADHD diagnosis and identification. Although there is an existing literature base for well-established treatments for ADHD, Caucasian American families are more likely to use these services compared to ethnic minorities (Bailey, 2005; Morgan et al., 2013; Olaniyan et al., 2007; Rothe, 2005). Rowland et al. (2002) reported that, compared to 76% of Caucasian children who were taking medication for ADHD, only about 50% of Hispanic and African American children were using medication. Kazdin and Weisz (2003), and Pham, Carlson, and Kosciulek (2010), reported that a potential reason for this disparity in the use of different services is possible cultural beliefs that may influence how these families perceive ADHD itself, which in turn may influence parents' decisions to seek and adhere to treatment. Other barriers to treatment for ethnic minority youth include lack of financial resources, lack of reliable transportation, and lack of knowledge about ADHD treatment (Eiraldi et al., 2006; Hervey-Jumper et al., 2009). African American parents, specifically, are less likely than Caucasian American parents to be aware of treatments for ADHD and less likely to request services for medication and school-based treatments (Pham et al., 2007). Additionally, African American and

Hispanic American parents are more likely to prefer and seek counseling or behavior-based interventions over medication and, overall, are not satisfied about medication use for their children, for which they think will consequently lead to drug abuse later in life (dosReis et al., 2003; Olaniyan et al., 2007). Asian American families are less likely to seek treatment due to the stigma associated with mental health illnesses in their ethnic group and heightened reliance on the family system to help with improving their child's behavior (Tannebaum, 2007; Walker et al., 2008). Furthermore, the number of probably and possibly efficacious treatments that are available for ethnic minority youth are limited. Based on a meta-analysis conducted by Huey and Polo (2008), recent research provides evidence that behavioral intervention combined with stimulant medication is a probably efficacious treatment for African American and Hispanic youth with ADHD.

Disparities in ADHD Diagnosis and Treatment: Teacher Perspectives.

Dominguez de Ramirez and Shapiro (2005) found that Hispanic teachers reported higher mean scores on rating scales assessing for hyperactivity, as compared to White teachers – but only for their ratings of Hispanic children. Asian American children have also been rated as being more hyperactive than European children based on teacher ratings (Sonuga-Barke, Minocha, Taylor, & Sandberg, 1993). These ratings, however, were not consistent with direct observations, which demonstrated that the Asian American students were less than their European peers. More recent research on Asian American children and ADHD supports this finding, indicating that Asian American children, when compared to other ethnic minority children, have the lowest ratings on hyperactivity symptoms (Gamarra, 2003; Redden et al., 2003 Root & Resnick, 2003).

Research investigating teachers' acceptability towards intervention has shown that teachers prefer interventions that are brief and minimally intrusive, and they prefer behavior interventions to medication (Curtis et al., 2006; Sherman, Rasmussen, & Baydala, 2008). Furthermore, if a teacher objects to a recommended intervention, it is unlikely to be implemented in the classroom (Vereb & DiPerna, 2004). Teacher acceptability of ADHD treatments and their willingness to recommend certain treatments may also differ depending on a student's cultural background. Wood et al. (2009) found that teachers were less likely to recommend interventions that involved families for students from non-Caucasian American backgrounds. Research also suggests that these differences in recommendations may be due to teachers' perceptions of how students' parents may view the intervention (e.g. African American mothers may be less likely to agree with medication use; Olaniyan et al., 2007).

In sum, the existing research in this section shows that Caucasian American parents are more knowledgeable about ADHD and more likely to utilize mental-health related services for their children with ADHD than are ethnic minority parents. Because the literature for teachers' level of ADHD knowledge, based on race/ethnicity is not established it is hypothesized that there would be a similar parallel with teachers. This is important because a difference in knowledge about the disorder based on race/ethnicity could indicate a need for culturally appropriate teacher education workshops. These trainings are necessary to inform teachers about ADHD assessment (e.g. having discussions with teachers about culturally appropriate behaviors) and treatment (e.g. importance of treatment fidelity) that is tailored to their specific child. Hopefully these culturally sensitive trainings could alleviate both parent (over-identification of minority

children with the disorder) and teacher (treatment fidelity) concerns about ADHD. An overview of teacher training and knowledge will be presented in later sections. First, however, the next section will review ADHD in the school system.

ADHD in the School System

Approximately 11% of school aged children, ages 4 to 17, in the United States have been identified as having ADHD (Centers for Disease Control and Prevention [CDC], 2013), with the average age of diagnosis being seven (American Psychiatric Association, 2012). Aside from having problems with inattention and hyperactive-impulsive behaviors, some children with ADHD suffer from multiple disabilities, such as oppositional defiant disorder and conduct disorder. In addition, Spencer, Biederman and Mick (2007) reported that the estimated prevalence (based on a restricted definition) for comorbid ADHD and learning disabilities was between 20 and 25%. In the school system, there is no specific special education eligibility category for children with ADHD. Under the Individuals with Disability Education Improvement Act (IDEIA), children who are affected by the disorder fall under the category of Other Health Impairment (OHI; IDEIA, 2004). Children with ADHD constitute the majority of students, 66.8%, receiving services under OHI (Schnoes, Reid, Wagner & Marder, 2006). In addition, students who meet the diagnostic criteria for ADHD and show that the disability negatively affects their educational performance are eligible to receive services under IDEIA. IDEIA also mandates that children with disabilities receive special education services in a “least restrictive environment”, which includes being able to interact with students without disabilities in the classroom.

All children who present with ADHD symptomatology may not qualify for special education services under IDEIA guidelines. Eligibility for services is determined by the assessment results presented in the individualized education plan (IEP) meeting that is attended by the child's teachers, parents, an individual from the special education assessment team, the principal, and any other professional that may have provided assessment for the child (e.g. speech pathologist).

Children who may need services but do not qualify under IDEA guidelines can be served under Section 504, which is a civil rights law that guarantees specific rights to individuals with disabilities and prohibits the use of discrimination of any individual based on his or her disability. Under Section 504 of the Rehabilitation Act of 1973, schools are required to accommodate the needs of these children. And once a student is determined to be eligible for services under Section 504, a plan is developed that includes a list of accommodations (e.g. providing the student with a working space where there are minimal distractions, aid with transitions, and providing time for physical activities for children who are hyperactive), which are geared towards reducing the effects of the child's symptoms on their educational performance (Low, 2012). Like some students served under IDEIA, most students receiving services under section 504 are educated in the general education classroom (Mastropieri & Scruggs, 2009). However, unlike IDEIA, there are no funds provided for accommodations under this law, but receiving services under section 504 in most cases seems to be a less strenuous process. The next section will review the research on the effectiveness of teacher training programs.

Teacher Training around ADHD

Given the prevalence of ADHD and the important role of teachers in helping to identify and intervene with children with ADHD, it would likely be beneficial for teachers to receive adequate training related to ADHD etiology, assessment, diagnosis and treatment options. Unfortunately, previous research indicates that teachers do not receive adequate training (Bieltz, 2010; Frye, 2011). Inadequate training could have serious negative implications for a student (e.g. teachers' lack of knowledge about ADHD could influence their ratings on ADHD rating scales). Moreover, such implications are particularly troubling considering statistics show that at least 11% of children in the United States will meet diagnostic criteria for the disorder.

Teacher training overview. Teacher in-services can be offered by local professionals who have expertise in the field, non-profit organizations with an interest in promoting ADHD awareness, and national professional organizations, such as the National Association of Special Education Teachers (NASSET). A well-known organization, Children and Adults with Attention-Deficit/Hyperactivity Disorder (CHADD) also provides trainings for parents and teachers of students with ADHD. This organization provides intense all-day training programs that focus on informing teachers about common symptoms, interventions, and learning strategies for children with ADHD. Teachers involved in these programs are specifically informed about how to encourage positive behaviors, how to incorporate peer-to-peer instruction for students, and how to incorporate more visuals in their lectures to increase student attention.

Similarly, the NASSET teacher training program focuses on helping teachers to identify characteristics of children with ADHD, legal requirements when working with

children with ADHD, evaluation procedures, treatment options for children with ADHD, and helpful academic and behavioral management tips for working with children who are affected by ADHD (NASET, 2007). Although there are trainings that have been developed to increase the level of teacher knowledge about ADHD, the literature shows that most teachers believe they are not adequately trained on ADHD during their undergraduate career, currently report below average ratings for the levels of ADHD training, and report that they could benefit from more ADHD training (Bieltz, 2010; Frye, 2011; Jones & Chronis-Tuscano, 2008).

Teachers' Opinions on Training. Bussing et al. (2002) conducted a study that included approximately 360 general education teachers in the Florida area to assess their opinions about their ADHD training. They studied sources of general education teachers' information about ADHD and teachers' perceived ability in working with children with ADHD. Demographic data and information related to where teachers received their knowledge of ADHD training were collected using the Teachers' Knowledge and Attitudes about ADHD survey (Jerome, Gordon, & Hustler, 1994). A survey developed by Reid, et al., (1994) was used to collect information on teachers' perceived ability in working with children with ADHD. Participants were asked about the amount of training received in regard to ADHD in their programs, 50% stated that they had not received any training about ADHD in their program, 30% stated they received minimal training, and 20% stated they had received intense training (Bussing et al., 2002). Overall, regardless of the training they had previously received, 94% of teachers stated that they wanted to receive additional training on ADHD.

In regard to teachers' perceived ability in working with children with ADHD, Bussing et al., (2002) found that teachers were less confident in their abilities to manage stress that resulted from working with children with ADHD, modify assignments for children with ADHD, or develop a successful behavior contract for children with ADHD. Findings from this study support the notion that ADHD training should be an ongoing process that begins in undergraduate training programs and continues throughout the teaching career. In addition, this longer-term approach should also focus on identifying ADHD symptoms, managing stress when working with children with ADHD, and supplying teachers with techniques for use in the development of effective behavioral interventions.

In a sample of 82 pre-service teachers at a university in the Southern United States, Frye (2011) examined teachers' views on the amount of training they had received in regard to ADHD. Additionally, the primary investigator developed and employed a demographic questionnaire in order to collect information relating to teachers' opinions about the amount of training they received. Specifically, the teachers were asked whether they had learned anything in their training program about ADHD. The subsequent results indicated that 50% of participants stated they had not learned anything about ADHD in their training program, while the other 50% stated that they had learned about specific symptoms and strategies for working with children with the disorder.

In a doctoral dissertation, Bieltz (2010) assessed levels of ADHD training and preferred sources of ADHD knowledge among graduate students in the fields of medicine, mental health, and education (Bieltz, 2010). Students from each field were asked to rate their level of ADHD training as either below average, average, or above

average. Of the education students, 57% reported below-average ratings for their level of ADHD training, while 42% of students in the medical field rated their training as below average. Almost all students in the mental health field rated their program as average in relation to training. Most students wanted to receive more resources and training from their graduate programs. Education students, specifically, wanted to receive more information about ADHD from workshops and classes. The results from this study also revealed that, although there was variability in how students from each field rated their graduate program level of ADHD training, graduate students from all fields were interested in receiving more training about ADHD.

Effectiveness of ADHD Intervention/Training Programs for Teachers

To the primary investigators knowledge, only two studies have assessed the effectiveness of ADHD training programs for teachers (Barbaresi et al., 1998; Jones & Chronis, 2008). Barbaresi et al. (1998) evaluated the effects of an established in-service training program on teachers' knowledge and stress in relation to ADHD. The sample included 44 teachers who worked for a small campus. These teachers were trained using an ADHD curriculum that was developed by CHADD. The intervention lasted for 2.5 hours and teachers were exposed to didactic trainings targeted at increasing knowledge about specific symptoms of ADHD, information about medication for ADHD, classroom-management techniques, and strategies for reducing teacher levels of stress when working with students with the disorder. Teachers were pre- and post-tested using a measure that was developed by the researchers to assess for ADHD knowledge, stress level and management techniques, and teachers' ratings of student behavior. At post-

intervention, results revealed that teacher level of stress had decreased in regard to working with children with ADHD.

At pre-intervention, almost half of the teachers were misinformed about the causes of ADHD, with 41% of teachers thinking that the disorder was caused by poor parenting or too much sugar. Results revealed that less than 10% of these teachers reported those beliefs, which shows that the intervention program may have improved teacher knowledge about ADHD causes. Although there was an increase in level of ADHD knowledge and a reduction in stress level reported by teachers, there were notable limitations to the study. These limitations include a small sample size (which may affect the generalizability of the results) and a lack of a control group to compare effects between two groups. Because there is a lack of a control group, the researcher cannot confidently conclude that the improvements in teacher knowledge about ADHD were entirely based on the intervention program or if teacher knowledge about ADHD improved due to other extraneous variables.

Jones and Chronis (2008) conducted a similar study investigating the efficacy of in-service training for ADHD assessment and treatment. Teachers ($n = 142$) were randomly assigned to either a training or a waitlist group. The researchers used a researcher-developed measure to assess ADHD knowledge. Teachers' use of behavior modification techniques was also assessed. The intervention program consisted of a general overview of ADHD (which included information on identification of ADHD), medication and psychosocial treatments, and specific classroom management strategies. The presenters provided handouts and daily report cards for the educators to supplement the information they were taught in the intervention program. The results revealed that

the training contributed to an increase in knowledge on a researcher-developed scale. Special education teachers specifically stated that they increased their use of behavior modification techniques after participating in the in-service training. A significant limitation to this study, however, was the researchers' inability to follow-up with teachers to identify any long-term effects of the intervention.

Research investigating the adequacy of teacher training related to teacher knowledge and attitudes about ADHD is limited. Since ADHD is among the most common psychiatric disorders in childhood, and because of its implications for school behavior and performance, there is a pressing need for additional research that focuses on teacher training for ADHD, the effectiveness of these training programs, and overall teacher knowledge in the area of ADHD. Because systematic study of those variables is limited, the next section will review the literature related to knowledge and opinions on a broader level and in other disciplines, followed by a review of studies of teacher levels of ADHD knowledge and opinions.

Knowledge and Opinions (Beliefs)

According to Anderson, Watt, Noble and Stanley (2012), knowledge is the extent of information about a subject that an individual can recall. The more experience an individual has with a certain subject the more information (knowledge base) the person will have to use as a basis for their behaviors and attitudes/opinions. Cognitive psychologists argue that knowledge serves to help individuals organize and retrieve information from memory and that it is also used to help individuals solve problems. Individuals store different forms (subtypes) of knowledge in their memory and these different subtypes of knowledge serve distinct purposes (e.g. preparing for an exam).

Even though the amount of knowledge an individual acquires and retains varies from individual to individual, researchers argue that individuals who share a similar culture are more likely to share similar schemas.

According to Schraw (2006) there are three forms of knowledge, which include declarative, procedural, and self-regulatory knowledge. Declarative knowledge is factual information about differing concepts and how they are related. An example of declarative knowledge is teachers having the knowledge that behavioral classroom interventions such as daily report cards and token economies have been effective for reducing the disruptive behavior of children with ADHD. Procedural knowledge is knowing how to use the information that we have acquired. An individual acquires procedural knowledge through his or her experiential learning. For example, teachers may be aware of the effectiveness of behavioral classroom interventions, however, if they have not been trained on how to use these interventions, they would lack procedural knowledge about behavior classroom interventions. Lastly, self-regulatory knowledge is knowledge about regulating one's thoughts and learning new information (Schunk & Zimmerman, 2006). Self-regulatory learning is necessary in order for individuals to process information and learn effectively. For example, a teacher uses self-regulatory learning when they have to decide when to use a specific behavioral intervention.

A form of declarative knowledge is semantic knowledge, which is acquired without reference to a place or time. It includes facts and abstract concepts. Two important features that make up semantic knowledge are that it is usually factual, and that it is organized into schemas. Schemas allow individuals to construct meaning based on prior knowledge and opinions (Schraw, 2006). When applied to learning new

information, schemas are beneficial in allowing individuals to learn information more effectively. However, schemas can also be problematic because when individuals already have knowledge organized in a specific way, it may be difficult for them to change their existing schema, which may cause them to disavow knowledge that does not fit in their existing schema.

A construct that is related to knowledge is that of opinions. Knowledge is thought to be factual, whereas opinions cannot be verified and have some degree of error (Barnes, 2013; Iniguez Taguena-Martinez, Kaski & Barrio, 2012). Additionally, most individuals will test their beliefs and opinions, but not their knowledge, because knowledge is accepted as true, whereas opinions are not. Opinions include beliefs and feelings that can be activated under different conditions and are evaluative in nature (e.g. helps one to determine if an individual approves or disapproves of a topic) (Giardini, Quattrocioni & Conte, 2011). According to Giardini et al. (2011) when opinions involve an evaluative component, they result from activating knowledge.

Opinions are composed of three different features. The first feature is that an opinion cannot be verified as true. For example, a teacher can provide a strong opinion that he/she believes that daily report cards are a better intervention for children with ADHD than are token economies. This opinion may be based on her experience with both interventions (e.g. one has worked for her with her students with ADHD, while the other has not), but does not mean that it is true for all cases.

The second feature is the degree of confidence an individual has in his/her opinions. The stronger the individual's confidence in their opinion, the more difficult it will be to change that individual's opinion when new knowledge or information is

presented. The strength of a personal opinion will increase according to the amount of evidence that person has to support his/her opinion. Using the previous example with the teacher who believes that daily report cards are more effective than token economies, if this teacher has had more positive experience (and has witnessed other teachers) with the effectiveness of daily report cards (whether based on data or child's overall improvement in functioning), then their opinion will continue to become stronger, thus making it more resistant to change.

The third feature of opinions is the extent to which an individual shares his/her opinion with others. If a person shares an opinion with others, the more likely he/she is to feel validated in his/her opinion, thus making their opinions even stronger. For example, continuing with the example above, if the target teacher believes and examines that other teachers in her school believe that daily report cards are more effective than token economies, the teacher's opinion is likely to become even stronger.

