



SELF-PERCEIVED AND ACTUAL KNOWLEDGE OF ATTENTION-  
DEFICIT/HYPERACTIVITY DISORDER: A COMPARISON BETWEEN  
GRADUATE STUDENTS IN MEDICINE, MENTAL HEALTH, AND EDUCATION

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

In Partial Fulfillment  
of the Requirements for the Degree

Doctor of Philosophy

by

Stephanie B. Hofer

August, 2010

SELF-PERCEIVED AND ACTUAL KNOWLEDGE OF ATTENTION-  
DEFICIT/HYPERACTIVITY DISORDER: A COMPARISON BETWEEN  
GRADUATE STUDENTS IN MEDICINE, MENTAL HEALTH, AND EDUCATION

A Dissertation Proposal for the Degree

Doctor of Philosophy

by

Stephanie B. Hofer

---

Dr. Thomas Kubiszyn, Chair

---

Dr. Thomas Schanding, Committee Member

---

Dr. Catherine Horn, Committee Member

---

Dr. Nicole Andrews, Committee Member

---

Dr. David Curtis, Committee Member

---

Dr. Robert K. Wimpelberg, Dean  
College of Education

August, 2010

SELF-PERCEIVED AND ACTUAL KNOWLEDGE OF ATTENTION-  
DEFICIT/HYPERACTIVITY DISORDER: A COMPARISON BETWEEN  
GRADUATE STUDENTS IN MEDICINE, MENTAL HEALTH, AND EDUCATION

An Abstract  
of  
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

by

Stephanie B. Hofer

August 2010

Hofer, Stephanie B. "Self-perceived and actual knowledge of Attention-Deficit Hyperactivity/Disorder: A comparison between graduate students in medicine, mental health, and education." Unpublished Doctor of Philosophy Dissertation, University of Houston, June 2010.

### Abstract

Attention-Deficit/Hyperactivity Disorder (ADHD) is a common and increasingly diagnosed disorder among school-age children. Medical professionals, mental health professionals and educators can play an integral role in the identification, assessment and treatment process; therefore, it is helpful to know how much knowledge of ADHD graduate students in these fields possess.

The present study assessed self-perceived and actual knowledge of ADHD between graduate students in medicine, mental health, and education. Participants were graduate students in medicine, mental health, and education from the Houston/Galveston area. Participants completed an online survey measuring self-perceived and actual knowledge of ADHD.

A bivariate correlation was conducted to determine the relationship between self-perceived and actual knowledge. A Multivariate Analysis of Variance (MANOVA) was used to compare between group differences in self-perceived and actual knowledge. The covariate was years of graduate/professional training. Descriptive statistics were used to assess levels of ADHD training and to identify current and preferred sources of ADHD training.

Results from the study showed a significant positive correlation between self-perceived and actual knowledge. Results from the MANOVA showed graduate fields of study were significantly associated with both dependent variables. Further analysis indicated a significant difference in both self-perceived and actual knowledge between graduate students in mental health and in medicine, with the mental health sample having higher levels of knowledge. The sample of graduate students in education did not show any significant differences compared to the other two fields. Graduate students in mental health had the highest levels of self-perceived and actual knowledge, followed by the education sample and then medicine.

Graduate students in the three fields generally reported below average to average levels of training regarding ADHD from their graduate programs. Regarding where graduate students prefer to receive ADHD training, all graduate students reported that they prefer to receive more ADHD training from multiple sources including classes, articles, and workshops.

Future research may want to further assess the level of training regarding ADHD provided by graduate programs and determine what should be considered an adequate level of knowledge for future practitioners. In addition, outcomes of this study may also support future research on a collaborative consultation model.

TABLE OF CONTENTS

Chapter .....	Page
I. INTRODUCTION .....	1
II. Review of Literature.....	3
Overview of ADHD.....	3
ADHD: Fact or Fad.....	4
Assessment of ADHD.....	5
Treatment of ADHD: Psychosocial .....	8
Treatment of ADHD: Psychopharmalogical.....	10
Treatment of ADHD: Combined .....	14
Training of Graduate Students.....	16
Competency-Based Assessment .....	22
The Gap between Research and Practice .....	24
Other Challenges in Diagnosis and Treating ADHD.....	30
Self-Perceived Knowledge Compared to Actual Knowledge.....	33
Knowledge of ADHD .....	35
Importance of Assessing Knowledge of ADHD.....	44
Research Questions.....	45
Hypotheses.....	46
III. METHODOLOGY .....	49
Design .....	49
Participants.....	50
Missing Data .....	52
Instumentation.....	52

Variables .....	54
Procedure .....	55
Data Analysis .....	56
IV. RESULTS.....	58
Descriptive Statistics.....	58
Differences Between Self-perceived and Actual Knowledge.....	59
Differences Based on Graduate Field of Study.....	60
Level of ADHD Training from Graduate Programs .....	63
Current and Preferred Sources .....	64
V. DISCUSSION.....	71
Limitations .....	81
Future Directions .....	84
REFERENCES .....	87
APPENDIX A Demographic Information .....	99
APPENDIX B Consent to Participate.....	101
APPENDIX C Self-Perceived Knowledge Questionnaire.....	105
APPENDIX D Knowledge Attention Deficit Disorder Scale (KADDS) .....	108
APPENDIX E Perceived and Actual Sources of Knowledge of ADHD.....	115
APPENDIX F Demographic Questionnaire .....	119
APPENDIX G Information Regarding Diagnosis and Treatment of ADHD.....	121
APPENDIX H Recruitment Flyer.....	126
APPENDIX I Approval Letters from Departments.....	128
APPENDIX J Permission to use KADDS .....	135

LIST OF TABLES

Table .....	Page
1 Response Rates of Participants .....	51
2 Means and Standard Deviations.....	59
3 Correlation for Self-Perceived and Actual Knowledge .....	60
4 ANOVA .....	62
5 Post Hoc Tests .....	63
6 Current and Preferred Sources of Information: Medicine .....	67
7 Current and Preferred Sources of Information: Mental Health .....	68
8 Current and Preferred Sources of Information: Education .....	69
9 Frequently Missed Questions.....	78

LIST OF FIGURES

Figure	Page
1 Level of Training Received .....	64

Running Head: SELF-PERCEIVED AND ACTUAL KNOWLEDGE OF ADHD

Self-perceived and actual knowledge of Attention-Deficit/Hyperactivity Disorder:  
A comparison between graduate students in medicine, mental health, and education

Stephanie Hofer

University of Houston

## **Chapter I**

### **Introduction**

#### *Overview*

Attention-Deficit/Hyperactivity Disorder (ADHD) is a very common disorder diagnosed among the pediatric population (Barkley, 2009). As a result of the number of children/adolescents diagnosed with ADHD, there is an abundance of research available on empirically supported methods of identifying and treating ADHD. In addition, there are professionals from multiple disciplines who aide in diagnosing and treating this disorder. Medical providers, mental health providers, and educators can all play roles throughout the diagnostic and treatment process. Educators are often the first to recognize symptoms of ADHD and then report their concerns to their student's parents. Subsequently, a family may seek advice from their medical or mental health provider who can diagnose and treat the disorder. Although medical providers, mental health providers, and educators frequently work with children and adolescents with ADHD, previous studies have indicated a lack of knowledge among practicing professionals regarding ADHD (Glascoe & Robertshaw, 2007; Scituito, Nolfi, & Bluhm, 2004). Furthermore, professionals who work with children/adolescents with ADHD often request additional training regarding assessment and treatment of ADHD (Williams, Klinepeter, Palmes, Pulley, & Meschan, 2004; Curtis, Pisecco, Hamilton, & Moore, 2006; Snider, Busch, & Arrowood, 2003). If practicing professionals are currently requesting more training regarding ADHD, how much knowledge of ADHD do graduate students possess?

#### *Purpose of Study*

It is important to assess graduate students from medicine, mental health and education's level of ADHD knowledge. Graduate training programs in medicine, mental health, and education aim to prepare their students for practice in their chosen profession; however, it is unclear if these future practitioners have the knowledge necessary to apply evidence-based practices in diagnosing and treating ADHD. In addition, graduate students in medicine, mental health, and education may perceive their knowledge of ADHD to be greater than it actually is. Thus, there may be a gap between students' self-perceived and actual knowledge regarding ADHD that can affect assessment and treatment practices. Research has indicated that self-perceived knowledge of a concept may be greater than actual knowledge (Park, 2000; Ruble, Walters, Yu, & Setchel, 2001; Tenenbergh & Murphy, 2005). This discrepancy can potentially impact diagnostic and treatment decisions. This study will assess self-perceived and actual knowledge of ADHD between graduate students in medicine, mental health, and education. Additionally, the study will compare knowledge of ADHD among the three groups. Information will also be collected concerning level of ADHD training received through graduate training programs and current and preferred sources of ADHD training.

## Chapter II

### Literature Review

#### *Overview of Attention-Deficit/Hyperactivity Disorder*

Attention-Deficit/Hyperactivity Disorder (ADHD) is a commonly diagnosed childhood disorder (Barkley, 2003). According to the *Diagnostic and Statistical Manual of Mental Disorders 4th ed., Text Revision (DSM-IV TR)*, “the essential feature of Attention-Deficit Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently displayed and more severe than is typically observed in individuals at a comparable level of development” (American Psychiatric Association, 2000, p. 85). There are three main subtypes of ADHD, the Predominately Inattentive Type (the inability to attend to external stimuli), the Predominately Hyperactive/Impulsive Type (excessive movement or the inability to control impulses), and the Combined Type. The prevalence of ADHD as reported by the DSM-IV TR is 3-7% of school age children (American Psychiatric Association, 2000); however, more recent studies have indicated an increased prevalence between 5-8% of school age children (Froehlich et al., 2007; Polanczyk, Silva de Lima, Horta, Biederman, & Rohde, 2007). Although ADHD is most commonly diagnosed in childhood, symptoms usually persist through adulthood (Barkley, 1998).

Children with ADHD often present deficits across multiple domains of functioning due to the disorder (behavioral, social, and academic) (Anastopoulos, DuPaul, & Barkley, 1991). In addition, Anastopoulos and Farley (2003) report that children with ADHD may experience new difficulties later in adolescence and early adulthood that can include “traffic violations and experimentation with alcohol and

drugs” (p. 188). Barkley (2009) reported that peer relationships problems are present in 50-70% of children and adolescents diagnosed with ADHD. “The large number of symptoms associated with ADHD, combined with variety of risk factors, as well as the numerous other comorbid diagnoses and deficits, requires treatment to be multidisciplinary as well as multimodal in nature” (Anastopoulos, DuPaul, & Barkley, 1991, p. 210). Because of these impairments and the pervasiveness and commonality of ADHD, it is important for professionals working with children to understand the evidence-based assessment and treatment options available to children with ADHD.