Over time, long-standing opinions influence one's views about the importance of information and individuals usually seek information or knowledge that supports their opinions (Mojzisch, Schultz-Hardt, Kerschreiter & Frey, 2008). As mentioned previously, an individual will disavow or reject information that does not fit into his/her already existing schema (Mojzisch, Schultz-Hardt, Kerschreiter & Frey, 2008). It can thus be concluded that one's beliefs or opinions can be influenced by the information or knowledge they possess, or based on our belief systems this may affect our willingness to accept or reject knowledge if it does not fit into our current beliefs. For example, individuals may be presented with research-based information that medication is effective for children with ADHD, but may choose to reject this knowledge if it contradicts with

their current beliefs or opinions that children should not be medicated. This relationship between knowledge and beliefs/opinions forms the basis of a critical research question in the current study (i.e. to determine if teachers' opinions about ADHD are a significant predictor of their knowledge about ADHD).

Although the literature revealed a study (Snider, Busch & Arrowood, 2003) that assessed for teacher ADHD knowledge and teacher ADHD opinions independently, no studies were found that assessed the relationship between teacher knowledge and teacher opinions about ADHD; however, researchers have explored the relationship between parent knowledge and parent opinions about the ADHD (Bennett et al., 1996; Corkum et al., 1999; Rostain et al., 1993). Bennett et al. (1996) assessed parents' readiness to pursue treatment for their child's ADHD symptoms and their adherence to recommended treatment. Participants included 87 mothers and 63 fathers whose children were patients at an outpatient clinic. The parents completed the AKOS-R, which during this study revealed three factors: Counseling Acceptability, Counseling Feasibility, and Medication Acceptability. Results revealed that parent knowledge about ADHD had a positive correlation with medication acceptability. The findings in this study were inconsistent with the results in the Corkum et al., (1999) study, which examined the relationship between parents' opinions of treatment and knowledge of ADHD and the impact these two variables have on adherence to and enrollment in interventions for children with ADHD. Participants were parents of 81 children with ADHD, who were referred for an ADHD treatment study that involved both pharmacological and psychosocial interventions. Parents completed the AKOS before the treatment study, which was a 12-month randomized trial of medication and parent trainings. Enrollment and adherence to

treatment were monitored over the 12-month period. Results revealed that a higher level of ADHD knowledge was positively correlated with more positive opinions about psychosocial interventions, but had a negative correlation with opinions about medication. Increased negative opinions about ADHD medication could be due to parents having more knowledge about medication side effects.

Given what is understood about parent opinions and knowledge about ADHD, it is logical to assume that a similar dynamic exists between these concepts when considering teachers. Teachers spend a significant amount of time with children and have the opportunity to have a critical influence. Teachers' beliefs or opinions about ADHD may influence many decisions teachers make including, their decision to seek information about the disorder and their willingness to use specific interventions.

Teacher Level of ADHD Knowledge

Jerome, Gordon, and Hustler (1994) conducted one of the first studies (to the author's knowledge) that examined teachers' level of ADHD knowledge. The results from this study, as well as additional studies that have been conducted within the past 20 years, will be presented to provide an overview of the literature in regard to teacher knowledge about ADHD. Jerome et al. (1994) investigated American and Canadian teachers' knowledge and attitudes about ADHD. Participants included 439 American teachers and 850 Canadian teachers. Teachers' knowledge was assessed with a researcher-developed questionnaire that evaluated teacher knowledge of diagnosis, treatment, and long-term ADHD effects. Results illustrated that teachers had minimal in-service training in regard to ADHD. Despite their limited amount of training, however, teachers were still able to perform well on the knowledge-based etiology and educational

implications questions, but were less knowledgeable about the evidence-based treatments for the disorder. For example, some teachers believed that dieting was an effective treatment for ADHD. Results also revealed teachers were unaware of the chronicity of ADHD symptoms, with most teachers believing ADHD symptomatology only manifested in adolescence. One limitation to this study was that the researchers only included in-service teachers in their sample.

Sciutto, Terjesen, and Bender Frank (2000) also investigated teachers' knowledge and perceptions about ADHD. Participants included 149 elementary school teachers who were assessed with the Knowledge of Attention Deficit Disorders Scale (KADDS), which was developed by the researchers. The KADDS was developed to assess the following three ADHD dimensions: symptoms, general information, and treatment. Findings revealed that teachers were not as knowledgeable about ADHD treatment and general information as they were about symptomatology, with nearly 80% correctly identifying symptoms, such as fidgeting and distractibility. The data also suggested that teachers' common misperceptions about the disorder included sugar intake and improper dieting as causes of ADHD.

Exposure to children with the disorder and years of experience as a teacher were positively correlated with higher scores on the KADDS. For instance, teachers who had worked with a child who was diagnosed with ADHD had a significantly higher score ($p < .001$) on the measure than teachers who had not taught a child with ADHD. Lastly, Sciutto, Terjesen and Bender-Frank (2000) found that although teachers were knowledgeable about the "hallmark" symptoms of ADHD, they were less knowledgeable about characteristics that would distinguish children with ADHD from children who do

not have the disorder. This finding has important implications because equipping teachers with information to help distinguish children with a disorder could aid in decreasing inappropriate referrals. One notable limitation of this study was that the sample used for this study was not diverse with regard to ethnicity, gender and educational experience. This is important because it may have affected the generalizability of the results.

Snider, Busch, and Arrowood (2003) conducted a study assessing the ADHD-related knowledge, opinions, and experiences of general education ($n = 200$) and special education ($n = 200$) teachers. ADHD-related knowledge, opinions, and information sources were assessed with a Likert scale questionnaire designed by the researchers. Teachers were also asked to indicate who they thought referred students for the disorder. Results revealed that less than half of the questions were correctly answered by 50% more of the respondents, with no statistically significant difference in scores between general education and special education teachers. When asked about their experiences with and attitudes about children with ADHD, the majority of teachers (both special education and general education) believed medication was beneficial for helping children improve their grades and their peer relationships. However, special education and general education teachers were more likely to disagree on the efficacy of interventions for the management of ADHD, the likelihood of children using medication throughout adolescence, and the rate of ADHD diagnosis (Snider, Busch & Arrowood, 2003). For example, special education teachers were more likely than general education teachers to agree that medication was effective in helping to improve the overall school performance of children with ADHD (e.g. improve test performance and grades).

Additionally, when compared to special education teachers, general education teachers were less likely to agree with students remaining on medication into adulthood, as well as less likely to be able to differentiate between symptoms of hyperactivity and inattentive children with ADHD. The results also revealed that special education teachers were more involved in the ADHD referral process than general education teachers. Over half of the teachers (66%) stated that teachers were the first individuals to refer children for ADHD assessment, which is consistent with previous research findings (Frankenberger, Fatmer, Parker, & Cermak, 2001). One limitation to the study is the validity of the measure that was used to collect data. For example, the researchers stated some of the questions may have been misleading or not appropriately worded, which could have affected teachers' response patterns. Another limitation to this study is that the researchers did not assess if teachers' opinions on certain topics about ADHD were predictive of their ADHD knowledge.

Similar to the previous studies, Kos, Richdale, and Jackson (2004) investigated teachers' level of ADHD knowledge – specifically, comparing practicing teachers and teachers-in-training in terms of level of ADHD knowledge. Participants included 120 elementary school teachers and 45 teachers in training who were in the process of completing the last year of their program. Teachers completed a researcher-developed instrument for the purpose of the study that compared their perceived level of knowledge to their actual level of ADHD knowledge. The researchers measured perceived knowledge by having the teachers rate their level of ADHD knowledge as either having “very little” or “a lot” of knowledge. The researchers measured actual knowledge by having the participants respond to 27 statements with either “true”, “false”, or “don't

know” responses. The actual knowledge section included questions related to symptomatology and treatment.

The results of this study revealed that ADHD knowledge and experience in teaching were not positively correlated; nevertheless, teachers with more experience were more likely to rate themselves as being more knowledgeable than teachers with less experience. This finding is contrary to the evidence Sciutto et al. (2000) and Jerome et al. (1994) found in their respective studies. Although differences were found between the three studies, this discrepancy could be due to differences in teacher training, such as the university the teacher attended and teacher characteristics based on geographic location (i.e. teachers in rural areas versus teachers in urban areas). Overall, the Kos, Richdale, and Jackson (2004) study revealed that in-service teachers did score higher on the actual knowledge section of the questionnaire than pre-service teachers. This finding may be due to the limited amount of experience pre-service teachers have had with ADHD. The researchers concluded that the majority of the correlations found were weak in nature, and that there may be other variables that affect teachers’ level of ADHD knowledge, such as their attitudes and opinions about the disorder. This limitation demonstrates the need for future research that focuses on addressing the influence of teacher opinions on their level of ADHD knowledge.

Stormont and Stebbins (2005) conducted a study to investigate preschool teachers’ knowledge and opinions about ADHD and to determine whether years of experience were associated with higher levels of ADHD knowledge. The participants, who were primarily Caucasian females (82%), included 138 preschool teachers who taught children between the ages of three and six years of age. The study participants also

completed the Preschool ADHD Questionnaire (Stormont & Stebbins, 2005)– a survey designed to assess knowledge and experiences related to ADHD. The survey consisted of three sections that assessed for demographic information, diagnostic information, and knowledge of special education law. The preschool teacher variables selected for investigation included level of education (i.e., high school, undergraduate, graduate), currently having a child with ADHD in their classroom, and years of experience.

Education level had a positive correlation with level of ADHD knowledge, with teachers who had earned graduate degrees obtaining higher scores on the questionnaire than teachers in other groups (Stormont & Stebbins, 2005). This finding has important implications because it demonstrates that extended training does have an effect on increasing teacher level of ADHD knowledge. The researchers also found that 68% of the teachers believed medication was overprescribed for children with ADHD, which is contrary to previous findings from elementary school teachers (Kasten et al., 1992). However, this may be due to preschool teachers believing the population they work with may be too young to be medicated, as compared to elementary school teachers. One major limitation is the limited generalizability of the results, given that the sample mainly consisted of Caucasian, middle-aged, women.

Vereb and DiPerna (2004) explored the relationships between teacher level of ADHD knowledge, knowledge about treatment, and teachers' acceptability of ADHD treatment methods. Participants included 47 general education and special education elementary school teachers. Of the overall sample, 94% were female, and the average years of teaching experience was 13. In addition, the researchers developed an instrument called the Knowledge of ADHD Rating Evaluation (KARE) for the study, which was

used to measure teacher knowledge of ADHD, medication knowledge, medication acceptability, and behavior management acceptability. This measure includes 47 questions presented in a true/false format and a Likert scaled format. This study's results revealed that teachers' level of ADHD knowledge was unrelated to their level of knowledge in regard to ADHD treatment, which may support the notion that when assessing teachers' level of ADHD knowledge these two categories should be separate. The researchers also found that years of experience teaching was only correlated with teachers' ratings of medication acceptability. Teacher training was positively correlated with level of ADHD knowledge and behavior management strategies, but was unrelated to teacher level of treatment knowledge. A significant limitation to this study was the representativeness of teachers from different backgrounds. There was, for instance, an underrepresentation of teachers from diverse school districts, including teachers from urban districts, which limits the generalizability of the results.

Ohan, Comier, Hepp, Visser and Strain (2008) conducted a study to investigate elementary school teachers' knowledge about ADHD and its impact on their behavior toward, and perceptions about, children with the disorder. The participants included 140 primary school teachers from Melbourne, Australia. Approximately 80% of the participants were female and about 60% identified as Caucasian. Demographic information was collected using a questionnaire that was developed based on the Jerome et al. (1994) study that assessed for information on gender, ethnicity, and other variables. Knowledge was also assessed by the 20-item self-report questionnaire that was utilized in the Jerome et al. (1994) study (discussed earlier in this review). In addition to using these two measures, the researchers used 10 vignettes of children who displayed behaviors

associated with ADHD to assess teachers' perceptions of children with ADHD. The researchers gave the teachers vignettes that were gender specific – half received vignettes about female children and the other received vignettes about male children. After the teachers reviewed the vignettes, they were asked to use a nine-pt Likert-scaled rating system to rate their perceptions of children with ADHD. The areas that the teachers rated included perceived benefit of treatment, and their expectations of teaching a child with ADHD.

Results revealed that teachers in this sample were most knowledgeable about symptoms of ADHD and least knowledgeable about treatments for the disorder, which is consistent with previous research (Jerome et al., 1994; Sciutto et al., 2000). Teachers who had scored above average to high on ADHD knowledge were more likely to seek help for their students with ADHD. However, these same teachers were not as confident in their ability to effectively manage their ADHD-diagnosed students. One notable limitation to this study was that the teachers rated behaviors based on vignettes rather than the behavior of children in their classroom, thus limiting the ecological validity of the study.

Canu and Mancil (2012) conducted a study to investigate if there were differences in pre-service teachers' knowledge of ADHD compared to their peers from diverse educational backgrounds. Over 900 individuals participated in the study (534 pre-service teachers and 377 undergraduates from different majors). In regard to the demographic make-up of the sample, both groups were majority female (approximately 75% in each group) and majority Caucasian American (over 90% in each group). One major difference between the two groups that should be noted is the years of college education

obtained before completing the study. On average, the pre-service teachers had three years of education, as opposed to the comparison group that had an average of .76 years of college experience, which could affect the outcomes of the study.

The researchers used the Knowledge and Beliefs Questionnaire (Kos et al., 2004), to assess the participants' level of ADHD knowledge. The questionnaire is composed of 27 perceived (e.g. how knowledgeable they thought they were) and actual knowledge questions. Perceived knowledge responses were based on a Likert scale, while actual knowledge questions were presented in a true or false format. Results revealed that overall, pre-service teachers scored significantly higher on both the actual and perceived knowledge scales compared to the comparison group. This result is expected considering that the pre-service teachers had more years of college experience and education than their peers in different majors. Although the teacher trainees were more knowledgeable than their peers, according to the researchers there is still area for growth in their level of ADHD knowledge. The results also revealed that teacher trainees had fewer misconceptions (e.g. myths) about ADHD, compared to individuals in the comparison group. This is a move in the right direction considering that teachers' misconceptions about ADHD could affect the ADHD referral process (e.g. understanding that ADHD affects both sexes and not overlooking symptoms in symptoms observed in females). Although this study provides important implications for the field of school psychology, and teacher training specifically, it is necessary to point out that there is one notable limitation: Although the researchers reported that the demographics of the individuals in the study were comparable to the individuals in the college as a whole, the sample was majority Caucasian, which limits the generalizability of the results.

Frye (2011) also conducted a study to investigate whether pre-service teachers' race/ethnicity and school level taught affected their level of ADHD knowledge. The participants included 82 pre-service teachers from the College of Education at a large, public university in the Gulf Coast region of the United States. Most of the study participants were female (98%), between the ages of 18 and 25 (78%), and were in the first two years of their training programs. The racial/ethnic breakdown of the participants was as follows: European-American or Caucasian of any Race (52%), Hispanic American or Latino of any Race (25%), Asian American or Asian of any Race (10%), African American or Black of any Race (7.5%) and Other (5%). As for school level, a the majority (70%) of participants stated they planned to teach at the elementary school level. Participants completed a demographic questionnaire that was developed by the principal investigator, which assessed for relevant demographic characteristics, such as race/ethnicity, school level, and age. The AKOS-R (Bennett, Power, Rostain & Carr, 1996), a measure developed to assess parent level of ADHD knowledge, was used to measure pre-service teachers' level of ADHD knowledge. The AKOS-R consists of 21 true/false questions that measure level of knowledge in relation to symptoms, treatments, and general information about ADHD.

Overall, the results of this study revealed that race/ethnicity and school level were not significant predictors of pre-service teachers' level of ADHD knowledge. However, these results should be viewed with caution due to the extent to which knowledge was measured. As for school level not being a significant predictor of level of ADHD knowledge, a possible explanation for this could be a result of the learning stage students had progressed to within their program by the time of the study. It is possible that these

students had not taken specific classes associated with the level they intended to teach upon completion of their degree, given that they were in the beginning stages of their programs, and had mostly begun taking introductory courses. Although this study is one of the first to investigate teachers' race/ethnicity and school level in relation to level of ADHD knowledge, there are limitations to this study. One notable limitation to this study (as with previous studies) is the small sample size, which limits its generalizability. Another limitation is that the sample was a non-randomized convenience sample, also limiting the generalizability of the findings. An additional limitation to this study is that only pre-service teachers were assessed. Adding a sample of in-service teachers would have been beneficial to ensure that there was a comparison group to assess possible differences in responses. Based on previous research, years of experience have been positively correlated with teacher knowledge about ADHD. Future studies should account for and address the limitations presented in this study in order to enrich the literature that is currently available on variables that affect teachers' level of ADHD knowledge.

Conclusions

Based on the studies reviewed in this section, one can conclude that teachers may be more knowledgeable about specific ADHD symptomatology than they are about specific treatments and general information. While level of teacher experience has been positively correlated with teacher level of ADHD knowledge, this finding has not been consistent across studies (Jerome et al., 1994; Kos, Richdale & Jackson, 2004; Sciutto, Terjesen & Bender-Frank, 2000). Additionally, the relationships between level of ADHD knowledge and other demographic variables (e.g., race/ethnicity, school level, and

specialty area) have either been assessed minimally or have not been assessed. This study also sought to address these limitations to the existing research base, and to address other ADHD-related topics, such as overall teacher opinions about ADHD (about medication, etc.). Additionally, because the literature shows that in general beliefs and opinions are related to an individual's knowledge base (and the knowledge the individual may choose to accept or reject) the relationship between teachers' ADHD knowledge and opinions about medication were also assessed to assess if there was a similar relationship. This was specifically connected to both survey measures that were used in the study. For example, if an individual does not believe that medication can help his/her student (statement one from the Teacher Opinions about ADHD scale) then this may affect their knowledge base about stimulant medications being the most common drug prescribed for ADHD (question 25 from the KADDS).

Additionally, if a teacher does not believe that medication for ADHD is basically safe (statement three from the Teacher Opinions about ADHD scale) then this may affect their knowledge about the side effects to ADHD medication (question 15 from the KADDS). Teacher opinions about receiving additional ADHD training in general was also examined since previous research indicated that teachers desire more training on the topic of ADHD. Although previous studies have assessed whether teachers desired additional training about ADHD, this study went further to assess for teachers' opinions on the feasibility of attending ADHD training sessions. The next sections will discuss the research questions and hypotheses related to the study followed by the methodology and the results/discussion sections.

Research Questions

- 1.) Do teachers agree that attending training sessions are feasible and beneficial for working with children with ADHD?
- 2.) Are there differences between teachers' level of ADHD knowledge based on race/ethnicity?
- 3.) Are early primary level teachers more knowledgeable about ADHD than later primary teachers?
- 4.) Is specialty area a significant predictor of level of ADHD knowledge?
- 5.) Is years of experience the predictor that accounts for the most variance in level of ADHD knowledge?
- 6.) Are there differences in teachers' opinions about ADHD (medication acceptability, information session acceptability, information session feasibility, teachers' ability to cope, and opinions about student misbehavior) based on their race/ethnicity, school level taught, specialty area, and years of experience?
- 7.) Are teacher opinions of ADHD medication a significant predictor of teacher knowledge about treatment for ADHD?

Hypotheses

1. Teachers agree that attending training sessions are feasible and beneficial for working with children with ADHD. (Existing research indicated that teachers were interested in obtaining more training about ADHD.)
2. There are differences between teachers' level of ADHD knowledge based on race/ethnicity. (Existing research indicated disparities in identification

between racial/ethnic groups with African American children being identified at higher rates than other children; however, the research on the influence of teacher race/ethnicity in regard to teacher knowledge about ADHD is not well established. This is important because a difference in knowledge about the disorder based on race/ethnicity could indicate a need for culturally-appropriate teacher education workshops.

3. Early primary teachers are more knowledgeable about the disorder than later primary teachers because more students are referred for ADHD during their early primary years.
4. Specialty area is not a significant predictor of level of ADHD knowledge based on some previous research, although findings have not been well established.
5. Years of experience is the predictor that accounts for the most variance of knowledge of ADHD, based on previous research.
6. There are differences in teachers' opinions (medication acceptability, information session acceptability, information session feasibility, teachers' ability to cope, and opinions about student misbehavior) about ADHD based on their race/ethnicity, school level taught, specialty area, and years of experience. (To the knowledge of the author, this is the first study to examine these variables and their relation to teacher opinions.)
7. Teacher opinions of ADHD medication are a significant predictor of teacher knowledge about treatment for ADHD based on existing research. (This

hypothesis is based on the literature that there is a relationship between knowledge and opinions in general).

Chapter III

Methodology

Participants

According to Field (2009) and Cohen (1988), with a medium effect size ($d=.30$), a sample size of 200 participants was sufficient to obtain a reliable regression model. Both pre-service and in-service teachers were sampled so that the principal investigator could assess a range of teachers' knowledge and opinions about ADHD. Assessing both current and past students allowed the principal investigator to assess different experience levels in relation to teachers' level of ADHD knowledge and opinions.

Furthermore, assessing former and current students from multiple universities allowed for a more diverse group of pre-service and in-service teachers, particularly with regard to race/ethnicity, school level, levels of experience, and specialty area. Participants in this study included 200 pre-service and in-service teachers with a focus on primary education from the Quality Urban Education for Students and Teachers Program in the College of Education at the University of Houston, current and past students from the comparable program at the University of Houston-Downtown, which is in the Department of Urban Education, and current and past students from the University of Houston of Victoria (School of Education and Human Development).

Participants from different ethnic and age demographics made up the total sample. A total of 337 individuals attempted the survey, but only 200 completed the survey and were included in the data analysis. This number was sufficient based on the power analysis. The sampling method used was a convenience sample since the participants came from already-established programs. Additionally, the participants self-selected to

participate in the online study. Demographic information for the sample will be presented in the results section.

Measures

Demographic questionnaire. Participants completed a demographic questionnaire that consisted of several items that asked about their age, gender, ethnicity, school level, and other relevant variables (see Appendix D).

Knowledge of Attention Deficit Disorder Scale (KADDS). The KADDS is a scale that was developed by Sciutto and Feldhammer (2000) in order to investigate teachers' knowledge and perceptions of ADHD (see Appendix E). The KADDS is a 39-item scale (true/false format) that assesses the following three domains related to ADHD: (a) symptoms/diagnosis of ADHD, (b) ADHD treatment, and (c) general information about ADHD. According to the author of the manual, these scales were included to reflect diagnostic and other relevant content areas related to ADHD. Approximately 40 clinical and school psychology students determined which items comprised each subscale by placing items in the different subscales. Items were assigned to a subscale if 75% of the sample was in agreement. Individual items for the KADDS were included if they were proven to be well documented and empirically-supported. Initially, 27 true-false items were administered to 73 pre-school and elementary school teachers. The final scale, which was administered to 63 prospective teachers, had a coefficient alpha of .81. Moderate levels of internal consistency were found for all three subscales of the measure ($.52 < \alpha < .75$). In order to test the stability of the KADDS, the authors administered the KADDS to 185 college students with a two-week interval (Sciutto & Terjesen, 2004). Test-retest correlations were moderate to high ($.59 < r < .76$).

Validity research also provides evidence that experience in working with children who have been identified having ADHD were shown to positively correlate with an individual's score on the KADDS. For example, teachers who had taught children with ADHD were more likely to score higher on the KADDS ($p<.01$). There was also an overall difference in knowledge between college students who knew someone with ADHD versus those who did not know anyone with ADHD ($p<.01$).

Teachers Opinions About ADHD Scale. The Teacher Opinions About ADHD Scale was also completed by participants (see Appendix F). The original Opinions scale, The ADHD Knowledge and Opinions Scale-Revised (Bennett, Power, Rostain & Carr, 1996) was developed to assess parents' opinions about ADHD. In this study, however, the scale was modified to assess teachers' opinions about ADHD. The Teacher Opinions About ADHD scale consists of 24 Likert scaled items ranging from "strongly disagree" to "strongly agree". The scale also consists of five dimensions that assess for teachers' opinions of ADHD. The Parent Opinions About ADHD-subscale was normed on 87 mothers and 63 fathers (Power, Karustis & Habboushe, 2001) and has three factors: Counseling Acceptability, Medication Acceptability, and Counseling Feasibility. Internal consistency coefficients for each factor were high (Counseling acceptability, .85; Medication Acceptability, .89; and Counseling Feasibility, .76). Five-week test-retest reliability was conducted on a subsample of 23 parents and was as follows: Counseling Acceptability ($r=.59$), Medication Acceptability ($r=.91$), and Counseling Feasibility ($r=.92$). Predictive validity for all three factors was assessed. The authors employed a discriminant function analysis to examine whether parent ratings of Counseling Feasibility and Acceptability at intake could predict if parents would actually initiate

recommended counseling. Results revealed that the discriminant functional analysis was not significant for either mothers ($p=.40$) or fathers ($p=.87$), demonstrating that their ratings at intake were not predictive of actual adherence. However, externalizing problems that were reported by the parent did indeed predict the number of counseling sessions attended at follow-up ($p<.05$).

The primary investigator of the study under analysis added and modified questions to measure teachers' opinions about ADHD. Because the initial measure assessed for parent opinions about medication and counseling feasibility, the measure had to be adapted to assess for teachers' opinions about medication and their ability to attend training sessions to receive further training on ADHD. For example, a statement in the parent version of the subscale read, "I believe that medication could help my child with ADHD." In the modified teacher version, the statement is as follows: "I believe that medication could help my students with ADHD." Additionally, questions were added to address teachers' ability to cope with children with ADHD (e.g. student misbehavior). A provided statement is as follows: "My student's behavior is so difficult to control that sometimes I feel like a failure as a teacher," while the question in the original scale is as follows: "My child's behavior is so difficult to control that sometimes I feel like a failure as a parent." The primary investigator pilot-tested the survey on a sample of 35 participants composed of teachers and the general public who were recruited through a social media website, and no additional demographic information was collected from the participants. Component-extraction procedures were then conducted. Initially, components with eigenvalues above 1.1 were extracted (eight components). However, after item analysis and review, five components were extracted, which accounted for 74%

of the variance. Reliability coefficients were computed for individual components and the overall scale. The reliability analysis for the overall scale was moderate, with $\alpha = .60$. Reliability information for each component was as follows: medication acceptability ($\alpha = .83$), information session feasibility ($\alpha = .77$), information session acceptability ($\alpha = .79$), teachers' ability to cope ($\alpha = .73$), and student misbehavior ($\alpha = .81$). Although the original measure has established validity data (see Appendix H), currently there is no validity data established for the Teacher Opinions about ADHD scale. Predictive validity for the Teacher Opinions about ADHD scale will be assessed in hypothesis seven.

Procedure

Applications were submitted by the primary investigator to members of the Committee for the Protection of Human Subjects (CPHS) at the University of Houston, the University of Houston Downtown, and the University of Houston-Victoria. In order to obtain permission to send the survey link to both current and past students via departmental list-servs and email lists, training directors of all programs were contacted via email (a copy of the recruitment emails can be found in Appendices G and H) after the CPHS applications were approved by the respective committees. The list-serv that was used to send out the survey link to participants at the University of Houston was the Teacher Education List-serv. To reach students at the University of Houston Downtown, the secretary of the Urban Education program provided the primary investigator with individual emails of both current and past students from the program, and the primary investigator then sent the survey to the students via the email list. The list-serv that was used to send out the survey link to participants at the University of Houston-Victoria was the Student Education list-serv. Once the committees and the training directors had

approved the study, the participants were able to complete the survey online via survey gizmo.

A cover letter outlining the purpose of the study, the potential risks, as well as the possible benefits was presented prior to the survey instrument being administered. In addition, participants were informed that the study would take between 30-45 minutes to complete. Upon completion of the demographic survey, participants were presented with the KADDS, followed by the Teacher Opinions about ADHD scale. If the participants had any questions or concerns, they were informed that they could contact the principal investigator through email or via phone contact. Once the participants completed the survey, they were given the opportunity to enter their name into a drawing to win one of eight \$25.00 gift certificates. These gift certificates were awarded at the completion of data collection. Due to an initial failure to meet the required sample size, the survey was sent out to participants at the University of Houston four times over a six-month period, to participants at the University of Houston-Downtown two times over a four-month period, and to participants at the University of Houston-Victoria two times over a period of two months.

Once data collection was complete, the data were downloaded from Survey Gizmo to an excel file in order to be cleaned and transcribed. The data were then moved and saved into SPSS. The responses that made up the dependent variables had to be recoded, based on the coding scheme from the KADDS' manual. For the 39 KADDS items, the responses were recoded so that correct answers received a score of 1, while incorrect or "don't know" responses received a score of 0 (See Appendix I). Once all items were recoded, each participant received a score, which was based on the total

number of items they answered correctly. Score ranges on the KADDS range from 0 to 39.

The 24 opinion items were also recoded by assigning numbers to each Likert scale response, with Strongly Disagree recoded to 1, Disagree recoded to 2, N/A recoded to 3, Agree recoded to 4, and Strongly Agree recoded to 5. There were also six items that were negatively-worded and a reverse coding system was utilized, with Strongly Disagree recoded to 5, Disagree recoded to 4, N/A recoded to 3, Agree recoded to 2, and Strongly Agree recoded to 1. As previously stated, this scale contains five subscales that did not correlate very well. Because of this, the means and standard deviations for each scale were calculated based on each individual's average score for each subscale. Lastly, for the free response items, the primary investigator developed a coding scheme. For the two open response items (which examined if participants learned anything in their program about working with children with ADHD and resources available for working with these children) five categories emerged for each question. The categories and responses can be found in the results section.

Variables

There were four independent (i.e., predictor) variables for this study, which included race/ethnicity, school level, specialty area, and years of experience teaching. There were two dependent (i.e., outcome) variables for this study: level of ADHD knowledge, and opinions. Additionally, the opinions variable was used as an independent variable in hypothesis seven to predict teacher knowledge about ADHD.

Chapter IV

Results

Demographic Data

Demographic data of the participants who completed the study can be seen in Table A1, which includes participants' gender, specialty area, school level, race/ethnicity, socioeconomic status, and years of experience. In the screening phase, the demographic data of those who completed the survey in its entirety and those who did not complete the survey were compared. Individuals who did not complete all three sections of the study (demographic questionnaire, KADDS, and the Teacher Opinions about ADHD scale) were excluded from the study. Of the 137 individuals who did not complete the survey in its entirety, 66, or 48% of individuals completed all or a part of the demographic form. Demographic data for the non-completers can be found in table A2. The demographic information of the non-completers was quite comparable to the demographics of the participants who completed the survey in its entirety. Additionally, of the 66 individuals who completed the full demographic form, 13% also completed the KADDS in its entirety. However, these individuals did not complete the Opinions' scale. The demographic breakdown for the nine individuals who completed the KADDS is also quite comparable to the demographic information of those who completed all three sections of the survey. However, there are a few noticeable differences. For example, in regard to school level taught, 51% of the individuals who completed all three sections of the survey were early primary teachers as opposed to 66% of individuals that only completed the survey through the KADDS. Additionally, in regard to race/ethnicity, 56% of Caucasian Americans completed the survey through the KADDS as opposed to 39% who completed the survey in its entirety. A complete description of all

demographic information for these nine participants who completed the demographic form and the KADDS can be found in table A2.

Participants were surveyed to determine whether they knew anyone who had a child with ADHD, with 70% stating that they knew someone who had a child with ADHD, while 30% did not. Participants were also asked if they had learned anything in their programs about children with ADHD. Five categories emerged and were used to code responses from this question. These categories include: accommodations, general information, personal experience, diagnosis and treatment, and the last category encompassed answers from individuals who had not learned anything in their training about working with students with ADHD. Exactly 45% of participants stated that they had learned about accommodations for working with children with ADHD. In order to be included in this category, responses had to center around accommodations that are used in the classroom for children with ADHD. Example of responses include, allowing the child extra time to complete work, proximal seating to the teacher, and providing the student with reminders. About 19% of participants reported that they had learned general information about children with ADHD in their training programs. In order to be included in this category, responses included: theories, statistics, and history of the disorder. For example, responses included, learning theories about the disorder in class, and learning about the history of the disorder.

Additionally, having personal experience with the disorder (i.e., having worked with a child with ADHD, having a child diagnosed with ADHD, or having been personally diagnosed with ADHD) was found to be characteristic of 3% of the sample. Diagnosis and treatment related responses accounted for 10% of responses. Inclusion

criteria for this category, included responses related to the diagnostic criteria for ADHD and the different types of treatments. Example of responses included: “I have learned that ADHD can be treated with medication but it makes children very dull”, “They have a hard time standing still”, and “Children with ADHD are very often distracted in anything they do”. Lastly, 45% of participants indicated that they had not learned anything in their training about ADHD.

Additionally, participants were surveyed on their level of knowledge and awareness of the resources/services available to them for working with children with ADHD in the school system. Similar to the previous question, responses were reviewed and coded into five different categories, including special education/counseling, modifications, books and resources, trainings, and being unaware of any services available to them, which was about 18% of participants. Special education/counseling staff was the most frequent response (57%), and this category included responses such as special education staff, school psychologist, counselor, teacher aides, and school nurse. The next category, modifications (13% of responses), included responses that were centered on adapting the environment for the child to be successful, including answers such as “requires additional attention”, and differential instruction. The books and resources category accounted for 12% of responses and included answers such as books, newsletters, and the web. The last category (3% of responses) was for participants who reported that there were different trainings at their schools that they could attend.

Design/Data Analysis

Outlier analysis. The primary investigator used descriptive statistics to describe the demographic characteristics of the sample (e.g. race/ethnicity, age, etc.). Due to the initial exclusion criteria outlining that only completed surveys would be utilized for data analysis, 137 participants' data were not analyzed. However, of the complete surveys, missing information was minimal (less than 1% of the total data analyzed), so the data that were missing were replaced with the mean. According to Field (2009), if the number of missing values is small relative to the sample size, then this does not present a serious issue. The primary investigator examined normality by examining the Kolmogorov-Smirnov tests for each regression model. The results from the Kolmogorov-Smirnov tests for questions 2 through 6 show that the years of experience ($D(194) = .44, p < .001$), specialty area ($D(194) = .46, p < .001$), ethnicity/race ($D(194) = -.26, p < .001$), and school level ($D(194) = .354, p < .001$), are all significantly non-normal. For question 7, the Kolmogorov-Smirnov tests that were completed for average opinions of medication ($D(200) = .06, p > .05$), was not significantly different from a normal distribution.

Data were assessed for outliers through visual analysis by using scatterplots in order to determine if any values were outside of the parameter (more than two standard deviations from the mean). According to Field (2009), there should be no more than 5% of instances with absolute values above two, and any cases above three could be an outlier. Field also reported that no more than about 1% of cases should have values above 2.5. Of the different regression models that were analyzed, only one regression model (teachers' opinions about information acceptability), presented with cases above three (cases 57 and 63). Because the cases were outside of the limit, the primary investigator

reviewed both Cooks' and Mahalanobis' distances to see if they had an undue influence on the model. Neither the Cooks' distance (none over one), nor the Mahalanobis' distance (none over 15), had an undue influence over the model, so the cases were not removed from the data analysis.

Assumptions. In order for a hierarchical regression to be used to analyze these data, multiple assumptions had to be tested, which include the assumptions of linearity, the assumption of independent errors, multicollinearity, variable type, normally distributed errors, and homoscedasticity (Field, 2009). The first assumption is linearity, which proposes that the predictor variables and their related coefficients are a linear combination. Visual inspection of the scatterplots was used to assess linearity, and points that indicated a curvilinear relationship indicated non-linearity. The majority of the partial p-plots for all of the variables did not indicate a problem with linearity; with the exception of the partial p-plot for years of experience (from the regression model information session acceptability, See Appendix B1), which indicates that the data broke the assumption of linearity. This will thus limit the generalizability of the findings beyond this analyses' sample. The assumption of independent errors, which tests for independence was assessed by viewing the Durbin Watson statistics for each regression model. According to Field (2009), the assumption of independent errors is tenable if the test statistic is close to two. For all of the models the assumption was met, because all of the statistics were close to two, and none were less than one or greater than three (all range between 1.45 and 1.94).