*ADHD: Fact or Fad*

The number of treatments available for children with ADHD may provide an indicator of the commonality of the disorder. ADHD is a diagnosis that has become mainstreamed through media and lay persons (Danforth & Navarro, 2001). Due to the commonality of the disorder, many people learn about ADHD through popular media sources. Unfortunately, media outlets do not always provide adequate or clear information. They may present information in a way that sensationalizes the concept and makes it the “buzz word” of the week. Due to the increase in diagnoses and media attention, perceptions of ADHD can be varied and extreme. Opinions related to ADHD have included characterizing it as a “’90s cop-out for poor parenting or teaching skills” and “an excuse for not paying attention” (Danforth & Navarro, 2001, p. 182). These misinformed and distorted ideas have caused scientists from around the world to unite to address the misconceptions and the media’s portrayal of the diagnosis of ADHD (Barkley et al., 2002). Many health professionals stress the importance of understanding the disorder of ADHD due to the possible implications.

Follow-up studies of clinical samples suggest that sufferers are far more likely...to drop out of school (32–40%), to rarely complete college (5–10 %), to have few or no friends (50–70 %), to underperform at work (70–80 %), to engage in antisocial activities (40–50 %), and to use tobacco or illicit drugs....Moreover, children growing up with ADHD are more likely to experience teen pregnancy (40 %) and sexually transmitted diseases (16 %), to speed excessively and have multiple car accidents, to experience depression (20–30%) and personality disorders (18–25 %) as adults and in hundreds of other ways mismanage and endanger their lives (Barkley et al., 2002, p. 97).

With these troubling outcomes in mind, both people with ADHD and their caregivers should understand the different treatment options available for the disorder. Yet according to Barkley et al. (2002), more than half of those diagnosed with ADHD are not receiving treatment. As Barkley and colleagues note, lack of treatment may be due to lack of knowledge about ADHD, treatment availability, and/or efficacy of the current treatments.

#### *Assessment of ADHD*

Research has been conducted on evidence-based assessments of ADHD which includes the utilization of rating scales, structured interviews, and observations (Pelham, Fabiano, & Massetti, 2005). In addition, to receive a diagnosis of ADHD, symptoms must be present in at least two settings; therefore it is necessary to obtain information from multiple raters (i.e., parents, teachers) and in multiple settings (i.e., home, school).

The American Academy of Pediatrics, AAP (2000) provides guidelines for diagnosing and evaluating ADHD. For a child to be diagnosed with ADHD, they are

required to meet the DSM-IV criteria for ADHD both in symptom count and severity of symptoms (i.e., symptoms must severely affect daily functioning). Another important component in assessing the presence of ADHD is information obtained from parents/caregivers. Information can be gathered through structured or unstructured interviews and behavioral measures. Interviews should assess current concerns including the presence of symptoms related to ADHD. In addition to the interviews, there are a variety of evidence-based measures that can be used for assessing ADHD. Broadband and narrowband instruments are typically used to assess behaviors related to ADHD. The measures are given to adults who typically interact with the child or adolescent (i.e., parent, teachers, day care workers, etc.). Broadband measures assess a breadth of behavioral and emotional domains of the child or adolescent and then use norm comparisons and assess functional impairment. The AAP recommends that broadband measures be used to screen for symptoms of ADHD and they can be used to support information obtained throughout the evaluation (i.e., interviews, observations, etc.). Narrowband measures focus on specific ADHD symptoms, such as inattention, hyperactivity, and impulsivity. They help determine the prevalence and degree of these symptoms in a child or adolescent. In addition, narrowband measures can provide information that differentiates children/adolescents with ADHD from those without the disorder.

According to the AAP (2000), to diagnose ADHD, symptoms must be present in two or more settings. Assessing ADHD symptoms in multiple contexts and from multiple informants allows clinicians to determine if another diagnosis is warranted or if there is another explanation for the presenting behaviors. Information from the school

setting is extremely important due to the amount of time a child or adolescent typically spends in this environment. A child/adolescent's behavior in the classroom setting helps determine the presence of an ADHD diagnosis. If the child is only exhibiting ADHD-like behaviors in one-setting then it may not be ADHD (exclusionary diagnosis), and another diagnosis or cause for the problem behavior needs to be considered.

A number of studies have been conducted regarding assessment practices of ADHD, such as the Preschoolers with Attention-Deficit/Hyperactivity Treatment Study (PATS) (Posner, Melvin, Murray, Gugga, Fisher, et al., 2007). One of the purposes of PATS was to assess preschoolers presenting with symptoms of ADHD. In addition, the study also evaluated stimulant and psychosocial treatments for this population. Information from the study highlighted the challenges of diagnosing ADHD in preschoolers and the importance of using multiple-informants and assessing the child in multiple settings before diagnosing. The study also focused on the significance of determining comorbid disorders in preschoolers with symptoms of ADHD. Comorbid disorders provide an additional challenge in determining if symptoms are due to ADHD, another disorder, or if the child has more than one disorder. Other studies have also recognized the importance of assessing comorbid disorders in pediatric ADHD in addition to determining differential diagnosis (Baroni, Lunsford, Luckenbaugh, Towbin, & Leibenluft, 2009; Drabick, Gadow, & Sprafkin, 2006). Common comorbidities may include oppositional defiant disorder, communication disorder, anxiety disorder, conduct disorder, and depression, and differential diagnosis considerations may include bipolar disorder (Baroni et al., 2009; Drabick et al., 2006; Posner et al.). It is important to assess comorbid disorders and differential diagnoses because they may affect response to

treatment and therefore, can help guide evidence-based treatment decisions depending on the child's presenting symptoms. Based on the assessment information reviewed, there are many factors to consider when assessing for the presence of an ADHD diagnosis in the pediatric population.

*Treatment of ADHD: Psychosocial*

Although all people diagnosed with ADHD may not receive treatment, there are numerous research studies dedicated to determining the most efficacious treatments for children and adolescents diagnosed with ADHD. There are four empirically supported treatments for adolescents and children with ADHD: behavioral parent training, behavioral school-based interventions, intensive peer-focused behavioral interventions, and medication (American Academy of Pediatrics, 2001; Pelham & Fabiano, 2008).

Three of the four empirically supported treatments are psychosocial treatments: behavioral parent training, behavioral school-based and peer-focused behavioral interventions (Pelham & Fabiano).

Parent training is a psychosocial treatment for ADHD that is different from most other treatments because it works indirectly with the child through the parent or caregiver (Anastopoulous & Farley, 2003). Parent training provides parents with specific parenting skills and behavior modification techniques for children with ADHD. Parent training programs seek to provide the parents of a child/adolescent with ADHD the tools to help manage their child's behavior. Some components of a parent training program include psychoeducation regarding ADHD, exploring the parent/child interaction, emphasizing the importance on specific praise and positive reinforcement, utilizing effective commands, behavior management strategies for providing consequences for behavior

(i.e., token system, response-cost, time-out), and then generalizing skills to public places. Providing parents with core parenting skills and modifying how they manage their child's daily routine can significantly impact their child's behavior.

Behavioral classroom interventions are the second empirically supported psychosocial treatments that have shown to be efficacious in treating ADHD symptoms. According to DuPaul and Weyandt (2006), certain criteria should be present when initiating treatment in a school setting: roles of participants involved in school-based interventions should be clearly defined, treatment efficacy should be determined, and the treatment should not only treat the problem behavior, but it should also help increase appropriate and desirable behaviors. Each situation is unique to the child, and therefore, the intervention should be designed and implemented based on the behavior of that particular child or adolescent.

Behavioral classroom management is a well-established treatment for ADHD (Pelham & Fabiano, 2008). Behavioral classroom management includes the use of contingency management procedures where reinforcement is contingent upon a student's behavior. Interventions may include token economies, behavior charts and daily report cards (DuPaul & Weyandt, 2006). These interventions target a specific behavior or a few behaviors (e.g., looking at the teacher while he/she is talking, staying in his/her seat, etc.). Once a desired behavior is determined, then a system is put into place by a teacher where the behavior is monitored and appropriate behavior is rewarded using a visual system (e.g., a sticker or a token). The main purpose of these interventions is to increase desirable behaviors or decrease undesirable behaviors.

Behavioral interventions in the classroom not only help improve behavior, but can also help improve other areas of functioning. In many cases, ADHD symptoms coincide with academic impairment and research has revealed that “school-based treatments for ADHD are effective in the short run for reducing disruptive behaviors and improving on-task behavior and academic performance of children with ADHD” (Miranda, Jarque, & Tarraga, 2006, p.35); however, their long-term effect has yet to be determined.

The third evidenced-based treatment is intensive behavior interventions implemented in peer group/recreational settings (e.g., summer programs) (Pelham & Fabiano, 2008). The peer-focused behavioral interventions typically consist of day-long programs that are held for multiple weeks (five to eight weeks) and typically provide two hundred to four hundred hours of treatment. During treatment, children and adolescents engage in activities that consists of training in social skills, “coached group play in recreational activities concurrent with contingency management systems (e.g., point system, time out)” and school-home collaboration which consists of home rewards contingent upon peer interactions (Pelham & Fabiano, 2008 p. 197). The main focus of the treatment is to enhance social skills and improve peer interactions in a variety of contexts. Skills are evaluated through objective observations and frequency counts of observed social skills. Adults also rate social skills behaviors to determine child/adolescent progress.

#### *Treatment of ADHD: Psychopharmacology*

Medication is the fourth empirically supported treatment for ADHD and currently has the most support regarding its use (i.e., has been shown to significantly improve core

symptoms of ADHD) (MTA, 1999). A meta-analysis by Findling (2008) was conducted to determine current treatment practices of ADHD. Currently, stimulants (i.e., methylphenidate and amphetamines) are the most prescribed medications used to treat ADHD; however, other medications such as atomoxetine/Strattera and Guanfacine/Tenex and Intuniv are increasingly used. Studies included in the meta-analysis were required to “have a controlled design, enroll >100 subjects in a clinical trial and >20 subjects in a classroom study, assess symptoms with the most widely used scales and tests, and be published from 2000 to 2008” (Findling, 2008, p. 943). Based on the review of a sample of comprehensive studies (e.g., the Multimodal Treatment Study for ADHD-MTA) and guidelines from the American Academy of Pediatrics (2000), stimulant medications remain the first line of treatment for children and adolescents with ADHD. However, prescribers continue to prescribe a number of other medications to treat children and adolescents with ADHD (e.g., atomoxetine, antihypertensives, antidepressants, selective serotonin reuptake inhibitors (SSRI) (Brown, 2005).