Multicollinearity was assessed to ensure that the variables examined were not highly correlated. According to Field (2009), Tolerance values below 0.1 and VIF scores

greater than 10 indicate that there may be a concern with multicollinearity. However, for these data, none of the Tolerance values or VIF scores violated these rules, therefore there was no issue with multicollinearity. VIF scores (questions 2-6) ranged from 1.008 to 1.045 and Tolerance values ranged from .91-.99. The VIF score and Tolerance values for question seven were both 1.0. Additionally, all predictor variables must be categorical (with two categories), and the outcome variable must be continuous and unbounded, or have no constraints on the variability of the outcome (Field, 2009). However, because there were more than two categories for some of the predictors, dummy coding was used to represent these groups.

The assumption of normally-distributed errors assumes that the differences between the model and the observed data are close to zero, and that differences that are not close to zero do not happen frequently (Field, 2009). This was assessed by inspecting a normal probability plot of the residuals. If the distribution is normal, it is expected that points on the normal probability plot should fall close to the line. All of the normal probability plots indicated that the residuals were non-normal (See Appendix B 2-8). According to Field (2013), a lack of normality will not “invalidate the confidence intervals and significance tests in large sample sizes (pg. 311).” Because the sample size for this study was considered to be large, the primary investigator made the decision not to transform the data due to the fact that the non-normal residuals would not affect the significance tests. Because the assumption of normally-distributed errors was violated this will affect the primary investigator’s ability to generalize the results to populations with normal residuals.

The assumption of homoscedasticity was also assessed to ensure that the variance of the residuals was constant at each level of the predictor variables by comparing plots of residuals versus predicted value and residuals versus time. Points that form the shape of a funnel (i.e. that are more spread out) indicate problems with homoscedasticity (Field, 2009). Three of the plots revealed problems with homoscedasticity (See Appendix B 9-11). These plots include both the years of experience and ethnicity/race plots (when information session acceptability was the dependent variable) and the ethnicity/race plot (when teachers' ability to cope was used as the dependent variable). Because problems were revealed with homoscedasticity for these three plots, and the assumption of linearity was violated, this may limit the inferences that can be made about the data.

Research Questions

Do teachers agree that attending training sessions are feasible and beneficial in working with children with ADHD? Descriptive statistics – specifically, the mean and the standard deviation – were used to analyze teachers' opinions about attending training sessions to receive more information about ADHD. Teachers' opinions on attending training sessions were determined by teachers' responses to statements about the acceptability and feasibility of attending these training sessions. In regard to acceptability of attending training sessions, the data shows that teachers believe it is acceptable and are willing to attend training sessions ($M=4.22$, $SD=.57$). As for teachers' opinions on the feasibility of attending training sessions, while overall they believed that it was feasible to attend the sessions, the mean and standard deviation (3.37, .61) were lower than the mean and standard deviation for teachers' opinions on the acceptability of

attending these sessions. The individual means and standard deviations for each question from the two subscales are reflected in Table A5.

The relationship between teachers' demographic variables and their level of ADHD knowledge. Overall knowledge scores and scores for each scale of the KADDS (e.g. symptoms, treatment) for the study participants (both those who completed all sections of the survey and those who completed the survey through the KADDS section) can be found in Table A3. A five stage hierarchical regression was conducted with ADHD knowledge as the dependent variable. Socioeconomic Status (SES) was entered at stage one of the model to control for participants' SES. Because research indicated that years of experience is the most significant predictor of teacher knowledge about ADHD (Jerome et al., 1994; Sciutto et al., 2000) this variable was entered at stage two. School level taught was entered in stage three because the average age of diagnosis is seven years of age (American Psychiatric Association, 2012), placing that child in the second grade (early primary), which may influence the experience teachers in this group possess with students with ADHD due to the number of referrals for ADHD. The literature on the influence of race/ethnicity on teacher knowledge about ADHD is not well established, which is why this variable was entered in stage four. Lastly, given that the literature on specialty area is not well established either, and is not hypothesized to predict teacher knowledge about ADHD (Snider, Busch & Arrowood, 2003), it was entered in at stage five. The regression statistics are reported in Table A6.

The hierarchical regression revealed that at the first stage, Socioeconomic Status (SES) did not contribute significantly to the regression model ($F(1,194) = .027, p = .98$), and accounted for .4% of the variation in ADHD knowledge. With the introduction of the

years of experience variable, an additional 5.4% of variance was explained in level of ADHD knowledge, with a significant change in R^2 , ($F(1,194)=2.65, p<.001$). While the addition of School Level to the regression model explained .06% of the variation in level of ADHD knowledge, this change in R^2 was not significant ($F(1,194)=.86, p=.39$). Ethnicity/Race was the next variable entered into the regression model, and it explained .09% of the variation in level of ADHD knowledge, but the change in R^2 was not significant ($F(1,194)=1.48, p=.14$). Finally, adding Specialty Area to the model explained .04% of the variance, which also did not produce a significant change in R^2 ($F(1,194)=.84, p=.40$). Based on the results presented, the most important predictor of level of ADHD knowledge was Years of Experience, which explained 5.4% of variance in level of ADHD knowledge. The five independent variables together accounted for 7.3% of the variance in level of ADHD knowledge.

Are there differences in teachers' opinions about ADHD (medication acceptability, etc.) based on their race/ethnicity, school level taught, specialty area, and years of experience? Because the opinions' scale consists of five subscales, five independent hierarchical regressions were conducted with opinions on medication, opinions on training session acceptability, opinions on training session feasibility, opinions on teachers' ability to cope, and opinions on student misbehavior as the dependent variables. All variables for each regression were entered in the same steps as the previous regression model in question 5, using the same rationale.

The initial hierarchical regression (opinions on medication) revealed that at the first stage, SES did not contribute significantly to the regression model ($F(1,194)=.394, p=.694$), and accounted for 0% of the variation in teachers' opinions on medication.

While the introduction of the Years of Experience variable explained an additional 1.2% of the variance in teachers' opinions on medication, there was no significant change in R^2 ($F(1,194)=1.52, p=.13$). The addition of School Level to the regression model explained .03% of the variation in teachers' opinions on medication, but the change in R^2 was not significant ($F(1,194)=-1.05, p=.29$). Ethnicity/Race was the next variable entered into the regression model and it explained .02% of the variation in teachers' opinions on medication, but the change in R^2 was not significant ($F(1,194)=-.644, p=.52$). Finally, adding Specialty Area to the model explained .05% of the variance, which also did not produce a significant change in R^2 ($F(1,194)=-.97, p=.33$). The five independent variables together accounted for 2.2% of the variance in teacher opinions on medication. Regression statistics can be seen in Table A7.

The second hierarchical regression (opinions on training session acceptability) revealed that at the first stage, SES did not contribute significantly to the regression model ($F(1,194)=.031, p=.98$), and accounted for 0% of the variation in teachers' opinions on training session acceptability. Even with the introduction of the Years of Experience variable, 0% of variance was explained in teachers' opinions on training session acceptability, which did not produce a significant change in R^2 ($F(1,194)=.324, p=.75$). While the addition of School Level to the regression model explained .01% of the variation in teachers' opinions on training session acceptability, the change in R^2 was not significant ($F(1,194)=-.331, p=.74$). Ethnicity/Race was the next variable entered into the regression model and it explained .01% of the variation in teachers' opinions on training session acceptability, but the change in R^2 was not significant ($F(1,194)=.101, p=.92$). Adding Specialty Area to the model explained 0% of the variance, which did not

produce a significant change in R^2 (F , (1,194)=.38, p =.71). The five independent variables together accounted for only .02% of the variance in teacher opinions on training session acceptability. Regression statistics can be seen in Table A8.

The third hierarchical regression (opinions on training session feasibility) revealed that at the first stage, SES did not contribute significantly to the regression model (F (1,194)=.125, p =.90), and accounted for 0% of the variation in teachers' opinions on training session feasibility. With the introduction of the Years of Experience variable, 0.3% of the variance was explained in teachers' opinions on training session feasibility, which did not produce a significant change in R^2 (F (1,194)=.616, p =.54). While the addition of School Level to the regression model explained .5% of the variation in teachers' opinions on training session feasibility, the change in R^2 was not significant (F (1,194)=.935, p =.35). Ethnicity/Race was the next variable entered into the regression model and it explained 1% of the variation in teachers' opinions on training session feasibility, but the change in R^2 was not significant (F , (1,194)=1.44, p =.15). Adding Specialty Area to the model explained 0% of the variance, which did not produce a significant change in R^2 (F , (1,194)=.275, p =.78). The five independent variables together accounted for only 1.8% of the variance in teacher opinions on training session feasibility. Regression statistics can be seen in Table A9.

The fourth hierarchical regression (teachers' ability to cope) revealed that at the first stage, Socioeconomic Status SES did not contribute significantly to the regression model (F (1,194)=.451, p =.65), and accounted for 0% of the variation in teachers' opinions on their ability to cope with students with ADHD. The Years of Experience variable accounted for 6% of the variance in teachers' opinions on their ability to cope,

which produced a significant change in R^2 ($F(1,194)=3.57, p<.001$). While the addition of School Level to the regression model explained .3% of the variation in teachers' opinions on their ability to cope, the change in R^2 was not significant ($F(1,194)=-.814, p=.417$). Ethnicity/Race was the next variable entered into the regression model and it explained .7% of the variation in teachers' opinions on their ability to cope, but the change in R^2 was not significant ($F(1,194)=-1.25, p=.215$). Adding Specialty Area to the model explained .1% of the variance, which did not produce a significant change in R^2 ($F(1,194)=-.286, p=.78$). The five independent variables together accounted for 7.1% of the variance in teacher opinions on their ability to cope with children with ADHD and years of experience was the most important predictor of teachers' opinions about coping with children with ADHD, accounting for 6% in variance. Regression statistics can be seen in Table A10.

The final hierarchical regression (opinions on student misbehavior) revealed that at the first stage, SES did not contribute significantly to the regression model ($F(1,194)=-.76, p=.449$), and accounted for 0.9% of the variation in teachers' opinions on student misbehavior. With the introduction of the Years of Experience variable, 3% of variance was explained in teachers' opinions on student misbehavior, which produced a significant change in R^2 ($F(1,194)=2.69, p<.01$). The addition of School Level to the regression model explained 2.5% of variation in teachers' opinions on student misbehavior, which produced a significant change in R^2 ($F(1,194)=2.56, p<.05$). Ethnicity/Race was the next variable entered into the regression model and it did not explain any variation in teachers' opinions on student misbehavior, and the change in R^2 was not significant ($F(1,194)=.312, p=.76$). Adding Specialty Area to the model

explained 0.8% of the variance, which did not produce a significant change in R^2 (F , (1,194)=-1.22, p =.225). Based on the results presented, the most important predictor of teachers' opinions on student misbehavior was Years of Experience, which explained 5% of the variance in level of ADHD knowledge. The five independent variables together accounted for only 7.2% of the variance in teacher opinions on student misbehavior. Regression statistics can be seen in Table A11.

Are teacher opinions of ADHD medication a significant predictor of teacher knowledge about treatment for ADHD? A hierarchical linear regression was conducted to determine if teachers' opinions about ADHD medication were a significant predictor of their knowledge about ADHD treatment. The regression revealed that teachers' opinions on medication contributed significantly to the regression model, F (1,198)=2.15, p <.05) and teacher opinions about medication accounts for 2.3% of the variation in teacher level of ADHD knowledge.

Chapter V

Discussion

The purpose of this study was to examine the relationships among multiple demographic variables and teacher knowledge and opinions about ADHD. These demographic variables included race/ethnicity, school level taught (early or late primary), specialty area (general, bilingual, and special education), and years of experience teaching. Participants included a diverse group of 200 in-service and pre-service teachers. In addition to examining the relationship among the variables and teacher knowledge and opinions about ADHD, participants were also surveyed on the acceptability and feasibility of attending training sessions about ADHD. A significant difference was found in the level of ADHD knowledge between pre-service and in-service teachers. Teachers who were still in training were less knowledgeable about ADHD than those teachers who had one or more years of experience. These findings are consistent with previous research (Jerome et al. 2000; Sciutto & Bender-Frank, 2000). When the analysis was disaggregated to examine the differences in teacher knowledge about ADHD based on the three knowledge subscales (general information, symptoms, and treatment), it was found that teachers with more experience overall scored significantly higher on all three subscales.

Additionally, overall, teachers were more knowledgeable about general information pertaining to ADHD than they were about symptoms and treatment for ADHD. These findings were inconsistent with previous research (Ohan et al., 2008; Sciutto et al., 2000), which found that the participants were more knowledgeable about

symptom-related questions. Similar to previous studies (Jerome, Gordon, & Hustler, 1994; Ohan et al., 2008; Sciutto, Terjesen & Bender-Frank, 2000), on average, teachers continue to be less knowledgeable about ADHD treatment than other ADHD areas. This could be because over half of the questions (seven) related to ADHD treatment on the KADDS focus on medication/therapy rather than interventions that teachers would normally provide for a child with ADHD (e.g. behavioral contracts, token economies).

Additionally information was collected on teachers' level of knowledge and awareness about resources available to them in the school setting for working with children with ADHD. While 57% of the participants identified special education staff as an available resource, 13% identified different modifications, and 12% identified certain resources like books, the internet, and newsletters. These findings were consistent with the researcher's previous study (Frye, 2011), where it was found that 60% of participants identified special education staff as an available resource in the school setting. These results provide more evidence to the literature that educators who are aware of the resources available to them are more aware of special education staff than any other resource.

Information was also collected on whether teachers had learned anything in their training programs about working with children with ADHD. As mentioned in the results section, 45% of participants reported that they had not learned anything in their programs about working with children with ADHD. These findings are consistent/similar with results found in previous studies that assessed for teachers having learned anything in their training programs about working with children with ADHD (Bussing et al., 2002; Frye, 2011). These data show that even though ADHD is the most common psychiatric

diagnosis in children, educators are still not receiving much information or training about the topic, even though they are interested in obtaining more information. Furthermore, it was hypothesized that teachers would think that it was acceptable and feasible to attend information/training sessions about ADHD. Specifically, teachers overall believed that it was acceptable and were willing to attend training sessions to obtain more information about ADHD, which is consistent with similar studies in the literature (Barbarese & Olsen, 1998; Bieltz, 2010; Bussing et al., 2002). Although teachers thought that it was feasible to attend these training sessions, their scores on these items were not as high as they were for information/training session acceptability. This discrepancy could be due to the lack of time that teachers have in their schedules to attend additional sessions given their already busy schedules.

Additionally, the demographic information and KADDS scores for the nine individuals who only completed the survey through the knowledge section were compared to those individuals who completed the survey in its entirety. Overall, the demographic information for individuals in both groups was quite comparable. The overall score and the three subscale scores on the KADDS were lower for individuals who did not complete the survey in its entirety. One potential reason for this discrepancy could be due to carelessness (which could have caused multiple mistakes) on the part of the individuals who did not complete the survey in its entirety. Additionally, those individuals who did not complete the survey in its entirety could have indeed been less knowledgeable about ADHD, which may have caused them to become frustrated and led them to not complete the remainder of the survey.

Results of this study also revealed that the most important predictor of level of ADHD knowledge was years of experience (accounting for 5.4% of the variance in the dependent variable), which was initially hypothesized given previous research (Jerome et al., 2000; Sciutto et al., 2000). This is consistent with common knowledge that the more experience and/or exposure an individual has with a topic, the more knowledgeable he/she may be about that topic. Additionally, results revealed that specialty area (accounting for only .04% of the variance in the dependent variable), was not a significant predictor of level of ADHD knowledge, something that was also hypothesized. There has not been consistency in the literature (Snider, Busch, & Arrowood, 2003) about whether specialty area is a significant predictor of level of ADHD knowledge. However, in this study a possible explanation for why this predictor was not significant could be that the majority of the participants (approximately 70%) in the study had zero years of experience in the school setting. Therefore a lack of experience and training with their different specialty areas/concentrations could be a reason why the majority of the teachers have been exposed to the same information thus far in their training programs. The majority of the teachers may still be in their core classes and learning the basics of their programs, and may have not had the opportunity to learn information about their specialty area.

Both race/ethnicity (accounting for .09% of the variance in the dependent variable), and school level (.06% of the variance) were also found to not be significant predictors of level of ADHD knowledge. The results in regards to race/ethnicity are consistent with the results from the researcher's previous study (Frye, 2011), which is inconsistent with what was hypothesized for the current study. Although race/ethnicity

has been shown to be a significant predictor for other areas regarding ADHD knowledge and opinions (Olaniyan et al., 2007), based on the two studies that have been conducted, this was not found to be a significant predictor in regards to teacher level of ADHD knowledge. It is possible that the location of where the data were collected (multiple ethnically-diverse campuses in one of the nation's most ethnically-diverse cities) could be a reason to explain why race/ethnicity is not a significant predictor. Being exposed to individuals from different races/ethnicities on a daily basis may minimize the effect that race/ethnicity has on individuals' level of knowledge with certain topics, as opposed to individuals who may live in a less diverse community.

It was hypothesized that school level would be the second most important predictor in regards to level of ADHD knowledge. The analysis, however, revealed that this variable was not a significant predictor. Even though it was reported that the average age of diagnosis for ADHD was in the early primary years (American Psychiatric Association, 2012), which was the basis for hypothesizing that early primary teachers would be more knowledgeable about ADHD, in this study this was not found. A possibility for why school level was not a significant predictor is because most curriculums do not differentiate between early and late primary, but rather these educators receive certifications that cover the span of the elementary years. Because of this similar level in training, the individuals in this sample from different school levels may have been exposed to the same information/trainings, which is why there was not a significant difference between the two levels.

Overall, the five factors only accounted for 7.3% of variance in knowledge of ADHD. There are numerous additional factors that could account for variance in

knowledge of ADHD. Personal experience with ADHD (having the disorder, having a child diagnosed with the disorder, or knowing someone with the disorder), could account for variance in knowledge of ADHD. For example, if an individual who completed the survey was a parent of a child with ADHD or was an individual who was placed on medication for ADHD in their childhood, they may have more experience and knowledge about the disorder versus someone who has no personal experience with the disorder. Additionally, because the survey was administered through an online format, there was no way to detect if participants used resources (internet, friends, individuals may have taken the survey together) to complete the survey, which could account for variance in knowledge.