As previously mentioned, the Preschool ADHD Treatment Study (PATs) not only assessed presenting problems of preschoolers with symptoms of ADHD, but its main purpose was to evaluate the efficacy of stimulant medication (methylphenidate-immediate release) in treating the preschool population (ages 3-5.5 years old) (Greenhill et al., 2006). A significant reduction in ADHD symptoms was found with the use of stimulant medication at dosages of 2.5 mg three times a day (t.i.d.), 5 mg t.i.d., and 7.5 mg t.i.d. (significant effects were not found at 1.25 mg t.i.d.) when compared to placebo. Although significant results were reported, the effect sizes for the preschool population were noted to be smaller than previous effect sizes for school-age children. Smaller

effect sizes in this population may be due to the severity of the symptoms present in this population, the difficulty assessing levels of attention in preschoolers, difference in methods between the current study and previous studies, or that preschoolers may respond differently to methylphenidate than school-age children. Although, methylphenidate was found to be effective in reducing symptoms of ADHD, continued research is needed regarding the safety and efficacy of the medication with the preschool population.

Carefully monitored medication management has also been found to be useful in improving the effects of psychotropic medications for ADHD. Medication management is used to help reduce symptoms associated with ADHD while also considering the side-effects of the medication (MTA, 1999). The Multimodal Treatment Study for ADHD (MTA) was a multi-site study that assessed the effects of medication alone (medication management), a combination of medication and behavioral treatment, behavioral treatment alone, and community care (i.e., typical treatment) for children and adolescents diagnosed with ADHD. In the MTA study, the medication management group showed significant reductions in core symptoms of ADHD. Medication management is a comprehensive process that consists of at least monthly follow-ups with the prescriber, assessment of adherence to the medication and the safety of the medication, and information regarding symptom reduction. In addition, medication management also consists of gathering data/feedback from parents and teachers about the child/adolescent's symptoms of ADHD in order to determine the effects of the medication from multiple settings. Lastly, the prescriber provides behavioral information to parents to help manage their children/adolescent's behavior. The combination of these components has

shown to be effective in reducing core symptoms of ADHD when compared to other treatments used in isolation.

Although much research has been done on psychostimulants, including long-term follow-up studies (MTA, 1999), these medications may require multiple daily doses based on their short-acting formulas and prescribers may prefer a one-dose medication (i.e., extended-release stimulants). However, there are other considerations when using extended-release medications because these medications “may be associated with high pharmacokinetic variability due to their dependence on pH and gastrointestinal transit time for drug delivery” (i.e., how an individual’s body breaks down the drug) (Findling, 2008, p. 954). Psychopharmacological treatment for children/adolescents with ADHD is still being explored and researchers are determining the variables that coincide with each class of medication and the potential side effects of each medication. Research on pharmacotherapy can assist practitioners in making the most informed treatment decisions for their patient’s individual needs.

Due to the number of medications used to treat ADHD and the inconsistencies of prescribing second and third line medications for ADHD, medication algorithms were developed to provide guidance to practitioners with regard to consensus around best practices for pharmacological treatment. The Texas Children’s Medication Algorithm for ADHD was created by physicians and psychologists to provide a systematic decision-making model when using pharmacotherapy (Pliszka et al., 2000a, 2000b). Medications chosen for the algorithm have shown some effectiveness in treating ADHD. Although the algorithm has been updated with evidence-based information, “to date, no randomized controlled study of the algorithm itself has been performed to confirm that algorithm-

based treatment yields a superior outcome for ADHD as compared with treatment as usual” (Pliszka et al. 2006, p. 654). Less rigorous research suggests that the algorithm has benefits (Pliszka et al., 2003); however, additional research is still needed to determine the feasibility of the algorithm for physicians in community health centers and private practices. These medication algorithms further highlight the prevalence of ADHD among children and adolescents and the need for systematic guidelines for prescribing medication to this population.

*Treatment of ADHD: Combined Treatment of Psychopharmacology and Psychosocial*

Psychopharmacology treatment and a combination of psychopharmacology and psychosocial treatments have shown to be the most efficacious in reducing core symptoms of ADHD in children (i.e., hyperactivity, inattentiveness, and impulsivity) (MTA, 1999; Van der Oord, Prins, Oosterlaan, Emmelkamp, 2008). Research has been conducted on the effects of psychopharmacology alone using the MTA medication management approach, behavior therapy alone, combining psychopharmacology with medication management and behavior therapy, and routine community care with children who have ADHD (MTA, 1999). The results of this research indicated participants in the medication management alone and the combination group with medication management and behavior therapy demonstrated the most improvement in reducing core symptoms. In addition, teacher’s ratings of the child’s behavior usually fell within the normal range after implementation of the combined treatment (Brown, 2005). However, no significant difference in the reduction of ADHD symptoms was found between medication management and the combined treatment group.

The consensus team for the Texas Children's Medication Algorithm for ADHD also recognized the importance of previous studies indicating the effectiveness of combined treatments (Pliszka et al., 2000b). The consensus team developed tactics that address combined treatment, psychopharmacology and psychosocial. "Tactics are a set of guidelines for implementing the chosen treatment strategies, including the starting dose of the agent, the titration schedule, the method of assessing drug response, the management of treatment-emergent side effects, and long-term maintenance of the medication" (Pliszka et al., 2000b, p. 920). The tactics also include the use of psychosocial treatments and psychoeducation for parents of children with ADHD. Psychosocial treatment, specifically behavior therapy, was recommended either before initiation of medication, with medication, after medication was stabilized, or if the child or adolescent does not respond to any medication on the algorithm, then psychosocial treatment can be used as a sole method of treatment.

The importance of educating both the caregiver and the patient about the disorder was also emphasized in the algorithm (Pliszka et al., 2000b). Psychoeducation is an important component to all treatments regarding pediatric ADHD. Although there have been numerous studies conducted to determine evidence-based treatments for ADHD (e.g., MTA Study) nonadherence to treatments continues to remain a barrier to treatment. According to a study looking at the Texas Children's Medication Algorithm for ADHD, psychoeducation has been shown to help improve treatment adherence; "patients and family members need to have an understanding of the disorder and of treatment options to play an active role in treatment planning and implementation" (Lopez, Toprac, Crismon, Boemer, & Baumgartner, 2005, p. 53). Psychoeducation can help provide

patients and families specific information about ADHD. In addition, it can encourage the patient and his/her family to ask questions that may be more specific to their own family and help determine the effectiveness of different treatment options based on individual characteristics. Participants in Lopez et al.'s study reported psychoeducational materials to be useful; however, consistent communication between the treating psychiatrist and the physician of the patient was not evident. Communication and the ability for parents of children/adolescents with ADHD to ask questions of their physicians and mental health providers can be a pertinent aspect of effective and useful psychoeducation.

#### *Training of Graduate Students in Medicine, Mental Health, and Education*

There are a number of professionals that work with children and adolescents with ADHD. Medical providers (i.e., physicians, physicians' assistants, and nurse practitioners), mental health providers (clinical, counseling, and school), and educators at the master's and doctoral level are three groups of post-graduate professionals that typically interact the most with this population. Teachers often report behavioral and academic concerns to parents who then may seek an assessment from a medical or mental health provider. Due to the potential impact that medical providers, mental health providers, and teachers with graduate training have on children with ADHD, it is imperative to assess the knowledge of these professionals regarding ADHD.

Many families trust their medical providers, mental health providers, and teachers with advanced training to be knowledgeable about ADHD and recommend evidence-based treatments for their child/adolescent; however, it is unclear the degree of ADHD knowledge medical providers, mental health providers, and educators have at the graduate level. Although training varies and this overview is not to be considered

exhaustive, the overview provides a brief account of general standards of training for future medical providers, mental health providers, and educators at the graduate level.

### *Medical Providers*

According to the “Common Program Requirements: General Competencies” (Accreditation Council for Graduate Medical Education; ACGME, 2007), physicians should have the following competencies regarding patient care: “Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health”; concerning Medical Knowledge, “Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as the application of this knowledge to patient care” (ACGME, 2007, p. 1). ACGME provides expectations for physicians to ensure the treatments they provide to their patients are effective, safe, and appropriate for the patient’s illness and/or disorder. In addition, competencies specifically identify the importance of obtaining knowledge of social-behavioral sciences which can include mental health disorders such as ADHD. Based on these guidelines, physicians should have the competencies to provide appropriate treatment to children/adolescents with ADHD. ACGME further elaborates on the importance of “investigat[ing] and evaluat[ing] their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning” (ACGME, 2007, p.1).

Specialty areas such as pediatrics and psychiatry require additional training and requirements. According to the American Medical Association (AMA), pediatricians are

“concerned with the physical, emotional, and social health of children from birth to young adulthood” (American Board of Medical Specialties, 2006, p.5). Psychiatry specializes in the prevention, diagnosis, and treatment of mental, addictive, and emotional disorders such as schizophrenia and other psychotic disorders, mood disorders, anxiety disorders, substance-related disorders, sexual and gender identity disorders, and adjustment disorders. The psychiatrist is able to understand the biologic, psychologic, and social components of illness and, therefore, is uniquely prepared to treat the whole person (American Board of Medical Specialties, 2006, p. 7).

Based on this information, pediatricians and psychiatrists should be qualified to treat ADHD in children and adolescents and provide psychoeducation on evidence-based treatment options.

According to the American Academy of Physician Assistants (AAPA) (2009), physician assistants (PAs) can work in a variety of medical and surgical settings. PAs prescribe medicine and provide primary or specialty care to a variety of populations under the supervision of a physician. PA programs are typically around two years of study. The first year includes classroom studies, anatomy, physiology, pharmacology, microbiology, biochemistry, pathology, clinical lab, health promotion, clinical medicine, and medical ethics. The second year consists of rotations in the following settings: clinical rotations, family medicine, internal medicine, emergency medicine, pediatrics, geriatric medicine, obstetrics/gynecology, surgery, orthopedics, psychiatry, and radiology.

According to the American Academy of Nurse Practitioners (AANP) (2007, p. 1), nurse practitioners (NPs) are “licensed independent practitioners who practice ambulatory, acute and long term care as primary and/or specialty care providers.” NPs can work with diverse populations and prescribe medicine for a variety of illnesses/disorders. Programs for NPs can award masters degrees, post-master’s certificates, and doctoral degrees. NPs are educated with both theory and evidence-based practice. In addition, some NPs may receive additional training to “cultivate advanced skills in the roles of educator, counselor, advocate, consultant, manager, researcher, and mentor” (AANP, 2007, p. 1). There are currently seven content domains: Management of Patient Health/Illness Status, The Nurse Practitioner-Patient Relationship, The Teaching-Coaching Function, Professional Role, Managing and Negotiating Health Care Delivery Systems, Monitoring and Ensuring the Quality of Health Care Practices, and Cultural Competence (National Organization of Nurse Practitioner Faculties and American Association of Colleges of Nursing, 2002). These domains are supposed to be incorporated in the training for NPs.

#### *Mental Health Providers*

According to the American Psychological Association (APA) (2002), psychologists have doctorates and are trained to assess and treat a variety of mental disorders in the general population. Psychologists from clinical, counseling and school programs can work in multiple settings including hospitals, community health agencies, schools, counseling centers, private practice, etc. Although there are general guidelines for all psychologists, specific training programs in specialty areas provide more specific parameters for training. APA’s Division 12, the Society of Clinical Psychology

integrates science, theory, and practice to understand, predict, and alleviate maladjustment, disability, and discomfort as well as to promote human adaptation, adjustment, and personal development. Clinical Psychology focuses on the intellectual, emotional, biological, psychological, social, and behavioral aspects of human functioning across the life span, in varying cultures, and at all socioeconomic levels” (APA, Division 12: Society of Clinical Psychology, 2009, ¶ 1).

APA’s Society of Counseling Psychology, Division 17 reports that counseling psychologists “facilitate personal and interpersonal functioning across the life span with a focus on emotional, social, vocational, educational, health-related, developmental, and organizational concerns” and it “is unique in its attention both to normal developmental issues and to problems associated with physical, emotional, and mental disorders” (2009, ¶ 1). APA’s, Division 16 (School Psychology) reports that school psychologists are “concerned with the science and practice of psychology with children, youth, families; learners of all ages; and the schooling process. The basic education and training of doctoral school psychologists prepares them to provide a range of psychological assessment, intervention, prevention, health promotion, and program development and evaluation services with a special focus on the developmental processes of children and youth within the context of schools, families, and other systems” (APA: Division of School Psychology, 2009, ¶ 3).

Master’s level counseling and clinical psychology students can obtain limited licensure or certification after completion of their master’s programs. The American Mental Health Counselors Association (AMHCA) (2009) is a national organization that

represents mental health counselors. According to AMHCA (2009, ¶ 7), “mental health counseling is a distinct profession with national standards for education, training, and clinical practice.” Mental health counselors provide a variety of services (e.g., diagnosing, therapy, psychological testing, group counseling, research, and program evaluation) to diverse populations. Licensed mental health counselors have the following requirements: obtained a master’s degree in counseling or a closely related field, completed a minimum of two years of post graduate clinical work under the supervision of a licensed or certified mental health professional, and passed a state or national licensure or certification exam.

According to the National Association of School Psychologists (NASP) (2000), master’s or specialist level school psychologists conduct evaluations, participate in consultation, provide prevention and intervention strategies/programs, and participate in research and planning. School psychologists trained at the master’s or specialist level typically work in schools; however, some also work in community health settings, hospitals, and private practice.

### *Educators*

Teachers receive generalized and/or specialized training to work with children and adolescents. Teacher training programs have a number of monitoring organizations that help provide information and guidelines on training. The Center for the Study of Teaching and Policy (2008) was created by the United States Department of Education’s Office of Educational Research and Improvement (OERI) through a grant. The center monitors teacher education programs, teachers in the field, and the resources available for

teachers. Although requirements for teachers can vary by state, the core requirements for teachers typically include the following:

a broad grounding in the liberal arts and sciences; knowledge of the subjects to be taught, of the skills to be developed, and of the curricular arrangements and materials that organize and embody that content; knowledge of general and subject-specific methods for teaching and for evaluating student learning; knowledge of students and human development; skills in effectively teaching students from racially, ethnically, and socioeconomically diverse backgrounds; and the skills, capacities and dispositions to employ such knowledge wisely in the interest of students (National Board for Professional Teaching Standards, 2002).

Typically, graduate students in education are preparing for leadership roles in education working in a variety of settings (such as universities, private and public schools, community organizations) (University of Houston, College of Education: Department of Curriculum and Instruction, August 2008). Most graduate programs in education require specific core courses that all students must take regardless of specialty area (e.g., gifted and talented, math, social studies). A course involving human development is typically required which focuses on developmental theories and theories and applications involved in learning.

*Competency-Based Assessment: Medical Providers, Mental Health Providers, and Educators*

An overview of the broad components of graduate training programs in medicine, mental health, and education was previously presented. Based on the information

discussed, how do programs determine if their students meet professional standards? Competency-based assessment helps answer this question and will be reviewed next.

Competency-based assessment is useful in applied fields when determining whether or not students are competent to work in their area of study. In addition, competency-based assessment can help track professional development and identify future areas where additional competencies are needed. The fields of medicine, mental health, and education all train students to become practitioners. Due to the nature of these professions, competency-based assessment becomes an important component to training programs in determining whether or not a student is competent to practice in their area of study.

Competency-based assessments attempt to evaluate a variety of areas: “knowledge, decision making, performance, personal attributes,” and “integrated assessments of practice-based skills and tasks” (Leigh et al., 2007, p. 463 & p. 467). Standards may also be developed to help provide guidelines to programs on competency areas measured (U.S. Government Accountability Office, 2004). Measures of knowledge may include multiple-choice, essays and short-answer questions; measures of decision making may include oral-exams concerning case studies. Measures of Performance and personal attributes may include global rating scales, portfolios, and comprehensive evaluations (Leigh et al., 2007). Some fields of study, such as psychology and education, may also require their students to propose and defend master’s theses, dissertations, and doctoral papers.

Proponents of competency-based assessments are finding other ways to assess competencies including the “use of summative assessment approaches” and through the

use of “multiple models of formative assessment” (Leigh et al., 2007, p. 470). However, it is noted that establishing effective competency-based assessment systems are expensive and time-consuming.

*The Gap between Research and Practice in Diagnosing and Treating ADHD*

Parents are expected to make the right treatment decisions for their child/adolescent with ADHD, but many of them do not have sufficient knowledge to determine which treatment option is best. One study found that parent’s knowledge about ADHD is positively correlated with seeking treatment for their child with ADHD (Bussing, Gary, Mills, & Garvan, 2007). Patients expect their medical providers, mental health providers, and educators to be competent in their chosen field, but do practitioners have knowledge of evidence-based research concerning ADHD? As previously discussed, most of the training programs in medicine, mental health and education have methods to assess the competency of their professionals; however, do medical professionals, mental health professionals, and educators follow best practice guidelines? How does the general public know if their provider uses the assessment and treatment practices that are empirically supported? Do these empirically supported methods for assessing and treating ADHD transfer to real-world application? Do medical professionals, mental health professionals, and educators collaboratively work together when diagnosing and treating pediatric ADHD?

First, there is the issue regarding diagnosing ADHD using “Best Practices”. As previously discussed, “Best Practices” in ADHD assessment consists of a multimethod, multidisciplinary approach where data is gathered from multiple settings (Calderon & Ruben, 2008). Handler and Dupaul (2005) conducted a study that found evidence to

suggest that clinicians who diagnose ADHD (i.e., medical providers and mental health providers) do not always use a “Best Practices” approach. Previous studies suggest that psychologists from different training backgrounds (i.e., clinical, counseling, and school) may vary in their diagnostic procedures for ADHD. Clinical, counseling, and school psychologists completed a questionnaire to assess current assessment practices regarding pediatric ADHD. Counseling and clinical psychologists were recruited from the American Psychological Association (APA) and school psychologists were recruited from the National Association of School Psychologists (NASP) (both doctoral and non-doctoral level psychologists were recruited from NASP). A three (specialty: clinical, counseling, and school) by three (primary setting: university, school and outpatient setting) between groups factorial design was employed. A questionnaire was created to measure demographic information, “frequency of diagnostic methods,” and “frequency with which alternative diagnoses were ruled out” (Handler & DuPaul, 2005, p. 404). Best practices of an ADHD assessment were based on previous literature and consisted of parent interviews, assessment of school behaviors and academic information, child interviews, rating scales from both the parent and the teacher, and observations in multiple settings. Results indicated statistical significance for the main effects for specialty area but a significant difference was not found for setting or the interaction between specialty area and setting. Results of the study also indicated that 51.5 % school psychologists surveyed met the criteria for best practices in ADHD assessments compared to 42.4% of clinical psychologists, and 6.1% of counseling psychologists. These results show that the majority of the psychologists surveyed do not use best practices when assessing for ADHD. Based on the current study, some differences in

ADHD assessments can be accounted for by the work setting of the psychologist; however, future research is needed to determine other variables that contribute to the results (i.e., training differences based on program of study). The study did not report if counseling, clinical and school psychologists had the knowledge of best practices assessment but did not apply the knowledge, or if the psychologists did not know what consists of a best practices assessment for ADHD. Based on this study, it is difficult to conclude if there is a lack of training among psychologists regarding assessment procedures or if there is a discrepancy in knowledge and application.

Physicians face similar difficulties implementing best practices when diagnosing ADHD. The American Academy of Pediatrics (AAP) (2000) has provided specific recommendations for assessing ADHD; however, it is difficult to determine the real-world applicability of these guidelines. Polaha, Cooper, Meadows, and Kratochvil (2005) evaluated the usefulness of the AAP guidelines for assessing ADHD including utilizing rating scales, conducting parent interviews, and evaluating potential comorbidities in two primary care practices located in a rural setting. Results indicated that with proper training and streamlined protocols, the general practice offices were able to maintain and collect empirically supported data to assist them in making diagnostic decisions about ADHD. These results indicate that best practice assessments are possible in other settings besides research labs; however, there are a variety of factors that must be present (e.g., training, resources) for best practices to occur.

Rushton, Fant, and Clark (2004) also assessed the use of the AAP guidelines in primary care settings. Primary care physicians (pediatricians and family physicians) in Michigan (N= 723) were assessed on their use of the AAP guidelines for children with

ADHD. Results showed that the majority of physicians adhered to individual components of the guidelines; however, only 25.8% followed the guidelines when multiple components were involved (e.g., all four components of assessing ADHD: DSM criteria, information from parents/caregivers, information from classroom teacher, and information regarding current conditions). Findings from this study suggest that primary care physicians are aware of the AAP guidelines and implement some of the guidelines; however, as the guidelines become more complex, adherence decreases.

Research has shown that teachers recognize the important role they play in diagnosing ADHD; however, previous research reports that teachers consistently request more ADHD focused training (Curtis, Pisecco, Hamilton, & Moore, 2006; Goldstein, 2002; Snider, Busch, & Arrowood, 2003). A study looking at knowledge of ADHD and ADHD treatments of undergraduate teachers in training compared to other undergraduate students showed no significant difference between the two groups, indicating that both groups had similar levels of knowledge (Hofer, 2008). Based on these results, it appears that teachers in training have no more additional knowledge of ADHD than other undergraduate students. Due to the number of interactions with a variety of children and adolescents, teachers can serve an integral role in diagnosing and treating ADHD (Goldstein, 2002; Snider et al., 2003); however, they may not have the adequate tools and knowledge to recognize symptoms of ADHD or effectively implement behavioral interventions in the classroom.

Treatment is the next area of concern. Although there are a number of supported treatment approaches for ADHD (Anastopoulous & Farley, 2003; DuPaul & Weyandt, 2006; Findling, 2008), there continues to exist a gap between research and practice.