Additionally, teachers' opinions about ADHD were assessed. It was hypothesized that all predictors except for specialty area would be significant predictors of teachers' opinions about ADHD. The first regression evaluated whether the demographic variables (race/ethnicity, school level, specialty area, and years of experience) were a significant predictor of teacher opinions about ADHD medication. The results revealed that none of the predictors were significant and altogether the variables only accounted for 2.2% of variance in the dependent variable. Because this was one of the first studies to examine these variables in relation to teachers' opinions about ADHD, there was not much information in the literature to compare these results. A possibility for why none of the predictors were significant could be because in general teachers may be unaware of the potential side effects and safety-related concerns of medication regardless of their demographic background. Although years of experience (only accounting for 1.2% of the variance in the dependent variable), was hypothesized to be the most significant

predictor, there is a possibility that other salient demographic factors could contribute to an individual's opinions about medication, including personal experience with medication consumption (i.e. consuming medication themselves or having children who have been diagnosed with ADHD who consume medication).

The second and third regression models evaluated the demographic variables in regard to teachers' opinions about the acceptability and feasibility of attending training/information sessions about ADHD. Once again, none of the variables were significant predictors of teachers' opinions about the acceptability (all variables accounted for only .02% of the variance in the dependent variable), and feasibility (all variables accounted for only 1.8% of the variance in the dependent variable), of attending training/information sessions about ADHD. A possibility for why none of the predictors were significant could be because teachers regardless of their demographic background may realize that there is a need/desire for more information about dealing with children with ADHD given the prevalence of the disorder, however, they all may realize that they have limited time to attend such sessions. One would hypothesize that because teachers with more experience are more knowledgeable about ADHD that they would be less likely to desire more training about the topic. However, because the research in the area of ADHD is continuing to evolve, teachers regardless of their years of experience and level of knowledge about ADHD are still interested in obtaining the most recent research about the disorder.

The fourth regression model evaluated the demographic variables in relation to teachers' opinions about their ability to cope with children with ADHD. As hypothesized, the years of experience variable was the most important predictor accounting for 6% of

the variance in the dependent variable. This was expected considering that the more experience an individual has with a topic/situation, the more likely it is that they will be confident in their abilities to cope with that certain situation, which is also true for the contrary (e.g. the less experience with a situation/topic, the less comfortable an individual feels with a certain situation). Given these results, the more knowledge that is acquired by the less experienced teachers, the more comfortable/confident they may feel in the future dealing with children with ADHD.

The fifth regression model assessed for the relation between the demographic variables and student misbehavior. For this model, years of experience (accounted for 3% of the variance in the dependent variable), and school level (accounted for 2.5% of the variance in the dependent variable) were significant predictors, which were initially hypothesized. In regard to years of experience and student misbehavior, this relationship is expected because the amount of experience an individual has may impact their opinions about student misbehavior. For example, some teachers may have had more experience based on their years of experience in working with children with ADHD and students with other behavior disorders, which may cause them to have different opinions about what it means for a student to “misbehave.” As for student misbehavior and school level, a reason for why this variable is a significant predictor could be due to possible differences in manifestation of behaviors that are displayed by children at the different levels (early primary versus late primary). For example, certain behaviors that are present in children with ADHD at the early primary years (e.g. crying, temper tantrums) may be more or less difficult to manage than the behavior problems that may manifest in children with ADHD at the later primary years (e.g. talking back, defiance). Behaviors at either

stage may be more or less manageable for teachers, which may impact their opinions about student misbehavior.

It was determined that teachers' opinions about ADHD medication were a significant predictor of their knowledge about ADHD, which was initially hypothesized. As stated in the literature review if one's beliefs or opinions can be influenced by the information or knowledge they possess, or, based on a person's belief system, it is no surprise then that this may affect their willingness to accept or reject knowledge if it does not fit into their current beliefs. As stated before, an example of this is when individuals are presented with research-based information that medication is effective for children with ADHD, but they may choose to reject this knowledge if it contradicts with their current beliefs or opinions that children should not be medicated. Again, this relationship was specifically connected to both survey measures that were used in the study. For example, if an individual believes that medication cannot help children with ADHD (statement one from Teacher Opinions about ADHD scale) then they may be less likely to know that Antidepressant drugs have been effective in reducing symptoms of ADHD (question eight from the KADDS). Lastly, it is important to note that although some of the findings were significant, the amount of variance accounted for by the predictors was small the results are not meaningful from a practical standpoint. Also, the definition of knowledge that was presented in the literature review suggests that information is considered "knowledge" when it is factual and can be verified. However, some of the items for the KADDS, which is a scale that is supposed to measure knowledge; contains questions that one could answer based on his/her opinion and not based on knowledge solely. For example, one of the questions asks if most children with ADHD will outgrow

the disorder and have a normal adult life. One cannot verify that most children will outgrow their symptoms and function “normally in adulthood.” This question could be answered based on someone’s opinions about the validity of an ADHD diagnosis. Additionally, in the literature, there are multiple forms of knowledge (e.g. declarative, procedural, etc), however, the KADDs only uses questions that are based on one’s declarative knowledge. In order for the KADDs to be a comprehensive knowledge scale, more questions should be added to address all types of knowledge.

In regard to the use of the Teacher Opinions of ADHD scale, it appears that this scale captured the three features of opinions, which include that opinions cannot be verified as true, the degree of confidence an individual has in his/her opinions, and the degree to which an individual shares his/her opinions with others. For example, the majority of the questions presented in the opinions scale, cannot be verified as true. One of the statements is “Group training sessions would probably be helpful to us.” Although group training sessions may have been effective in the past for a different subset of teachers, this may not be the case for the teachers taking the survey. Additionally, a few of the statements address the feature about an individual being confident in their opinions. Statement 18 is “In general, I think I know how to handle my students with ADHD pretty well.” The last feature, which is the degree to which an individual shares his/her opinions with others is also captured by the survey. Statement 19 is “Other teachers are pretty impressed by the way I handle my students’ with ADHD behavior.”

Limitations

One limitation to this study was that it was completed through an online response process. Since the primary investigator could not control the setting in which the

participants completed the survey, the participant could have possibly researched some of the answers to the survey questions and compromised the validity of his/her responses. Additionally, the investigator could not control for whether the participants completed the survey on their own or had someone else help them. The investigator also could not control for whether the participants completed the survey in its entirety due to not being able to follow up with the participant directly after the completion of the survey.

A fourth limitation of this study is that the participants were not a random sample, but rather individuals who volunteered to participate in the study, which could have caused selection bias. This could limit the generalizability of the findings because the individuals who volunteered to participate may not be an adequate representation of the individuals who did not volunteer to participate in the study.

A fifth limitation to the study was that the in-service teachers who were sampled in the study were recruited via the university list-servs and not from actual school settings. Sampling individuals from other school districts (that were not associated with the University of Houston system) throughout the city could have added to the diversity of the sample (e.g. teachers who were trained at different institutions). On a similar note, another limitation to recruiting from the university list-servs is that there was a limited amount of individuals who had access to the list-servs that were in-service teachers. This could have contributed to the differences in sample size between the pre-service and in-service teachers. Additionally, of the in-service teachers who completed the survey, it is possible that they could have been more interested in the subject of ADHD and chose to participate in the study compared to those in-service teachers who were not interested in ADHD.

A seventh limitation to the study is that the sample was not very representative of both genders, with more females completing the survey than males. Because males and females may have different views about behavior (which may impact their knowledge and opinions about ADHD) and/or behave differently (Else-Quest, Hyde, Goldsmith & Van Hulle, 2006), it would have been beneficial to sample more male participants. However, this is not uncommon due to the overrepresentation of females in the teaching field.

An eighth limitation to the study was that the data violated two important assumptions, which include the assumption of normally distributed errors and the assumption of heteroscedasticity. Due to the violation of these assumptions, the inferences that can be made from the data are limited. Future publications that come from these data can use transformed data so that the results will not be limited to the study sample.

A ninth limitation to this study and to the knowledge and beliefs literature in general is the potential to confound the two terms. The two scales used in this study serve as an example. The KADDS was developed to survey teachers' knowledge about ADHD; however, some of the questions (e.g. question 19 "Most ADHD children "outgrow their symptoms by the onset of puberty and subsequently function normally in adulthood") may be answered based on an individual's belief system (e.g. believing that all children are hyperactive when young) rather than their knowledge base. Along the same lines it is difficult when surveying online to differentiate between what is an individual's opinion or belief as opposed to ignorance (not knowing something). For example, some teachers may not know that medication is an effective treatment for

ADHD (ignorance), whereas others may consider medical treatment inconsistent with their belief system.

A final limitation to the study was that the time to complete the study was between thirty and forty-five minutes, which may have influenced individuals' decisions not to begin or complete the study. Due to this, there could be differences in types of response between the individuals who completed the survey and those individuals that did not complete the survey.

Implications for Current Practice

To extrapolate the findings from this study, school psychologists may desire to consult with principals and university training directors about the possibility of adding more ADHD training sessions to local in-service meetings held for teachers. Although over half of the participants reported learning about ADHD in their pre-service training, 45% of the participants had not learned anything about the disorder. This is particularly concerning since ADHD is one of the most common psychiatric disorders in children.

Additionally it was revealed teachers were most knowledgeable about special education staff being a resource for them in working with children with ADHD. Because of this special education staff can play an important role in providing teachers with additional resources (locations of trainings, evidence-based research on the topic, school nurse) when working with children with ADHD.

Due to the research showing that teachers continue to perform poorly on the knowledge about ADHD treatment scales (which asks about medication and therapy, compared to other scales) a scale assessing teachers' knowledge about specific classroom interventions should be developed by researchers. Creating a scale that assesses for

teacher's knowledge about interventions would be more applicable to their role in working with children with ADHD than assessing for their knowledge about ADHD medication since they do not prescribe medication. Additionally, having data about teachers' knowledge about interventions may help school psychologists meet the needs (e.g. if they lack information about ADHD interventions) of individual teachers when consulting with them about intervention implementation.

Future Directions

Although there were a number of limitations to this study, there are also a few future directions and areas that present opportunities for growth with this research. Beginning in their training programs, pre-service teachers should be formally evaluated to assess for their knowledge and skill level in working with children with ADHD. Once an initial assessment is completed, school psychologists and other mental health clinicians could help with the development and implementation of an ADHD training program/curriculum that addresses the areas that teachers lack in regard to ADHD training.

Additionally, because teachers seem to have an expressed desire to have more information concerning ADHD, along with a sense that this information is necessary for working with children with the disorder, one future direction is to ensure that teachers are obtaining the necessary training and information that they need for working with children with ADHD. Personnel from training programs and even school districts should ensure that information about working with children with ADHD is available for pre-service and in-service teachers.

In addition to ensuring that teachers are receiving adequate training about ADHD, future studies should examine why and in which domains teachers would desire more training. For example, most teachers may be generally knowledgeable about the prevalence of ADHD, but may be lacking in knowledge about classroom interventions for ADHD. Obtaining this information could aid in personalizing trainings for teachers in regards to the different ADHD domains (e.g. treatment).

Also, because the knowledge questions from the KADDs do not adequately address knowledge and cover the different types of knowledge, it may be beneficial for researchers in the field to address the discrepancy between the definition of knowledge and the questions that are being used to assess the construct. Lastly, future research should examine if there are differences in teachers' knowledge and opinions based on if they are primary or secondary teachers. It would be interesting to see if teachers level of ADHD knowledge and opinions differ based on their training curriculums (primary vs. secondary).

In conclusion, the current study showed that in-service teachers were more knowledgeable about ADHD, and overall pre-service and in-service teachers were more knowledgeable about general information related to ADHD than symptomatology and treatment-related issues. Additionally, teachers are interested and willing to receive more training in regards to ADHD. Because teachers can play an integral role in referring and working with children with ADHD, it is important that training program directors and school district administrators/special education equip teachers who are not as knowledgeable about the disorder with the skills necessary to work with these children

via the integration of ADHD training sessions into the curriculum and professional trainings.

TEACHER KNOWLEDGE OF ADHD

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Appendix A

Tables

Table A1

Demographic Characteristics of Study Participants (N = 200)

<hr/>		
Gender		
	Male	9%
	Female	91%
Specialty Area		
	General Education	79%
	Special Education	10%
	Bilingual Education	17.5%
School Level		
	Early Primary	51%
	Late Primary	49%
Race/ethnicity		
	European American or White of any Race	39%
	African American or Black of any Race	13%
	Hispanic American or Latino of any Race	34%
	Asian American or Asian of any Race	13%
	Other	5%
Socio-Economic Status		
	Low	16.5%
	Middle	80%
	High	3.5%
Years of Experience		
	0	69.5%
	1-5	21%
	6-10	9.5%
<hr/>		

Table A2

Demographic Characteristics of Non-Completers (N = 66)

	Demo Form	Demo Form + KADDS
Gender		
Male	6%	100%
Female	94%	0%
Specialty Area		
General Education	75%	80%
Special Education	11%	0%
Bilingual Education	14%	12%
School Level		
Early Primary	50%	66%
Late Primary	50%	34%
Race/ethnicity		
European American or White of any Race	50%	56%
African American or Black of any Race	18%	22%
Hispanic American or Latino of any Race	30%	22%
Asian American or Asian of any Race	2%	0%
Other	0%	0%
Socio-Economic Status		
Low	18%	0%
Middle	73%	77%
High	8%	23%
Years of Experience		
0	70%	77%
1-5	15%	23%
6-10	15%	0%

Table A3

Descriptive Statistics for Scores on Teacher Level of ADHD Knowledge

	<i>M (SD)</i>
Overall Knowledge score	17.31 (6.72)
Pre-Service Teachers	16.27 (6.72)
Teachers (1-5 years experience)	19.32 (6.31)
Teachers (6+ years experience)	21.31 (.77)
Non-Completers	11.83 (6.31)
General Information	5.88 (3.12)
Pre-Service Teachers	5.39 (2.97)
Teachers (1-5 years experience)	7.12 (2.95)
Teachers (6+ years experience)	7.38 (4.29)
Non-Completers	4 (2.0)
Symptoms	5.22 (1.92)
Pre-Service Teachers	4.99 (1.86)
Teachers (1-5 years experience)	5.56 (2.05)
Teachers (6+ years experience)	6.08 (1.80)
Non-Completers	3.33 (1.63)
Treatment	5.47 (2.43)
Pre-Service Teachers	5.15 (2.47)
Teachers (1-5 years experience)	6.0 (2.33)
Teachers (6+ years experience)	6.85 (1.99)
Non-Completers	3.33 (2.25)

Table A4

Descriptive Statistics for Scores on Teacher Opinions about ADHD Scale

	<i>M (SD)</i>
Medication Acceptability	3.06 (.58)
Information Session Feasibility	3.37 (.61)
Information Session Acceptability	4.22 (.57)
Teachers Ability to Cope	3.30 (.57)
Student Misbehavior	2.88 (.70)

Table A5

*Individual Means and Standard Deviations for Opinions about Training Session
Acceptability and Feasibility*

	<i>M (SD)</i>
Training Session Acceptability	
Question 6	4.52 (.71)
Question 8	4.22 (.99)
Question 10	4.34 (.77)
Question 11	4.27 (.73)
Question 12	3.75 (1.0)
Training Session Feasibility	
Question 9	4.35 (.75)
Question 13	2.84 (.92)
Question 14	3.34 (1.1)
Question 15	3.0 (1.1)
Question 19	3.3 (1.9)

Table A6

Hierarchical Regression Analysis Summary for the Prediction of Level of ADHD Knowledge

<i>Predictor Variable</i>	<i>B</i>	<i>SE</i>	<i>β</i>
Socioeconomic Status	-.03	1.12	-.00
Years of Experience	2.93	.80	.26*
School Level	.84	.98	.06
Race/Ethnicity	-.61	.41	-.11
Specialty Area	-.56	.67	-.06

Table A7

*Hierarchical Regression Analysis Summary for the Prediction of
Teacher Opinions About Medication*

<i>Predictor Variable</i>	<i>B</i>	<i>SE</i>	<i>B</i>
Socioeconomic Status	-.04	.09	-.03
Years of Experience	.11	.07	.11
School Level	-.09	.09	-.08
Race/Ethnicity	-.02	.04	-.05
Specialty Area	-.06	.06	-.97
Note: * $p < .001$			

Table A8

*Hierarchical Regression Analysis Summary for the
Teacher Opinions about Training Session Acceptat....,*

<i>Predictor Variable</i>	<i>B</i>	<i>SE</i>	<i>β</i>
Socioeconomic Status	.003	.09	.002
Years of Experience	.02	.07	-.02
School Level	-.03	.09	-.03
Race/Ethnicity	.004	.04	.007
Specialty Area	.02	.06	.03

Note: *p<.001

Table A9

*Hierarchical Regression Analysis Summary for the Prediction of Teacher Opinions
about Training Session Feasibility*

<i>Predictor Variable</i>	<i>B</i>	<i>SE</i>	<i>B</i>
Socioeconomic Status	-.01	.11	-.01
Years of Experience	-.05	.08	-.05
School Level	-.09	.09	-.07
Race/Ethnicity	-.06	.04	-.11
Specialty Area	-.02	.06	-.02

Note: * $p < .001$

Table A10

Hierarchical Regression Analysis Summary for the Prediction of Teacher Opinions about their Ability to Cope

<i>Predictor Variable</i>	<i>B</i>	<i>SE</i>	<i>B</i>
Socioeconomic Status	-.04	.10	-.03
Years of Experience	.24	.07	.25*
School Level	-.07	.08	-.06
Race/Ethnicity	-.04	-.04	-.07
Specialty Area	-.02	.06	-.02

Note: * $p < .001$

Table A11

*Hierarchical Regression Analysis Summary for the Prediction of Teacher Opinions
about Student Misbehavior*