Guevara et al. (2007) conducted research to assess treatment strategies used by primary care physicians for managing problematic behaviors seen in children/adolescents. One of the purposes of the study was to determine the factors that affect treatment recommendations and referrals. Physicians either chose to manage the problem themselves, refer for joint care with a behavior specialist, refer solely to a mental health provider, or observation (wait and see approach). Over 22,000 children participated in the study and of them, 6.2% were identified with a new behavior problem. Children identified with ADHD were one of the largest populations of children with behavior problems. Treatment recommendations by physicians were affected by the practice structure and the location of the physician (urban or rural setting). Physicians in group practices were more likely to provide sole or joint care to patients than physicians who were in solo or multispecialty practices, who were more likely to refer for mental health only or conduct observations. Location also seemed to affect treatment decisions, urban practices typically recommended joint care compared to rural settings which were more likely to recommend observations. In addition, the more severe the behavior problem, then the more likely physicians preferred joint care. Results of this study may further emphasize the potential need of collaboration among physicians and mental health professionals in the treatment of ADHD.

Research regarding diagnosing and treating ADHD has indicated the potential efficacy of professionals who collaborate and/or consult when treating pediatric ADHD. Studies assessing the gap between research and practice have stressed the importance of collaboration among professionals to meet the growing diagnostic and treatment needs of children and adolescents with ADHD (Epstein et al., 2007). The MTA study (1999)

highlighted the benefits of carefully managed psychopharmacology in the treatment of ADHD; however, results of the study also stressed the importance of careful titration and regular management of psychotropic drugs. The recommendation of medication management may be considered best practices; however, it is not always implemented in community settings (Rushton, Fant, & Clark, 2004). Epstein et al. (2007) conducted a study to determine how a collaborative consultation model can assist in reducing the gap between research and practice in the treatment of ADHD in community health settings. Primarily the researchers were determining what factors from the multimodal treatment study were real-world applicable and which service models best fits the evidence. Researchers reported three big problems translating research into practice: money, time, and resources. “Collaborative consultation service models use experts in mental health to score and interpret behavioral ratings collected by the pediatrician during assessment, titration of medication, or medication maintenance, and a report on the behavioral findings is provided to the pediatrician to help guide diagnostic and treatment decisions” (Epstein et al., 2007, p. 835). The collaborative consultation model resulted in pediatricians reporting fewer difficulties titrating medication including more knowledge about titration, more time, and greater knowledge of monitoring titration through rating scales. Community pediatricians’ use of titration trials with the assistance of collaborative consultation resulted in better management of symptoms of ADHD.

Although results indicated the benefits of the collaborative consultation model, the low adherence rate to this program should also be noted. Some pediatricians did not use the model which may be the result of their reluctance to change their current practices. However, pediatricians who participated in the study requested “expert

assistance and consultation when treating children with ADHD” (Epstein et al., 2007, p. 840). This indicates that when given the opportunity/means to seek additional knowledge/assistance concerning the treatment of ADHD, some physicians recognize the benefits and the importance of consultation/collaboration.

#### *Other Challenges Diagnosing and Treating ADHD*

Not only do professionals have challenges applying research into practice when diagnosing and treating pediatric ADHD, but there are additional challenges that they encounter. Some of these challenges include an increase in the diagnosis of ADHD combined with an increase in prescribing psychotropic medication among general practitioners (Parens & Johnston, 2008). In addition, there is a shortage of qualified psychiatrists and psychologists whom other health care professionals can refer their patients to (Maughan, Christiansen, Jenson, Olympia, & Clark, 2005; Serby, Schmeidler, & Smith, 2002; Thomas & Holzer, 2006, Van Den Berg, Shapiro, Bickerstaff, & Cavanagh, 2004).

Although psychiatrists have specialty training in prescribing psychotropic drugs, more general practitioners are currently prescribing medications for mental health disorders, such as ADHD (Parens & Johnston, 2008). Current prescribing practices may be the result of the limited number of child psychiatrists available to work with this population. Thomas and Holzer (2006) reported that there are shortages of child psychiatrists, especially in rural and poor communities. Due to the shortages of psychiatrists combined with the growing population of pediatric ADHD, other professionals, such as general practitioners, are needed to treat this population; however, they may be providing treatment without the necessary training (Parens & Johnston,

2008). As a result of the potential side effects of psychotropic medications, it is important for prescribers to be well-trained in treating mental health disorders.

Parens and Johnston (2008) assessed prescribing practices of psychotropic medications. They hosted five workshops for practitioners and scholars to focus on presentations of psychopharmacology in children and adolescents and to spend time discussing and debating the many variables that accompany prescribing medications to this population. The need for additional training was emphasized by workshop participants. Results suggested that practitioners who diagnose and provide/recommend treatments may not have adequate expertise in childhood mental disorders. General practitioners seem to be the practitioners that prescribe psychotropic medications the most; however, these practitioners may have limited training or resources to make well-informed diagnostic and treatment recommendations. General practitioners also may not have time to do comprehensive assessments that are considered best practices for diagnosing and treating mental health disorders (e.g., ADHD). Physicians at the workshop reported that they prescribe psychopharmacological medications to help alleviate current symptoms, and noted that due to time constraints, they do not take a holistic approach in determining other environmental variables that may be affecting/contributing to symptoms of ADHD.

Not only is there a shortage of physicians specifically trained in treating mental health disorders, but those that are being trained may be receiving less training. Psychiatry clerkships in most medical schools across the nation were found to range between 4 to 6 weeks (Serby et al., 2002). Concerns have been expressed on whether the length of the clerkship provides enough time to convey the complexities of mental health

disorders and their subsequent treatments, and if these clerkships help recruit future psychiatrists. One-hundred and twenty-four medical students were surveyed from the American Association of Medical Colleges (AAMC) from the following cohorts: 1995-96, 1996-97, 1997-98, and 1998-99. During this period, it was found that the number of clerkships between 4 to 6 weeks has increased over time while the number of clerkships lasting 7 to 8 weeks has decreased. The reduction in the length of clerkships indicates that training in psychiatry may be decreasing. In addition, results also indicated that the number of psychiatry residencies has remained constant between 1996 and 1999. Although there is increased use of psychotropic medications among children and adolescents, there is not an increase in medical doctors specializing in psychiatry (Olfson et al., 2002). Results suggest that physicians with limited training may be prescribing psychotropic medications to their patients (Olfson et al., 2002), because specialized training in psychotropic drugs is not a requirement for future physicians before prescribing medication for mental health disorders (Muse & McGrath, 2010).

In addition to the shortage and decrease in training requirements of prescribers familiar with mental health disorders, there is also a shortage of mental health providers who provide empirically supported treatments to the pediatric population (Maughan et al., 2005; Van Den Berg et al., 2004). Medical providers may diagnose a child/adolescent with ADHD and they may prefer to recommend psychosocial treatments as a first line of treatment; however, there may not be a mental health provider available to provide the treatment (i.e., there are no mental health providers in a particular geographical location, long waiting periods to see mental health providers, shortage of mental health providers providing empirically supported treatment such as behavioral

parent training, etc.). The shortage of mental health providers may be inadvertently encouraging increased prescription of medication for the treatment of ADHD (Maughan et al., 2005; Van Den Berg et al., 2004).

### *Self-Perceived Knowledge Compared to Actual Knowledge*

Knowledge of ADHD is influenced by many factors including media coverage, family prevalence, interactions with people with ADHD, courses that address ADHD, training, etc. Unfortunately, not all of these sources of information are valid. Some professionals may receive information concerning ADHD and feel that they have an accurate understanding of the disorder, but this may not always be the case. Studies have shown that self-perceived knowledge and actual knowledge are not always congruent (Park, 2000; Ruble, Walters, Yu, & Setchel, 2001; Tenenberg, & Murphy, 2005). It is important to determine if professionals who work with children and adolescents with ADHD have greater self-perceived knowledge than actual knowledge, because this discrepancy can potentially influence the probability that they will seek further training and new updates on research in the area of ADHD. This discrepancy may not only affect the area of ADHD but there are many domains where people think they know more than they actually do. Studies that reveal this gap between self-perceived and actual knowledge, and how it may affect performance will be reviewed next.

Tenenberg and Murphy (2005) compared computer science students' self-perceived performance to actual performance concerning a previously taught computer science concept. The study was based on a research paradigm in psychology, "calibration of knowledge that suggests that self-knowledge across a range of disciplines is highly unreliable" (Tenenberg & Murphy, 2005, p. 297). Students were asked to rate

their level of knowledge about a given topic and then they were tested to determine their actual knowledge of the topic. The study found that students were unable to accurately identify their current knowledge of the measured concept. This indicates that students may be unaware of the discrepancy between their self-perceived and actual knowledge and may need more feedback on their performance.

The media has already been shown to influence perceived knowledge of ADHD and studies have been conducted to show the media's influence on self-perceived knowledge (Danforth & Navarro, 2001). Park (2000) assessed the media's influence on self-perceived knowledge and actual knowledge of an urban adult population's knowledge of a presidential election. The research question evaluated whether more media exposure increased a person's actual knowledge of a topic or if it just increased the person's self-perceived knowledge, how much they think they know about the topic. The study found that more media exposure was positively correlated with increased "illusion of knowing," where illusion of knowing is defined as "the gap between self-perceived and actual knowledge" (Park, 2000, p. 421); however, it was not positively correlated with actual knowledge. It was also found that the more education a person had, the differences between self-perceived and actual knowledge were less obvious. However, when comparing media exposure and level of education, media exposure was found to have slightly more influence on level of self-perceived knowledge.

Ruble, Walters, Yu, and Setchel (2001) also measured self-perceived and actual knowledge of child development. Based on previous research, the authors suggest that many therapists do not receive adequate training in the area of child development during their education. Therapists were provided two questionnaires measuring perceived and

actual knowledge of child development. The results indicated that most of the respondents felt knowledgeable in the area of child development and felt comfortable conducting therapy with children. However, the scores on the questionnaires resulted in the majority of the participants overall “application of child development knowledge to therapeutic contexts” falling below-average (Ruble et al., 2001, p. 178). Training was not determined to have a significant relationship with the scores on the actual knowledge scale. This could be an instance where knowledge in an area does not translate into application. Current training models may not provide appropriate resources and skills to transfer theory into practice.

*Knowledge of ADHD: Medical Providers, Mental Health Providers and Educators*

Training and current practices of medical providers, mental health providers, and educators have previously been reviewed. The next section will provide research reviewing knowledge of ADHD among these three groups.

A medical provider’s knowledge of ADHD and ADHD treatments is an important component to consider when dealing with a child with ADHD. The medical provider is the professional who is most likely to diagnose ADHD and provide/recommend treatment options to the parent of a child/adolescent with ADHD. Medical providers see a number of children through different stages of development and can help recognize behavior difficulties related to the disorder. Medical providers can screen children for many mental health disorders, but it is unclear how medical providers view their role in “identifying, treating/managing, and referring patients with common mental health issues” (Stein et al., 2008, p. 12).