<i>Predictor Variable</i>	<i>B</i>	<i>SE</i>	<i>B</i>
Socioeconomic Status	-.09	.12	-.05
Years of Experience	-.23	.08	-.19**
School Level	-.26	.10	-.19*
Race/Ethnicity	.01	.04	.02
Specialty Area	-.09	.07	-.09

Note: * $p < .001$ ** $p < .01$

APPENDIX B

Regression Plots

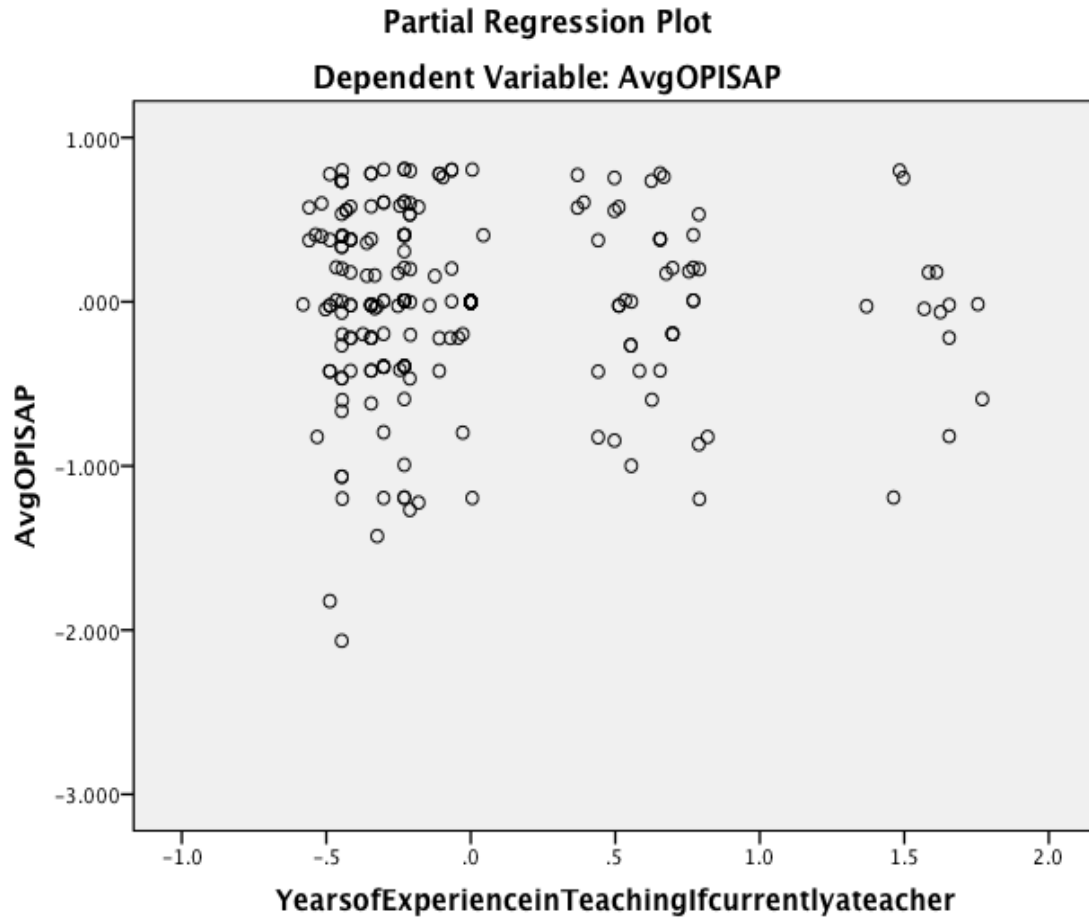


Figure B1. Partial P Plot for Years of Experience Teaching when the Dependent Variable is Opinions about Information Session Acceptability

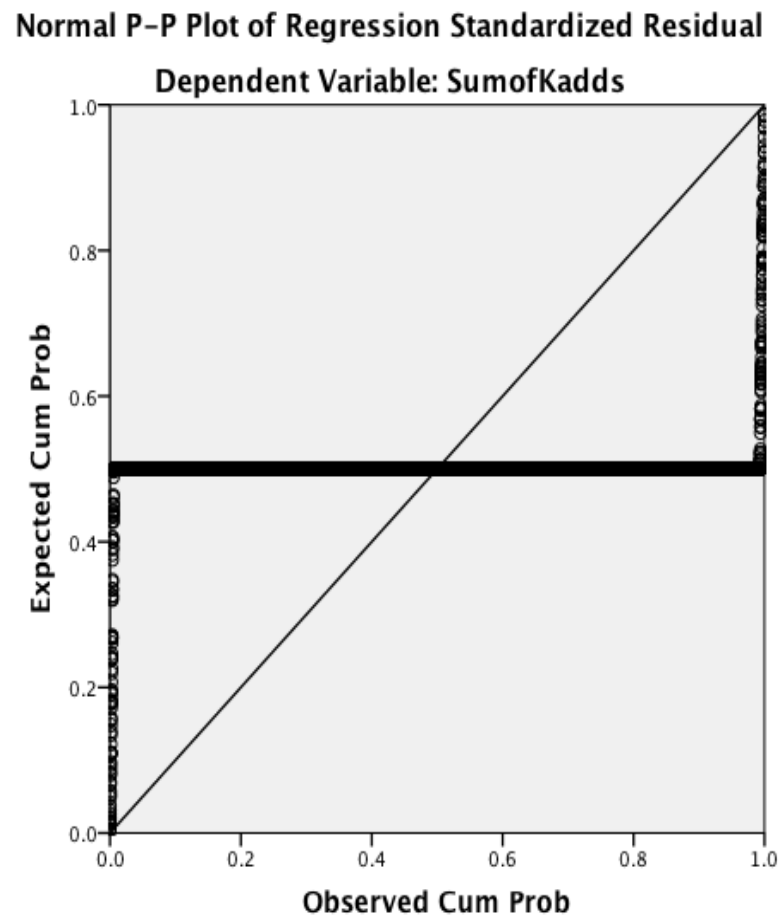


Figure B2. Normal P-P Plot of Regression when the Dependent Variable is Knowledge of ADHD

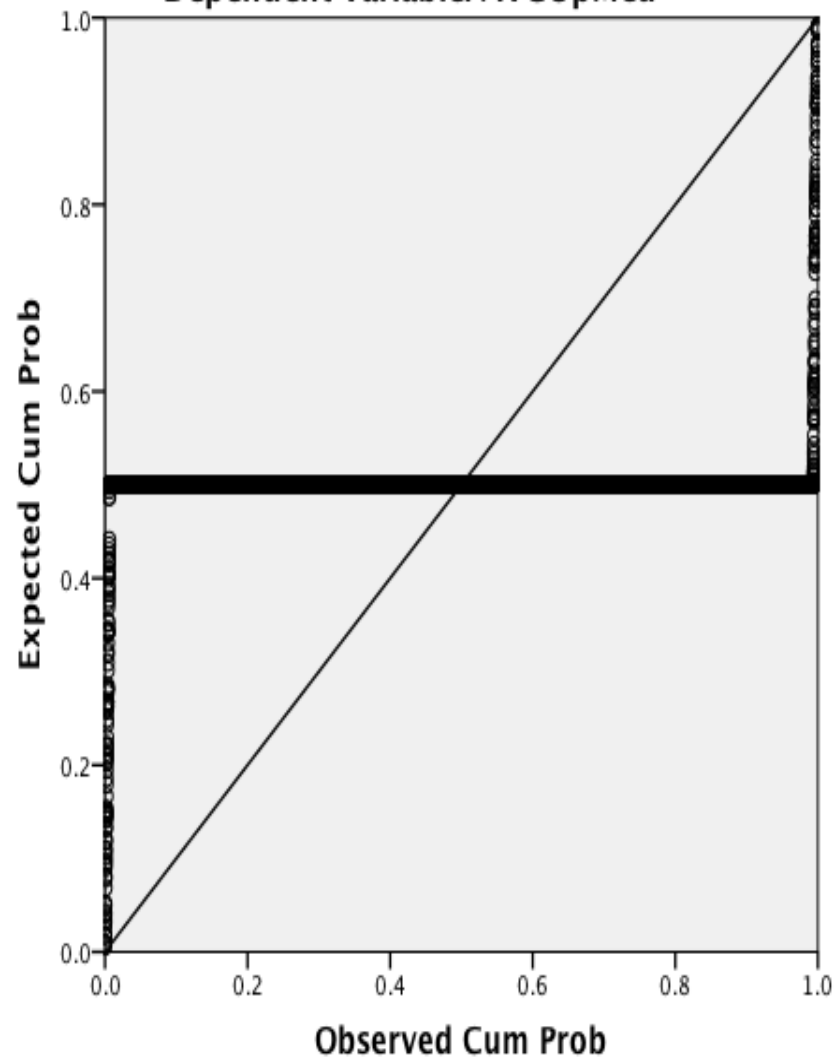
Normal P-P Plot of Regression Standardized Residual**Dependent Variable: AVGOpMed**

Figure B3. Normal P-P Plot of Regression when the Dependent Variable is Opinion of Medication

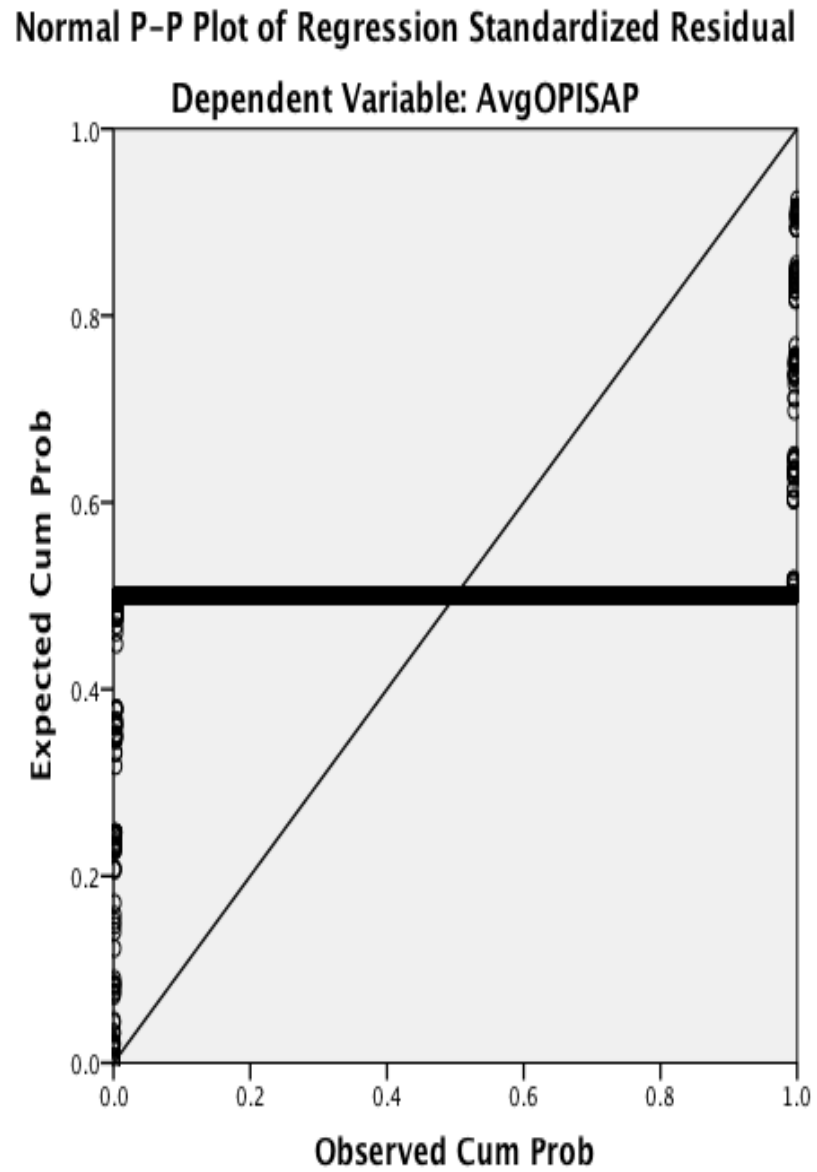


Figure B4. Normal P-P Plot of Regression when the Dependent Variable is Opinion on Information Session Acceptability

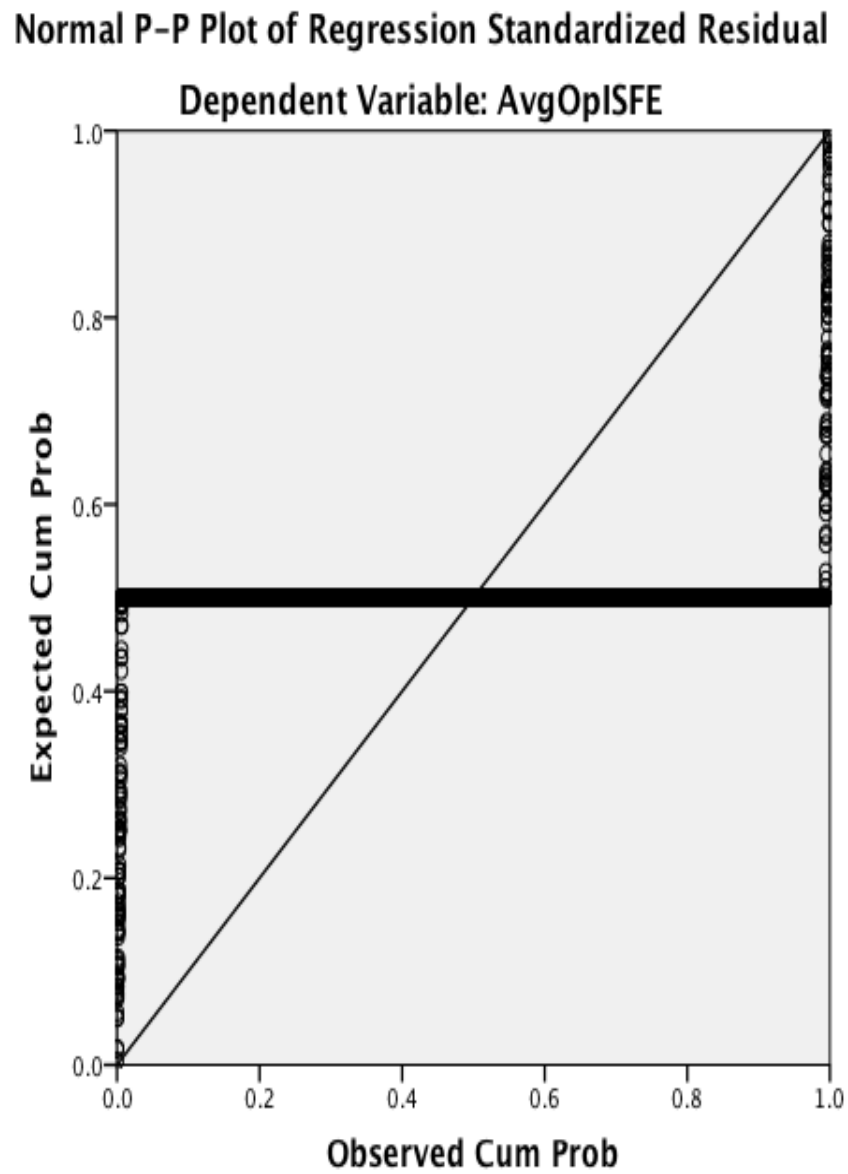


Figure B5. Normal P-P Plot of Regression when the Dependent Variable is Opinion on Information Session Feasibility

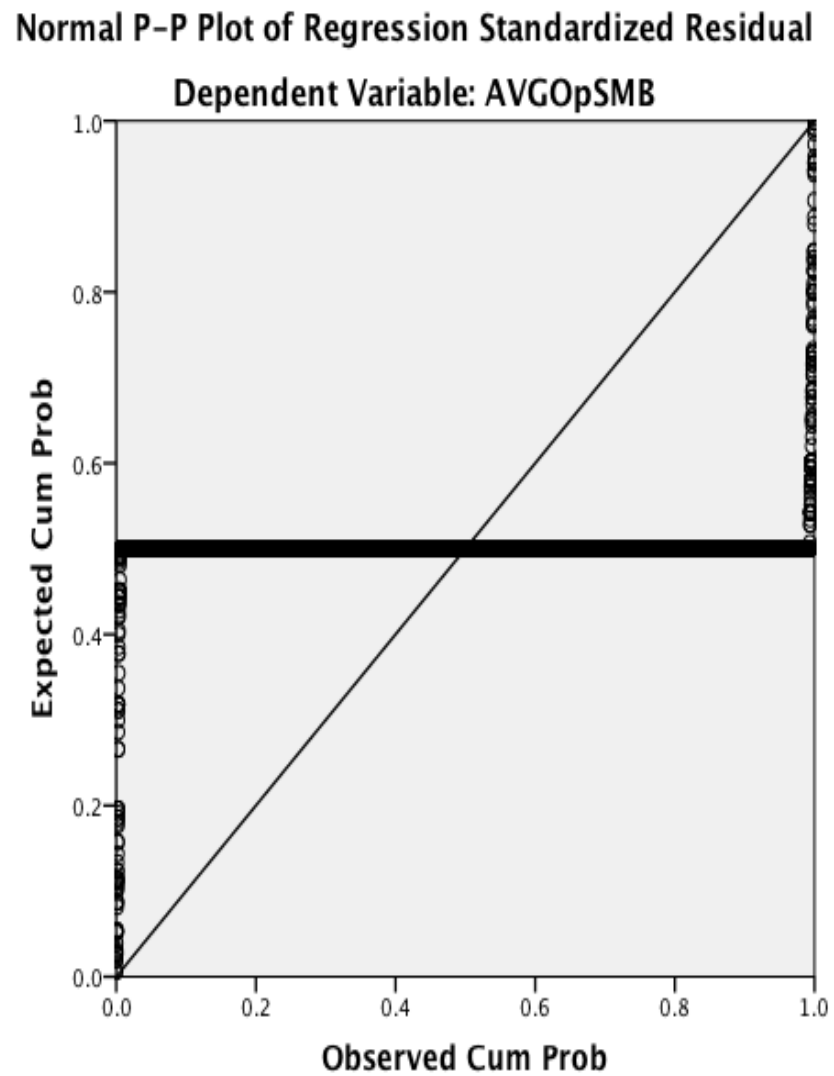


Figure B6. Normal P-P Plot of Regression when the Dependent Variable is Opinion on Student Misbehavior