Primary care physicians and pediatricians are expected to be cognizant of potential behavioral problems in young children in order to ensure proper early intervention services; however, many clinicians reported using checklists that “lack reliability, validity, accuracy, and scoring criteria” to determine developmental and behavioral problems (Glascoe & Robertshaw, 2007, p. 407). However due to the utilization of these checklists, many children eligible for early intervention services are undetected. The AAP recognizes that this is problematic and therefore, developed a policy to address developmental and behavior problems through detailed developmental surveillance (Glascoe & Robertshaw, 2007). This essentially requires the physician to take a holistic approach in identifying current problems and potential risk factors based on biological characteristics and environmental factors affecting the child. This step-wise process assesses parental concerns, monitors milestones, promotes appropriate development, and screens for autism and psychological risk factors. However, more information regarding the feasibility and effectiveness of this approach in clinical settings is needed. In addition, previous studies have indicated that physicians may not have the time to take a holistic approach when assessing and treating ADHD (Parens & Johnston, 2008).

Stein et al. (2008) assessed a national sample of pediatricians to determine their perception of their role in diagnosing and treating mental health disorders in children. A number of practice guidelines and screening tools have been created for the purposes of diagnosing and treating mental health disorders; however, do pediatricians subscribe to these guidelines or use the screening instruments? Of the 745 pediatricians who completed the survey, 90% reported that they should identify ADHD, 70% reported that

they should treat/manage ADHD, and 54% reported that they should refer children with ADHD to other professionals. “The gap in perceived responsibility for identification compared to treatment/management suggests the need to better understand the barriers to pediatricians treatment/management of a range of common behavioral and mental health issues and for restructuring care to overcome these barriers” (Stein, et al., 2008, p. 14). Based on these results, there is a disparity in the perceived role of pediatricians regarding assessing and treating ADHD.

Another study by Williams, Klinepeter, Palmes, Pulley, and Meschan, (2004) also looked at pediatricians’ views of behavioral health disorders and their current practices. An interview concerning the diagnosis and treatment of behavioral health disorders by primary care pediatricians was conducted in an urban setting to determine current practices. Williams and colleagues highlighted the importance of pediatricians’ involvement and management of behavioral health disorders including diagnosis and treatment due to the stigma associated with mental health disorders. Parents of children and adolescents with mental health disorders may feel more comfortable receiving diagnostic and treatment information concerning mental health issues from their pediatricians versus a mental health provider. “In 1993, the American Academy of Pediatrics (AAP) adopted a policy statement that focused on the prevention, early detection, and management of behavioral, developmental, and social problems as a main part of the scope of pediatric practice” (Williams et al., 2004, p. 602). Due to the imbalance of managed care reimbursements (i.e., managed care does not always cover psychosocial treatments); therefore, pediatricians treat many of the pediatric health disorders. Pediatricians were interviewed for the study and indicated that 14-15 % of their

populations have behavioral health disorders; however, pediatricians noted behavioral health disorders were not routinely screened for. However, in another study that assessed the identification of psychosocial problems by physicians indicated an increase in identification (6.8 % to 18.7 %) among pediatric patients (ages 4 to 15) from 1979 to 1996 (Kelleher, McInerney, Gardner, Childs, & Wasserman, 2000). Both studies (Kelleher et al., 2000; Williams et al., 2004) identified ADHD as the most frequent behavioral health disorder diagnosed and treated. Pediatricians reported reasons to not make a diagnosis were “uncertainty of the diagnosis (e.g., rule-outs, lack of information),” “possible negative effects of labeling a child,” “hesitance when parents were not ready,” and “lack of experience or training” (Williams et al., 2004, p. 603). In the Williams et al. (2004) study, a majority of the pediatricians interviewed indicated they provided non-medication treatment for ADHD including “information about the cause of the disorder, school modifications, organizational skills, consistency in parenting, structured activities, educational rights, self-esteem issues for the child, and parental self-care” (p. 604). Surveyed Pediatricians reported they would feel even more competent in treating children with behavioral health disorders if they received additional training. In addition, they reported more time for diagnosis and treatment would allow for a more comprehensive management of behavioral health disorders. Pediatricians requested “future training, [in] the areas of psychopharmacology, diagnosis and treatment of depression and anxiety, updates on ADHD, and [further training] recognizing comorbidities” (Williams et al., 2004, p. 604).

Shaw, Mitchell, Wagner, and Eastwood (2004), used both qualitative and quantitative methods to assess knowledge of ADHD in an Australian population of

general practitioners. A questionnaire concerning beliefs about ADHD was administered to over 500 general practitioners. Results indicated that older practitioners “were more likely to believe that sole parenting and junk food contribute to ADHD” compared to younger doctors; however, the results were not statistically significant (Shaw et al., 2004, p. 483). A majority of the practitioners assessed believed that ADHD was over-diagnosed. In addition, they noted that ADHD should be diagnosed using multiple assessments to determine the presence of the disorder. When presented with sixteen symptoms from ADHD, oppositional defiant disorder, conduct disorder, anxiety, and depression from the *DSM-IV TR* (2004), “respondents correctly identified the appropriate diagnostic criteria to the following degrees: all 16 correct, 1.3%; 13-15 correct, 8%, 9-12 correct, 34%; 5-8 correct, 32%; 0-4 correct, 26%” (Shaw et al., 2004, p. 483). More than half of the general practitioners surveyed identified eight or less symptoms correct on the checklist; indicating a lack of familiarity with DSM-IV criteria.

The majority of practitioners participating in the study requested additional information on diagnostic methods of ADHD (Shaw et al., 2004). Beliefs and attitudes regarding the treatment of ADHD were also assessed. Practitioners assessed disagreed on the first-line of treatment for ADHD; fifty-one percent reported behavioral therapy to be the first line of treatment and forty-three percent recommended stimulant medication. The most common treatments utilized were: “educating the child and family about ADHD (89%), collaborating/liasing with the school (79%) and referral for behavior and family therapies (45%)” (Shaw et al., 2004, p. 484). Although drug therapy was initiated for some patients, overall, general practitioners preferred to refer the patient to pediatricians or child psychiatrists; however, the tendency to refer depended on a number

of factors including location of area being served (i.e., rural or urban). General practitioners surveyed in the study reported difficulties in assessing ADHD due to the time-consuming nature of managing pediatric ADHD and the lack of confidence in their abilities to manage the treatment of pediatric ADHD. Because this study was conducted in Australia, it is unclear if these results would be different with physicians in America.

Psychologists who work with children/adolescents with ADHD can diagnose and provide psychoeducation and psychosocial treatments to children/adolescents with ADHD. Due to their work in the school, school psychologists may recognize symptoms of ADHD the most in school-age populations. School psychologists (master's and doctoral) assess and recommend behavioral treatment for children/adolescents with ADHD; therefore, it is important to understand what school psychologists think about the etiology and treatment of ADHD and how these beliefs guide their practice (Cushman, LeBlanc, & Porter, 2004). One-hundred and ninety-one school psychologists were surveyed from the National Association of School Psychologists (NASP) about their "beliefs regarding the etiology of ADHD, sources of inattention, the validity of the disorder, the reliability of the diagnosis, and preferences for specific interventions (Cushman et al., 2004, p. 186). Overall, school psychologists reported that ADHD is a valid disorder that can be reliably diagnosed. In addition, they reported that ADHD is mostly due to biological components; however, it can be influenced by psychosocial factors (e.g., parental psychopathology, stress, multiple moves). Respondents were neutral in their opinion concerning nutrition and its affect on hyperactivity and impulsivity, but did believe that nutrition plays a role in inattention. In addition, school psychologists reported that they "play an important role in the treatment of children and

adolescents diagnosed with ADHD” (Cushman et al., 2004, p. 187). They reportedly were in disagreement on the use of stimulant medications for treatment, but overall they agreed that parent training and behavioral treatments are useful in treating children and adolescents with ADHD.

A teacher’s perception of ADHD is another important component to consider when managing a child with ADHD. The teacher is one of the key figures that recognize behavior, social, and/or academic difficulties related to the disorder. A teacher’s approach or perceptions about the disorder can influence diagnosis and treatment. Research has been conducted to determine teacher perceptions of ADHD. For example, teachers from New Zealand and the United States were provided with a list of measures to assess their perceptions of ADHD (Curtis, Pisecco, Hamilton, & Moore, 2006). Teachers from the U.S. reported they had more interaction with children with ADHD than teachers from New Zealand. Teachers from the United States also indicated that they wanted more training in the area of ADHD.

Sciutto, Nolfi, and Bluhm (2004) assessed knowledge of ADHD in 199 teachers. The participants were given a vignette with a child background profile and an accompanying questionnaire. Each profile contained information concerning grades, teachers’ comments, and standardized achievement test scores. In addition, the vignettes depicted variation in the student’s academic performance. After reading the profiles, teachers indicated whether they would refer the child to a school psychologist and they rated how disruptive the child’s behavior would be in their classroom. Specific variables were tested to determine if gender or the type of symptoms exhibited (hyperactive symptoms, inattentive symptoms, and hyperactive plus aggression symptoms) influenced

teachers choice of referral. Results indicated that the more disruptive the child's behavior, the more likely he/she would be referred to a school psychologist. In addition, when controlling for disruptive behavior, boys were more likely than girls to be referred. This indicates that children/adolescents with externalizing symptoms of ADHD (i.e., hyperactivity and impulsivity) may be identified more than children with internalizing symptoms of ADHD (i.e., inattentiveness).

In another study, perceptions of 225 teachers were measured concerning the incidence of ADHD, their views on the etiology of the disorder, and what they believed was the best intervention choice (Glass & Wigar, 2000). Seventy-eight percent of the teachers surveyed reported that ADHD is a "biological abnormality" and a majority of them recommended a combination of behavior modification and medication as the best treatment option. When asked for teachers to rate the prevalence of ADHD in their classroom, a majority of the teachers (72%) reported that 6-26 % of their students had or may have ADHD. These numbers are considerably higher than the 3-7% prevalence as reported by the *DSM-IV TR* (2000).

A group of general and special education teachers in Wisconsin participated in a study that measured knowledge concerning stimulant medication and ADHD (Snider, Busch, & Arrowood, 2003). The questionnaire consisted of three parts: factual knowledge, opinions concerning the effectiveness of stimulant medication in the classroom, and previous experience with students with ADHD. Overall, teachers felt that stimulant medication was effective in improving students' functioning in multiple areas (e.g., academic and interpersonal); however, the study reported that teachers wanted more information about stimulant medication and the possible side effects. This indicates that

although teachers play an integral role in informing the diagnosis and management of ADHD, they may not have enough information concerning the effects of medications used to treat the disorder. Based on the questionnaires, “47 % [of teachers] agreed that they were involved in assisting with [the] initial diagnosis of ADHD and 51% agreed that they were involved in assessing the effectiveness of medication” (Snider et al., 2003, p. 52). Respondents were asked “who most frequently recommended students for ADHD assessment,” and they responded that “teachers (92%), parents (47%), school psychologists (46%), and physicians (33%)” (Snider et al., 2003, p. 52). As reported from this study, teachers responded that they were the most likely group to recommend children with ADHD for assessment; however, teachers continue to request additional training in this area.