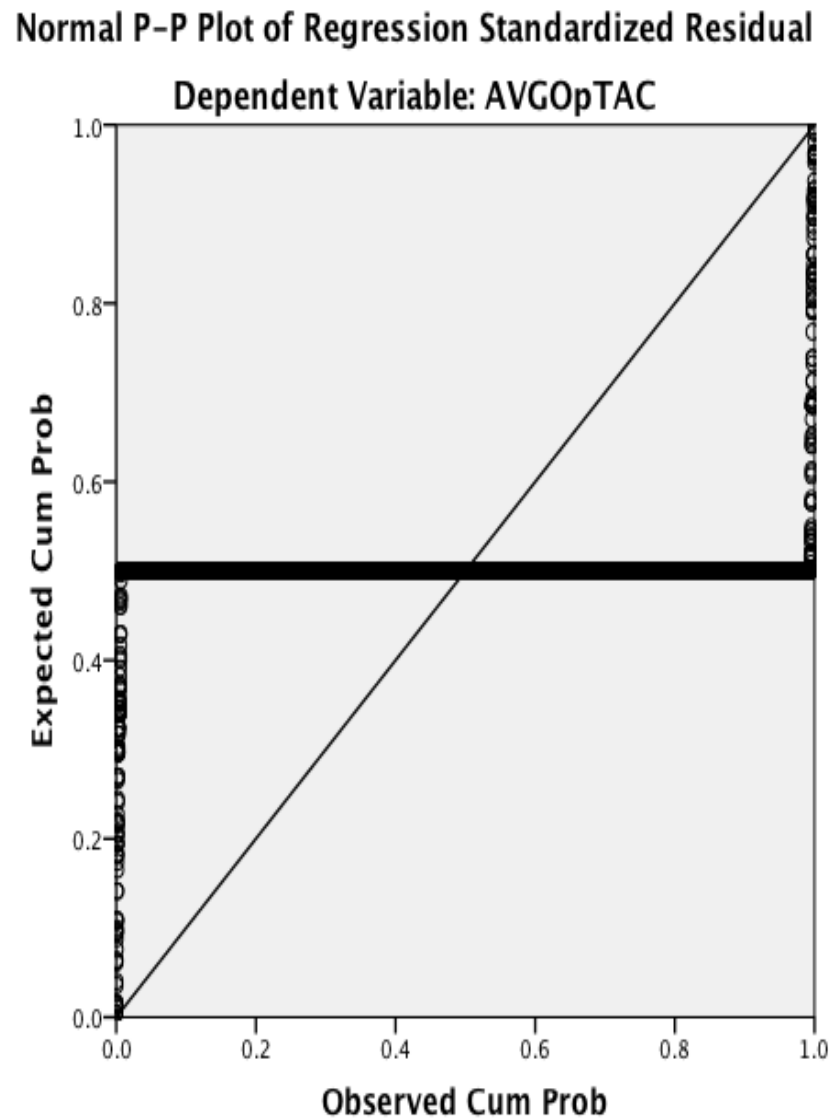


Figure B7. Normal P-P Plot of Regression when the Dependent Variable is Opinion on Teachers Ability to Cope

Normal P-P Plot of Regression Standardized Residual
Dependent Variable: TREATMENT

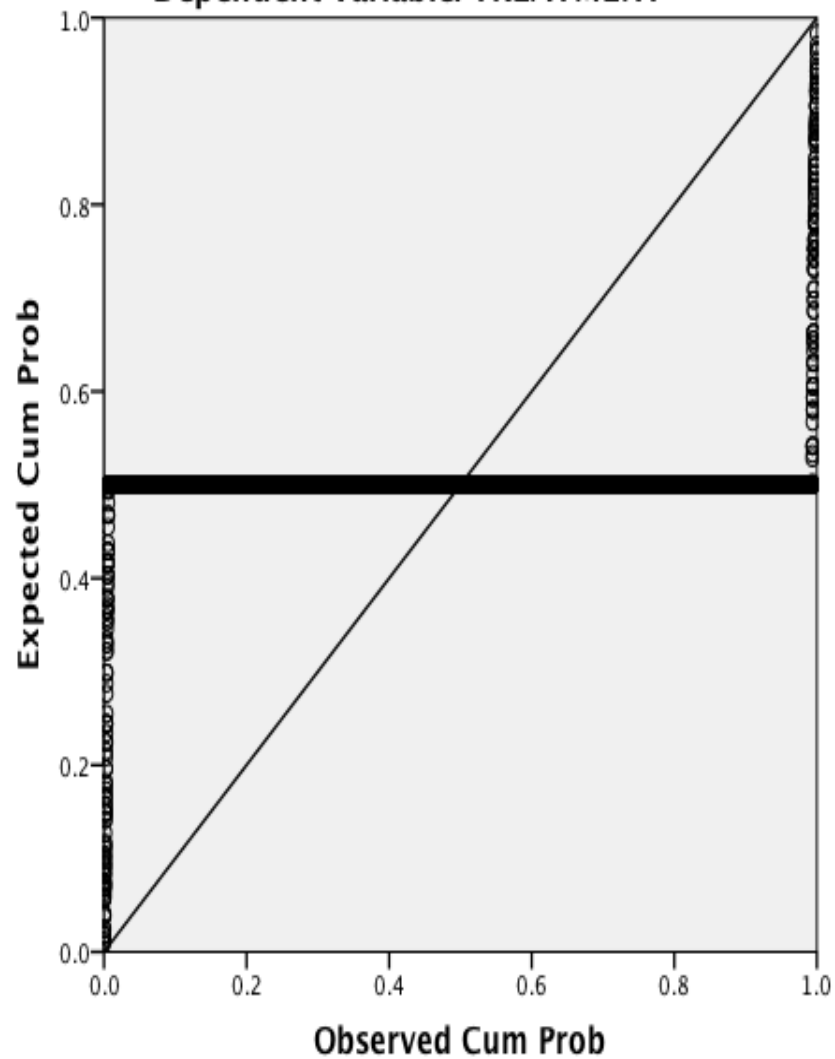


Figure B8. Normal P-P Plot of Regression when the Dependent Variable is Knowledge of ADHD Treatment

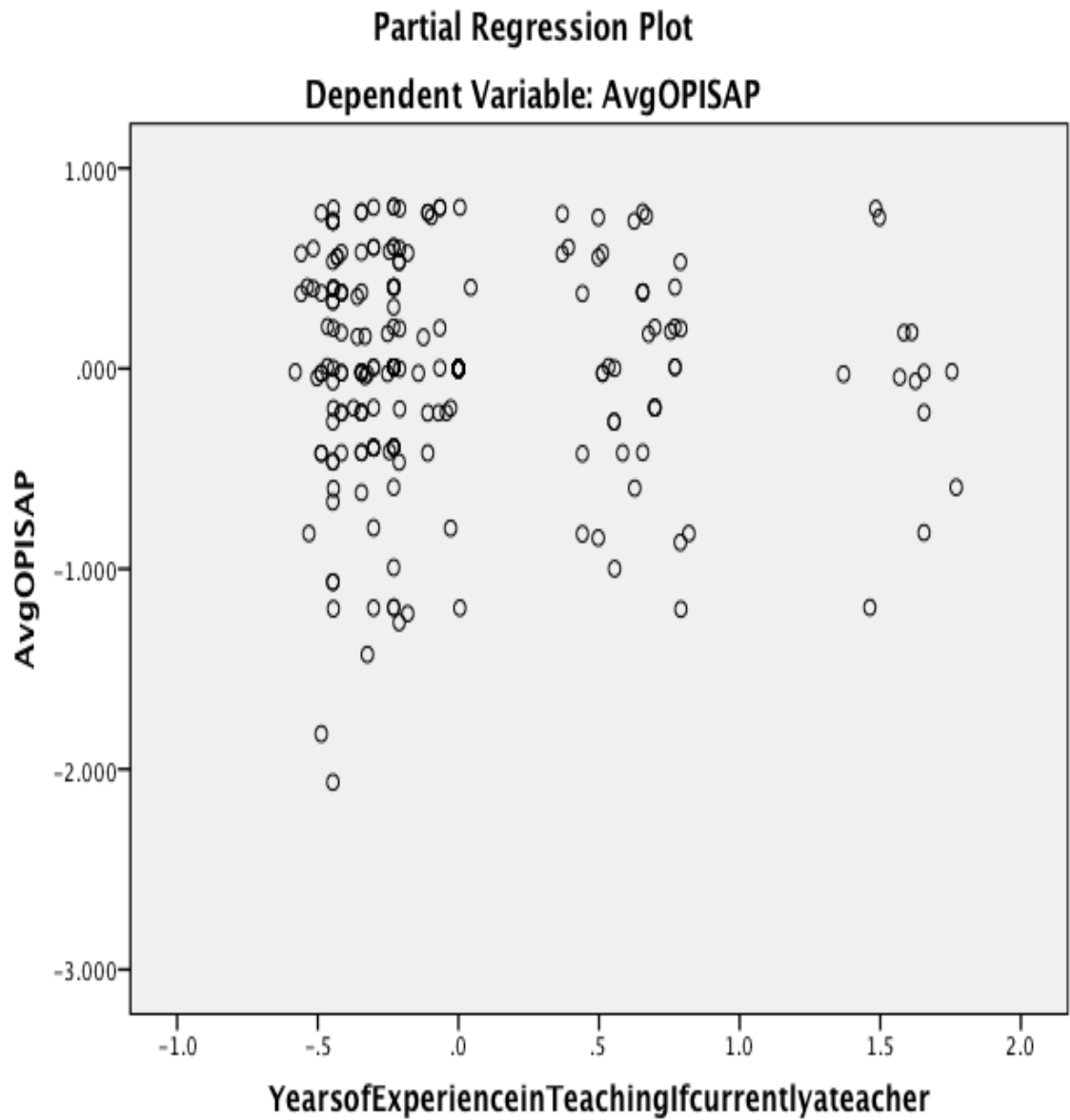


Figure B9. Partial Regression when the Dependent Variable is Opinions on Information Acceptability

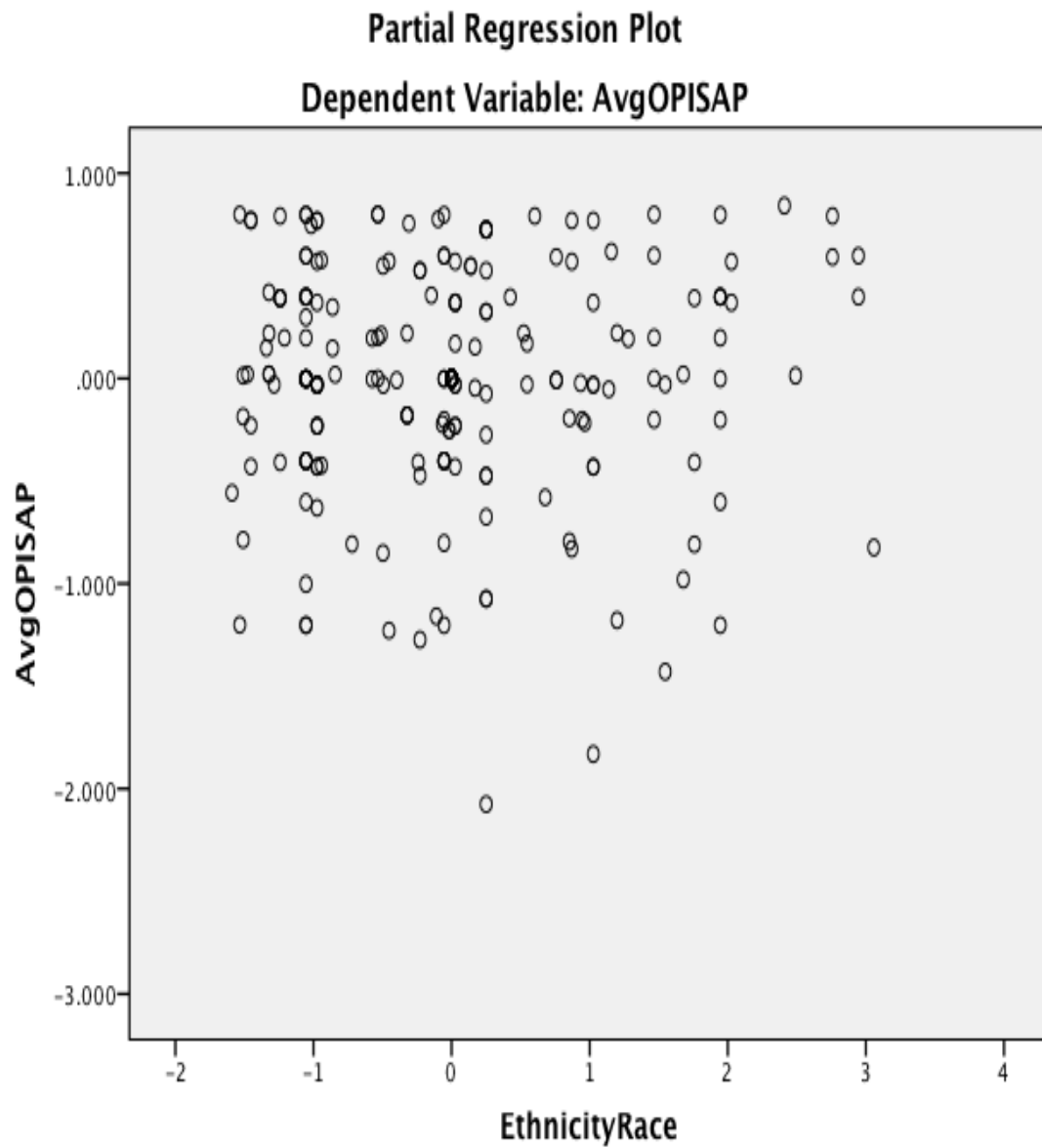


Figure B10. Partial Regression when the Dependent Variable is Opinions on Information Acceptability

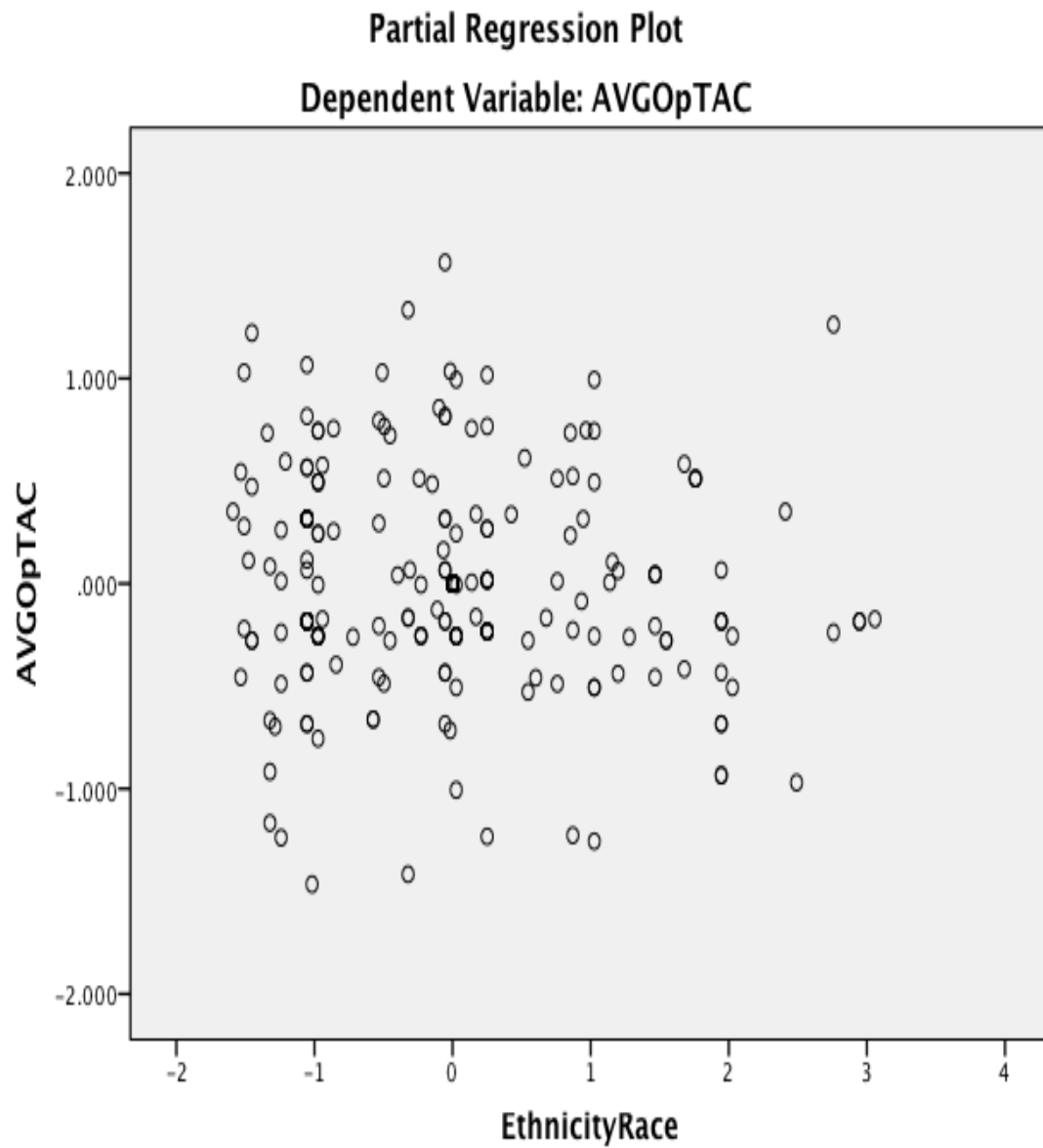


Figure B11. Partial Regression when the Dependent Variable is Opinions on Information Acceptability