Snider and colleagues (2003) also looked at where teachers are receiving information about ADHD. The top three sources reported in the study were in-service trainings, other professionals, and parents of children with ADHD. Although, it is important that teachers receive pertinent in-service trainings, it may be useful to determine how much knowledge the average educator has about ADHD before attending these trainings in order to provide information that is useful and appropriate.

Kos, Richdale and Jackson (2004) assessed preservice teachers’ (undergraduate students in their last year of school) and in-service teachers’ self-perceived and actual knowledge of ADHD. Two questionnaires, developed by the examiners, were issued to the participants, a one item self-perceived questionnaire, using a 10-point likert scale, asked participants “how much they thought they knew about ADHD,” and a 27-item actual knowledge questionnaire in a True/False/Don’t Know format. They found that

“teaching experience was not significantly correlated with actual knowledge scores” (Kos et al., 2004, p. 521). In-service teachers with additional training regarding ADHD were also found to have greater self-perceived and actual knowledge of ADHD scores compared with teachers who did not have additional training regarding ADHD. Another finding showed that in-service teachers who had taught a child with ADHD had higher actual knowledge scores compared to those that had never taught a child with ADHD. In-service teachers were also shown to have greater actual knowledge about ADHD compared to preservice teachers, which may support the previous findings of a positive correlation between knowledge of ADHD and having taught a child with ADHD. Results from the study also showed that actual knowledge was greater than self-perceived knowledge for both preservice and in-service teachers, however, this finding does not support research previously conducted in the area of self-perceived and actual knowledge. Previous research has indicated that self-perceived knowledge is usually greater than actual knowledge (Park, 2000; Ruble et al., 2001; Tenenberg & Murphy, 2005). The authors hypothesize that this finding is not consistent with other self-perceived and actual knowledge research because of the variable used in the study, ADHD (Kos et al.). In addition, self-perceived knowledge of ADHD was measured by a single question using a likert scale; therefore, it may be hypothesized that results may be different if more questions were used in the assessment of self-perceived knowledge, assuming that a longer test may be more valid in measuring self-perceived knowledge.

*Importance of Assessing Graduate Students' in Medicine, Mental Health, and Educations Self-Perceived and Actual Knowledge of ADHD and ADHD Treatments*

Providing graduate students in medicine, mental health, and education information regarding evidence-based ADHD assessments and treatments may help guide appropriate recommendations. Research has indicated that when a person has more knowledge concerning a disorder and their respective treatments, their perceptions about the topic will change (Odom, 1996). The importance of education can be observed when participants have an increase in their treatment acceptability and compliance. This can have important and lasting affects for the children/adolescents receiving these treatments; therefore, it is important for graduate students in medicine, mental health, and education to have knowledge of ADHD and ADHD treatments options.

Assessing self-perceived knowledge and actual knowledge of ADHD will provide useful information in helping determine if future medical providers, mental health providers, and educators have knowledge regarding ADHD that will help guide them in making diagnostic and treatment decisions. In addition, it might also provide information on the importance of utilizing a multi-discipline/collaborative model in diagnosing and treating ADHD.

#### *Proposed Research Questions*

This study will assess the following questions: 1) Are there differences between self-perceived and actual knowledge of ADHD and ADHD treatment options? 2) Are there any self-perceived and actual knowledge differences of ADHD based on graduate field of study (medicine, mental health, education, and comparison)? 3) Do graduate students in medicine, in mental health, and in education think their graduate programs provide them with adequate training in ADHD and ADHD treatment options? 4) Where do graduate students in medicine, in mental health, and in education obtain knowledge

about ADHD and ADHD treatment options? 5) Where would graduate students in medicine, in mental health, and in education prefer to obtain knowledge about ADHD and ADHD treatment options?

### *Hypotheses*

1) It is hypothesized that self-perceived knowledge will be more consistent with actual knowledge of ADHD and ADHD treatment options in graduate students in mental health than in graduate students in medicine, education, and the comparison sample. 2) It is hypothesized that graduate students in mental health will have more knowledge of ADHD and ADHD treatment options than graduate students in medicine, education, and the comparison sample of graduate students. 3) It is hypothesized that graduate students in medicine, mental health, and education will report less than adequate training regarding ADHD from their graduate programs. 4) It is hypothesized that graduate students in medicine, mental health, and education obtain knowledge of ADHD and ADHD treatment options from class and articles. 5) It is hypothesized that graduate students in medicine, mental health, and education would prefer to obtain more knowledge of ADHD and ADHD treatment options from classes, articles, and workshops.

## Chapter III

### Method

#### *Design*

This study is a cross-sectional, quantitative comparison design. A cross sectional design was chosen for this study because it can assess a large number of participants at one time. The questionnaire was done in a survey format and provided a snapshot of the participants' level of self-perceived and actual knowledge of ADHD. The participants' scores on the questionnaires (graduate students in medicine, mental health, and education) were then compared between groups, providing a cross-section of the population sampled. The participants who agreed to participate were a convenience sample.

#### *Participants*

Graduate students from medicine, mental health, education, and a comparison group in the Houston area were asked to voluntarily participate in this study (see Appendix H). To obtain the graduate students in medicine sample, medical students and physician assistant students from Baylor College of Medicine and nurse practitioner students from the University of Texas Health Science Center were sampled. To obtain the sample of graduate students in mental health, psychology doctoral graduate students from the school psychology and counseling psychology programs and master's counseling students from the University of Houston, and master's level clinical and school psychology students from University of Houston Clear Lake were asked to participate. For the graduate students in education sample, graduate students (doctoral and masters) in education from the department of Curriculum and Instruction and

master's and doctoral graduate students from the Educational Psychology and Individual Differences programs within the Educational Psychology Department at the University of Houston were surveyed. Participants in the comparison group were graduate students from University of Houston's College of Engineering and College of Liberal Arts and Social Sciences (i.e., communication, political science, and economics).

Approximately 1700 graduate students across the four different fields were asked to participate in this study (see Table 1). Graduate students in medicine (i.e., students in medical school, in physician's assistant school, and in nurse practitioner programs) comprised the largest sample asked to participate ( $n=1062$ ); 41 students completed the study (response rate = 3.9%). Graduate students in psychology (i.e., doctoral students in counseling and school psychology programs and master's level students in clinical, counseling, and school psychology programs) had the second largest group with 367 students asked to participate; 22 completed the survey (response rate = 6.0%). Doctoral graduate students from clinical psychology were attempted to be sampled; however, the program did not provide the principal investigator with a definitive response before the study concluded. Graduate students in education (i.e., students in master's and doctoral education and educational psychology programs) had the smallest sample with 121 students asked to participate; ten students complete the survey (response rate = 8.3%). Graduate students in the comparison sample had 139 students asked to participate; six students complete the survey (response rate = 4.3%). All participants were current students.

**Table 1: Response Rates of Participants Based on Graduate Field of Study**

	Total Sampled	Total Responded	Response Rate
Graduate Students in Medicine	1062	41	3.9%
Graduate Students in Mental Health	367	22	6.0%
Graduate Students in Education	121	10	8.3%
Graduate Students Comparison Sample	139	6	4.3%
<b>Total</b>	<b>1689</b>	<b>79</b>	<b>4.7%</b>

A power analysis for a MANOVA indicated that 7 subjects were needed in each of the four groups to have 95% power for detecting a large effect size,  $\alpha = 0.05$  (Faul, Erdfelder, Lang, & Buchner, 2007). A total of 79 participants completed the online survey; however, participants were not evenly distributed among the four groups. Due to the insufficient sample size from the comparison group (N=6), this group was not used in the MANOVA analysis. The power analysis was re-run using three groups and indicated that 8 subjects were needed in each group.

Demographic information was also collected from the current sample (Appendix A). Age of the participants was recorded and indicated that the highest percentage of total graduate students who participated in the study were in the 23 to 27 age range. Descriptive statistics on the sample were also collected: 72.2 % were females; 72.1 % of graduate students had 1 to 3 years of graduate training; 5.2 % of the participants have a current or previous diagnosis of ADHD; and 47.3% of participants have a friend or family member diagnosed with ADHD.

*Missing Data*

Ninety- eight participants began the online survey, with 79 total completers. Nineteen participants began the survey but either did not complete one or both of the questionnaires measuring self-perceived or actual knowledge and were therefore excluded from the analysis. The remaining 79 responses were either completed or had only one or two missing answers; therefore, pairwise deletion was used (Meyers, Gamst, & Guarino, 2006).

*Instrumentation*

The Self-Perceived ADHD Knowledge questionnaire (see Appendix C) is an 11-item questionnaire that was developed by the principal investigator; it includes general items that relate to the more specific knowledge items included in the actual knowledge questionnaire (KADDS) (see Appendix D). Each item is phrased as a question and answer choices range from 1, “no knowledge” to 5, “very high knowledge.” The Self-Perceived ADHD Knowledge Questionnaire was used in the principal investigator’s candidacy research (Hofer, 2008). Analysis for the Self-Perceived Knowledge questionnaire indicated an acceptable degree of internal consistency ( $\alpha = .89$ ) with a sample size of 151 participants.

Concurrent validity evidence of the Self-Perceived Knowledge Questionnaire has also been assessed. The Self-Perceived ADHD Knowledge questionnaire was found to have a significant positive correlation with the KADDS (Hofer, 2008). Participants in the study who scored high on self-perceived knowledge, scored high on actual knowledge ( $n = 144$ ); two-tailed Pearson correlation ( $\alpha = .05$ ) was conducted to assess the relationship

between self-perceived and actual knowledge of ADHD and ADHD treatments,  $r = .505$  (26% shared variance).

The Knowledge of Attention Deficit Disorder Scale (KADDS) is the second dependent measure used (Sciutto & Feldhammer, 2000) (see Appendix J). The scale was designed by Sciutto and Feldhammer for a study concerning teacher perceptions and knowledge of ADHD. The KADDS consists of 39-items. Each item is phrased as a statement and requires a true, false or don't know answer. The scale measures three domains: symptoms/diagnosis of ADHD; treatments of ADHD; and general information about the etiology and outcome of ADHD based on knowledge and perceptions of ADHD (Sciutto & Feldhammer, 2000). Sciutto and Feldhammer determined that KADDS total scale was shown to have a moderate to high degree of internal consistency ( $\alpha = .80$  to  $.90$ ).

The KADDS was also determined to have adequate validity evidence. It was concluded by Sciutto and Feldhammer (2000) that previous exposure to working with children with ADHD, the extent of the exposure to working with children with ADHD, increased training in the area of ADHD, and experience with children in special education have shown to be positively correlated with scores on the KADDS. Results showed a significant difference in scores on the KADDS between participants who had previous exposure to ADHD and those that did not. In addition, scores on the KADDS increased when participants were given an educational intervention on ADHD (Sciutto & Terjesen, 2004).