APPENDIX C

Hierarchical Regression Formulas

$$\begin{aligned}
 \text{Level of ADHD Knowledge}_i &= b_0 + b_1SESi + b_2YOEi + b_3SchLevi + b_4Ethn/ \\
 &Raci + b_5SpecAreai \\
 &= 16.83 + (-.03ses_i) + (2.92yoe_i) + (.84schlev_i) + (-.61ethn/rac_i) + (-.56specarea_i)
 \end{aligned}$$

Figure C1. Hierarchical Regression formula for the prediction of level of ADHD knowledge.

$$\begin{aligned}
 \text{Opinions about Medication} &= b_0 + b_1SESi + b_2YOEi + b_3SchLevi + b_4Ethn/ \\
 &Raci + b_5SpecAreai \\
 &= 3.11 + (-.03ses_i) + (.11yoe_i) + (-.09schlev_i) + (-.02ethn/rac_i) + (-.06specarea_i)
 \end{aligned}$$

Figure C2. Hierarchical Regression formula for the prediction of Teacher Opinions about Medication.

$$\begin{aligned}
 \text{Opinions on Training Session Acceptability}_i &= b_0 + b_1SESi + b_2YOEi + \\
 &b_3SchLevi + b_4Ethn/Raci + b_5SpecAreai \\
 &= 4.22 + (.00ses_i) + (-.02yoe_i) + (-.03schlev_i) + (.004ethn/rac_i) + (.02specarea_i)
 \end{aligned}$$

Figure C3. Hierarchical Regression formula for the Prediction of level of Opinions on Training Session Acceptability.

$$\begin{aligned}
 \text{Opinions about Training Session Feasibility}_i &= b_0 + b_1SESi + b_2YOEi + \\
 &b_3SchLevi + b_4Ethn/Raci + b_5SpecAreai \\
 &= 3.5 + (-.01ses_i) + (-.05yoe_i) + (-.09schlev_i) + (-.06ethn/rac_i) + (-.02specarea_i)
 \end{aligned}$$

Figure C4. Hierarchical Regression formula for the prediction of Teacher Opinions about Training Session Feasibility.

$$\text{Teachers}'\text{Ability to Cope}_i = b_0 + b_1\text{SESi} + b_2\text{YOE}_i + b_3\text{SchLevi} + b_4\text{Ethn/Raci} + b_5\text{SpecArea}_i$$

$$= 3.34 + (-.04\text{ses}_i) + (.24\text{yoe}_i) + (-.07\text{schlev}_i) + (-.04\text{ethn/rac}_i) + (-.02\text{specarea}_i)$$

Figure C5. Hierarchical Regression formula for the prediction of teachers' ability to cope.

$$\text{Teacher Opinions about Student Misbehavior}_i = b_0 + b_1\text{SESi} + b_2\text{YOE}_i + b_3\text{SchLevi} + b_4\text{Ethn/Raci} + b_5\text{SpecArea}_i$$

$$= 3.17 + (-.09\text{ses}_i) + (-.23\text{yoe}_i) + (-.26\text{schlev}_i) + (.01\text{ethn/rac}_i) + (-.09\text{specarea}_i)$$

Figure C6. Hierarchical Regression formula for the prediction of Teacher Opinions About Student Misbehavior.

$$\text{Knowledge of Treatment}_i = b_0 + b_1\text{AvgOpMedication}_i$$

$$= 3.53 + (.63\text{avgopmed}_i)$$

Figure C7. Hierarchical Regression formula for the prediction of Knowledge about ADHD Treatment.

Appendix D

Demographic Survey

Demographic Survey

Please complete the demographic items below based on your experience:

Indicate the one that applies to you:

Gender: (Male) (Female) (Other)

Age: _____

Ethnic Background (Based on aggregate reporting requirements of the US Department of Education): Hispanic/Latino of any race, American Indian or Alaskan native, Asian American or Asian of any race, African American or Black of any race, European-American or White of any race, Native Hawaiian or other Pacific-Islander, Other: (please specify) _____

School Level you plan to teach in or are currently teaching:

Early Primary (Early Childhood -2nd) Later Primary (3rd -5th)

Specialty Area: General Education Special Education Bilingual Education

Years of Experience in Teaching (If Currently A Teacher): (0 years) (1-5 years) (6-10 years) (10+ years)

Current Classification (If Currently a Student): Freshman Sophomore Junior Senior

Socioeconomic status: Low Middle High

Do you have any children? _____ Does your child have ADHD? _____

Do you know of anyone with children who have ADHD? _____

Have you learned anything in your training (or in your current work experience) about working with students with ADHD? _____. If yes, explain.

What are the types of sources (i.e. personnel and resources) of help in the school setting available to teachers for students with ADHD? List all of the options that you can think of.

TEACHER KNOWLEDGE OF ADHD

Appendix E

KADDS

Knowledge of Attention Deficit Disorders Scale

Please answer the following questions regarding Attention Deficit Hyperactivity Disorder (ADHD). If you are unsure of an answer, respond Don't Know (DK), DO NOT GUESS.

1. Most estimates suggest that ADHD occurs in approximately 15% of school age children.

True

False

Don't Know

2. Current research suggests that ADHD is largely the result of ineffective parenting skills.

True

False

Don't Know

3. ADHD children are frequently distracted by extraneous stimuli.

True

False

Don't Know

4. ADHD children are typically more compliant with their fathers than with their mothers.

True

False

Don't Know

5. In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.

True

False

Don't Know

6. ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population.

True

False

Don't Know

7. One symptom of ADHD children is that they have been physically cruel to other people.

True

False

Don't Know

8. Antidepressant drugs have been effective in reducing symptoms for many ADHD children.

True

False

Don't Know

9. ADHD children often fidget or squirm in their seats.

True

False

Don't Know

10. Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment.

True

False

Don't Know

11. It is common for ADHD children to have an inflated sense of self-esteem or grandiosity.

True

False

Don't Know

12. When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.

True

False

Don't Know

13. It is possible for an adult to be diagnosed with ADHD.

True

False

Don't Know

14. ADHD children often have a history of stealing or destroying other people's things.

True

False

Don't Know

15. Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction.

True

False

Don't Know

16. Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity.

True

False

Don't Know

17. Symptoms of depression are found more frequently in ADHD children than in non-ADHD children.

True

False

Don't Know

18. Individual psychotherapy is usually sufficient for the treatment of most ADHD children.

True

False

Don't Know

19. Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.

True

False

Don't Know

20. In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.

True

False

Don't Know

21. In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school).

True

False

Don't Know

22. If an ADHD child is able to demonstrate sustained attention to video games or TV for over an hour, that child is also able to sustain attention for at least an hour of class or homework.

True

False

Don't Know

23. Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.

True

False

Don't Know

24. A diagnosis of ADHD by itself makes a child eligible for placement in special education.

True

False

Don't Know

25. Stimulant drugs are the most common type of drug used to treat children with ADHD.

True

False

Don't Know

26. ADHD children often have difficulties organizing tasks and activities.

True

False

Don't Know

27. ADHD children generally experience more problems in novel situations than in familiar situations.

True

False

Don't Know

28. There are specific physical features which can be identified by medical doctors (e.g. pediatrician) in making a definitive diagnosis of ADHD.

True

False

Don't Know

29. In school age children, the prevalence of ADHD in males and females is equivalent.

True

False

Don't Know

30. In very young children (less than 4 years old), the problem behaviors of ADHD children (e.g. hyperactivity, inattention) are distinctly different from age-appropriate behaviors of non-ADHD children.

True

False

Don't Know

31. Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.

True

False

Don't Know

32. The majority of ADHD children evidence some degree of poor school performance in the elementary school years.

True

False

Don't Know

33. Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.

True

False

Don't Know

34. Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.

True

False

Don't Know

35. Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.

True

False

Don't Know

36. Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.

True

False

Don't Know

37. Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood.

True

False

Don't Know

38. If a child responds to stimulant medications (e.g., Ritalin), then they probably have ADHD.

True

False

Don't Know

39. Children with ADHD generally display an inflexible adherence to specific routines or rituals.

True

False

Don't Know

TEACHER KNOWLEDGE OF ADHD

Appendix F

Teacher Opinions About ADHD Scale

Teacher Opinions About ADHD Scale

Instructions: For the following statements, please relate **your own opinions** by circling the number that is **most representative** of your views. Base your responses on a student in your classroom who has ADHD, or if you are not in the classroom, base your response on a hypothetical situation. Please complete this survey at your earliest convenience..

- 1.) I believe that medication could help my students with ADHD.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 2.) I would be reluctant to start any child on medication for ADHD.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 3.) I believe that medication for ADHD is basically safe and has only minor side effects.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 4.) I am confident that medication is safe for my student if a doctor who is knowledgeable about ADHD recommends it.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 5.) Television and newspaper reports about Ritalin and other ADHD drugs have made me very uneasy about giving children medication.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 6.) Teachers in our school could benefit from information sessions to learn how to cope better with our students with ADHD.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 7.) My student's behavior is so difficult to control that sometimes I feel like a failure as a teacher.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 8.) I would be reluctant to have teachers in our school attend information sessions to find better ways to work with our students with ADHD.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 9.) This is not a good time for teachers in our school system to attend information sessions.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 10.) I could benefit from possible information sessions to help me manage my student with ADHD in better ways.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 11.) Group training sessions would probably be helpful to us.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 12.) If a school psychologist recommends that our teachers participate in ADHD information sessions, I would go despite not wanting to go.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 13.) I think that teacher's busy schedules would make it difficult for us to arrange information sessions to learn more about ADHD.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

- 14.) A cut in our school finances will make it difficult for our teachers to follow through with information sessions, if recommended for our teachers at the present time.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

15.) Teachers should have no difficulty attending information sessions.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

16.) Information sessions would probably be too expensive for our school to get involved with at this time.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

17.) When students in my classroom misbehave, other teachers usually tell me I do not know how to manage my students the correct way.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

18.) In general, I think I know how to handle my students with ADHD pretty well.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

19.) Other teachers are pretty impressed by the way I handle my students with ADHD.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

20.) I have a good understanding of my student's emotional needs.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

21.) I am confident in my ability to manage my students with ADHD in the classroom.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

22.) Doctors should take into account teachers' opinions about what is best for their students when making treatment recommendations.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

23.) A doctor's recommendations are generally based upon sound scientific evidence and should be followed regardless of my personal beliefs or feelings.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

24.) Medical experts generally know the best treatments for ADHD.

1	2	3	4	5
Strongly Disagree	Disagree	N/A	Agree	Strongly Agree

Appendix G

Letter of Recruitment

Letter of Recruitment (University of Houston, Main campus)

Dear Dr. Pierson,

I am excited to announce that I have begun the process of developing my dissertation project. As we have discussed in our informal conversations, the purpose of my dissertation project is to understand how race/ethnicity, specialty area (i.e. general education, special education and bilingual education), school level, and years of experience do or do not affect future teachers' and current teachers' level of ADHD knowledge and opinions. This study is important to the field of school psychology because one of the main contacts for the school psychologist in regard to a student's academic and behavioral functioning is the teacher. Given that most teachers are integral in the rating of certain behaviors, school psychologists should be knowledgeable with regard to how certain factors, such as race/ethnicity and specialty area, may affect a teacher's knowledge and opinions about certain disorders, which may, in turn, have an impact on how they rate a child's behavior in the classroom.

With respect to the study participants, I would like to assess students from the Quest Program in all levels and students who have graduated from the program. If granted permission to assess students and graduates, they will be recruited through email and will have the opportunity to complete an on-line survey.

Completion of the demographic questionnaire, the Teacher Opinions about ADHD scale, and the Knowledge of Attention Deficit Disorders Scale will take between 30 minutes to an hour. For completing the study, students will have the opportunity to enter their names into a drawing to win one of eight \$25.00 gift certificates (which will be given away once data collection is complete).

If you would be interested in having your students participate in this dissertation research project, please contact me at kennethafrye@yahoo.com. I look forward to hearing from you.

Sincerely,

Kennetha Frye, M.S.

School Psychology-Doctoral Student

University of Houston

Appendix H

Letter of Recruitment

Letter of Recruitment (University of Houston, Downtown)

Dear Ms. Hill,

I am excited to announce that I have begun the process of developing my dissertation project. As we have discussed in our informal conversations, the purpose of my dissertation project is to understand how race/ethnicity, specialty area (i.e. general education, special education and bilingual education), school level, and years of experience do or do not affect future teachers' and current teachers' level of ADHD knowledge and opinions. This study is important to the field of school psychology because one of the main contacts for the school psychologist in regard to a student's academic and behavioral functioning is the teacher. Given that most teachers are integral in the rating of certain behaviors, school psychologists should be knowledgeable with regard to how certain factors, such as race/ethnicity and specialty area, may affect a teacher's knowledge about certain disorders, which may, in turn, have an impact on how they rate a child's behavior in the classroom.

With respect to the study participants, I would like to assess students from the Department of Urban Education in all levels and students who have graduated from the program. If granted permission to assess students and graduates, they will be recruited through email and will have the opportunity to complete an on-line survey.

Completion of the demographic questionnaire, the Teacher Opinions about ADHD scale, and the Knowledge of Attention Deficit Disorders Scale will take between 30 minutes to an hour. For completing the study, students will have the opportunity to enter their names into a drawing to win one of eight \$25.00 gift certificates (which will be given away once data collection is complete). If you would be interested in having your students participate in this dissertation research project, please contact me at kennethafrye@yahoo.com. I look forward to hearing from you.

Sincerely,

Kennetha Frye, M.S.

School Psychology-Doctoral Student

University of Houston

TEACHER KNOWLEDGE OF ADHD

Appendix I

Request to make modifications to the AKOS-R

Request to make modifications to the AKOS-R

Dear Dr. Power,

My name is Kennetha Frye and I am a current student at the University of Houston working on my dissertation, under my advisor Dr. Milena Keller-Margulis. The title of my dissertation is “The Relationship Between Race/Ethnicity and Other Demographic Variables and Level of ADHD knowledge: A Comparison between Pre-Service and In-Service Teachers.” The purpose of my dissertation project is to understand how race/ethnicity, specialty area (i.e. general education, special education and bilingual education), school level, and years of experience may affect future teachers’ and current teachers’ level of ADHD knowledge and opinions. This study is important to the field of school psychology because one of the main persons of contact for the school psychologist in regard to a student’s academic and behavioral functioning is the teacher. Given that most teachers are considered integral in the rating of certain behaviors, school psychologists should be knowledgeable about how certain factors, such as race/ethnicity and area of specialization, affect a teacher’s knowledge of certain disorders, which may, in turn, have an impact on how they rate a child’s behavior in the classroom. I wanted to obtain your approval to modify the opinions scale that was developed by you and your colleagues to address teachers’ opinions about ADHD. To my knowledge, there is currently not a measure that has been developed to assess for this domain. I look forward to hearing from you.

Best,

Kennetha Frye, M.S.
School Psychology-Doctoral Student
University of Houston

TEACHER KNOWLEDGE OF ADHD

Appendix J

Request to use the KADDS

Request to use the KADDS

Dear Dr. Sciutto,

My name is Kennetha Frye and I am a current student at the University of Houston working on my dissertation, under my advisor Dr. Milena Keller-Margulis. The title of my dissertation is “The Relationship Between Race/Ethnicity and Other Demographic Variables and Level of ADHD Knowledge: A Comparison between Pre-Service and In-Service Teachers.” The purpose of my dissertation project is to understand how race/ethnicity, specialty area (i.e. general education, special education and bilingual education), school level, and years of experience may affect future teachers’ and current teachers’ level of ADHD knowledge. This study is important to the field of school psychology because one of the main persons of contact for the school psychologist in regard to a student’s academic and behavioral functioning is the teacher. Given that most teachers are integral in the rating of certain behaviors, school psychologists should be knowledgeable of how certain factors, such as race/ethnicity and area of specialization, affect a teacher’s knowledge about certain disorders, which may, in turn, influence how they rate a child’s behavior in the classroom. I wanted to obtain your approval to use the KADDS to assess for teacher knowledge in my dissertation project. Please let me know at your earliest convenience if it would be possible for me to use the measure. I look forward to hearing from you.

Best,

Kennetha Frye, M.S.

School Psychology-Doctoral Student

University of Houston

Appendix K

Parent Opinions About ADHD-subscale

Parent Opinions About ADHD-subscale

The Parent Opinions About ADHD-subscale was normed on 87 mothers and 63 fathers (Power, Karustis & Habboushe, 2001) and has three factors: Counseling Acceptability, Medication Acceptability, and Counseling Feasibility. Internal consistency coefficients for each factor were high (Counseling acceptability, .85; Medication Acceptability, .89; and Counseling Feasibility, .76). Five-week test-retest reliability was conducted on a subsample of 23 parents and was as follows: Counseling Acceptability ($r=.59$), Medication Acceptability ($r=.91$), and Counseling Feasibility ($r=.92$). Predictive validity for all three factors was assessed. The authors employed a discriminant function analysis to examine whether parent ratings of Counseling Feasibility and Acceptability at intake could predict if parents would actually initiate recommended counseling. Results revealed that the discriminant functional analysis was not significant for either mothers ($p=.40$) or fathers ($p=.87$) demonstrating that their ratings at intake were not predictive of actual adherence. However, child externalizing problems that were reported by the parent did indeed predict the number of counseling sessions attended at follow-up ($p < .05$).

Appendix L

KADDS Recoding Scheme and Subscales

Recodes:

Correct answer is false:

(1 = 0) (2=1) (3=0) Items: 1, 2, 7, 11, 12, 14, 18, 19, 22, 23, 24, 27, 28, 29, 30, 34, 35, 36, 37, 38, 39

Correct answer is true:

(1=1) (2=0) (3=0) Items: 3, 4, 5, 6, 8, 9, 10, 13, 15, 16, 17, 20, 21, 25, 26, 31, 32, 33

KADDS Subscales:

Associated Features (i.e., General): 1, 4, 6, 13, 17, 19, 22, 24, 27, 28, 29, 30, 31, 32, 33

Symptoms/Diagnosis: 3, 5, 7, 9, 11, 14, 16, 21, 26

Treatment: 2, 8, 10, 12, 15, 18, 20, 23, 25, 34, 35, 36