The reliability for the Self-Perceived Knowledge questionnaire and the KADDS were determined using the current graduate sample ( $n=81$  and  $n=73$ ). Both instruments

were previously used on samples of undergraduate students and therefore, it was important to determine that the measures had adequate reliability for this sample of graduate students. A high degree of internal consistency was found for both the self-perceived knowledge questionnaire ( $\alpha = .93$ ) and the actual knowledge questionnaire (KADDS) ( $\alpha = .92$ ).

In addition, data were collected through a questionnaire that assessed graduate students level of training regarding ADHD received by their graduate programs. Respondents were asked to rate their training programs as being below average, average, or above average regarding their training of ADHD. A questionnaire also asked participants to report where they currently receive information about ADHD and where they would prefer to receive information. This information was assessed through a Likert scale ranging from 1 (receiving the most information from this source) to 5 (receiving the least information from this source). Students were asked to use the Likert scale on the following sources of information: classes, articles, workshops, electronic media, print media, and friends.

Additional information was also collected from participants on whether they or someone they know had ever been diagnosed with ADHD. A demographics questionnaire was also used to collect subject data (age, gender, years in graduate school, graduate field of study, and future profession) (see Appendix F).

### *Variables*

The independent variable was field of graduate study. Graduate students in medicine, mental health, and education served as the levels of the independent variable. The two dependent variables were self-perceived knowledge of ADHD and ADHD

treatment options and actual knowledge of ADHD and ADHD treatment options as measured by the Self-Perceived Knowledge Questionnaire and KADDS, respectively.

### *Procedure*

The study was approved by the Committee for the Protection of Human Subjects at the University of Houston in January 2010. The study was posted online through Survey Monkey for 4 weeks (April) during the spring 2010 semester. Students were recruited through professors in the different programs either through listserves or by face-to-face solicitations during their classes. An online consent form was included at the start of the survey. The consent form included general information about the study (see Appendix B). The participants were informed that all questionnaires were anonymous, and each participant was issued a participant number with no identifying information (information was de-identified). If participants had any questions or concerns, they were instructed to contact the principal investigator through email.

After agreeing to the consent form, participants were automatically directed to an eleven item-likert scale questionnaire that measured Self-Perceived Knowledge of ADHD (Hofer, 2008). After completion of the first questionnaire, participants were directed to the thirty-nine item, True/False/Don't Know format, Knowledge of Attention Deficit Disorders Scale (KADDS) questionnaire, a measure of actual knowledge of ADHD (Sciutto, 2000). Completion of the two questionnaires helped answer if there was a relationship between self-perceived and actual knowledge (research question 1) and if there were any self-perceived and actual knowledge differences of ADHD based on field of study (medicine, mental health, and education) (research question 2). In addition, information was also collected regarding the level of training the sampled graduate

students feel they receive regarding ADHD (research question 3), and completed a questionnaire that assessed where participants currently receive information about ADHD and where they would prefer to receive information (research questions 4 and 5) (see Appendix E). Finally, participants completed a demographics questionnaire (e.g., age, gender, graduate field of study, etc.) and were also asked to indicate if they or a friend or family member had ever been diagnosed with ADHD.

After participants completed the study, they had the option to receive information about ADHD and ADHD evidence-based treatment options (see Appendix G). This was indicated in the Protection of Human Subjects application as an incentive for participants. They were provided this information through web format.

Incentives for participation in this study included furthering research on knowledge of ADHD and ADHD treatments, a link providing resources for diagnostic and treatment information about ADHD, and a drawing for four gift cards to an on-line retailer. Participants entered the drawing by providing their email address after completion of the survey. Emails were only used for the drawings of the gift cards and were not linked in any way to the data.

#### *Data Analysis*

Initially a bivariate correlation was used to descriptively assess differences between self-perceived knowledge and actual knowledge (research question 1). A one-way multivariate analysis of variance (MANOVA) was conducted to investigate the relationships among 3 levels of graduate field of study (medicine, mental health, and education) and the dependent variables, self-perceived knowledge of ADHD and ADHD treatment options, and actual knowledge of ADHD and ADHD treatment options

(research question 2). A MANOVA was used because it can simultaneously assess one independent variable on two or more dependent variables. Descriptive statistics (means) were used to assess level of training regarding ADHD received by graduate students from their programs (research question 3). Descriptive statistics (means) were also used to assess participants' current sources and desired sources of information regarding ADHD (research questions 4 and 5). The comparison sample was not reported in the descriptive statistics for research questions 3 through 5, because a comparison sample was not needed for these analyses.

## Chapter IV

### Results

Analyses were conducted to assess all five research questions. When appropriate, preliminary and/or primary analyses were run to answer the research questions. Results for each research question are presented below.

#### *Descriptive Statistics for Scores on Self-Perceived and Actual Knowledge*

The means and standard deviations for the scores on self-perceived and actual knowledge are presented in Table 2. Self-perceived knowledge scores range from 1 (“no knowledge”) to 5 (“very high knowledge”). Graduate students in medicine had an average self-perceived knowledge score of 2.51 (between the “no knowledge” and “some knowledge” range). Graduate students in mental health had an average self-perceived knowledge score of 3.36 (in the “some knowledge” range). Graduate students in education had an average self-perceived knowledge score of 2.81 (between the “no knowledge” and “some knowledge” range). Graduate students in the comparison group had an average self-perceived knowledge score of 1.50 (in the “no knowledge” range).

Actual knowledge scores are based on percent correct and therefore, range from 0% to 100% correct. Graduate students in medicine had an average score of 50.90% correct. Graduate students in mental health had an average score of 72.84% correct. Graduate students in education had an average score of 64.87% correct. Graduate students in the comparison group had the lowest average score with 28.63% correct.

**Table 2: Means and Standard Deviations for Self-Perceived and Actual Knowledge Based on Graduate Field of Study:**

Graduate Field of Study	Knowledge of ADHD				
	Self Perceived Knowledge*		Actual Knowledge**		
	M	SD	M	SD	N
<b>Graduate Students in Medicine</b>	2.51	0.69	56.90%	21.1	41
<b>Graduate Students in Mental Health</b>	3.36	0.93	72.84%	14.06	22
<b>Graduate Students in Education</b>	2.81	0.73	64.87%	16.88	10
<b>Graduate Students in the Comparison Sample</b>	1.50	0.53	28.63%	25.3	6
<b>Total Number of Graduate Students***</b>	2.81	0.85	62.80%	19.79	73

\*Self-Perceived Knowledge Scores range from 1 to 5

\*\*Actual Knowledge Scores range from 0% to 100%

\*\*\*Means are computed without the comparison group's scores because their data was not used in the main analysis

*Are there differences between self-perceived and actual knowledge of ADHD and ADHD treatment options?*

A bivariate correlation ( $\alpha = 0.05$ ) was calculated to assess the relationship between self-perceived and actual knowledge of ADHD and ADHD treatments (Table 3).

A statistically significant positive correlation was found between self-perceived and actual knowledge,  $r = .689$ , 47% shared variance, for the total sample of graduate students. An analysis was also conducted to determine the relationship between self-perceived and actual knowledge based on graduate fields of study (Table 3). The following results were obtained: a significant positive correlation was found among graduate students in medicine,  $r = .734$ , 53.9 % shared variance; a significant positive correlation was found among graduate students in mental health,  $r = .634$ , 40.2 % shared variance; and no significant relationship was found between self-perceived and actual knowledge among graduate students in education,  $r = .365$ , 13.3% shared variance.

**Table 3: Bivariate Correlations Between Self-Perceived Knowledge and Actual Knowledge by Graduate Field of Study**

Subscale	Actual Knowledge			
	Total Graduate Students (n= 73)	Graduate Students in Medicine (n= 41)	Graduate Students in Mental Health (n = 22)	Graduate Students in Education (n=10)
Self-Perceived Knowledge	.689**	.734**	.634**	.365

\*\*p < .01

*Are there any self-perceived and actual knowledge differences of ADHD based on graduate field of study (medicine, mental health, and education)?*

A one-way between-subjects multivariate analysis of variance (MANOVA) was conducted to understand if field of graduate study affects self-perceived and actual

knowledge of ADHD. The independent variable was graduate field of study (medicine, mental health, and education).

Statistical assumptions were assessed to determine any violations before proceeding with the analysis. Univariate normality was assessed and showed no statistically significant scores, indicating no normality violations within the distributions of the dependent measures. Bartlett's test of sphericity was used to determine if there was a statistically significant correlation present between the two dependent variables. Bartlett's test was significant indicating sufficient correlation between the two dependent variables. Levene's test of Equality of Error Variance was used to assess if there was equality of variances for each dependent variable across all levels of the independent variable. Levene's test was not significant, indicating no violations of homogeneity of variance. The Box M's test was conducted to assess for equivalence-of-covariance matrices. Box M's test was not statistically significant ( $p < .615$ ), indicating homogeneity of variance-covariance matrices of the dependent variables across levels of the independent variable (fields of graduate study). All assumptions were met and therefore, analysis using a MANOVA was conducted.

Results of the MANOVA indicated that the dependent variate was significantly associated with the independent variable, Wilk's Lambda = .795,  $F(2,73) = 4.19$ ,  $p < .01$ ,  $\eta^2 = .108$ . This indicates that the omnibus null hypothesis can be rejected, because there are differences on scores of self-perceived and actual knowledge based on graduate field of study. Due to the statistical significance of the multivariate effect, univariate F tests were conducted.

Univariate ANOVAs were conducted on each dependent measure separately to determine the locus of the statistically significant multivariate effect. Table 4 shows that graduate field of study significantly predicted self-perceived knowledge ( $F(2,70) = 8.57$ ,  $p < .01$ ,  $\eta^2 = .197$ ) and actual knowledge ( $F(2,70) = 5.26$ ,  $p < .05$ ,  $\eta^2 = .131$ ).

**Table 4: Univariate Analyses of Variance Results for Graduate Field of Study**

**Controlling for Years of Graduate Training**

Source	df	F	$\eta$
Self-Perceived Knowledge	2	8.57**	.20
Error	70	(.603)	
Actual Knowledge	2	5.26*	.13
Error	70	(350.32)	

Note: Values enclosed in parenthesis represent mean square errors.

\*  $p < .05$ ; \*\*  $p < .01$

Scheffe post hoc tests, appropriate when homogeneity of variance is present, were conducted due to the statistically significant univariate  $F$ 's that were observed and because the independent variable contained more than two levels (three levels of graduate field of study). A Scheffe post hoc multiple comparison test was computed for each dependent variable (Table 5). Post hoc tests suggest that graduate students in mental health had significantly higher scores of self-perceived ( $M = 3.36$ ,  $SD = .93$ ) and actual knowledge ( $M = 72.84\%$ ,  $SD = 14.06$ ) of ADHD than graduate students in medicine ( $M = 2.51$ ,  $SD = .69$ ;  $M = 56.91\%$ ,  $SD = 21.10$ ). No significant difference was found between graduate students of education compared to graduate students of medicine or mental health.

**Table 5: Multiple Comparison Post Hoc Tests (Scheffe) for Self-Perceived Knowledge and Actual Knowledge**

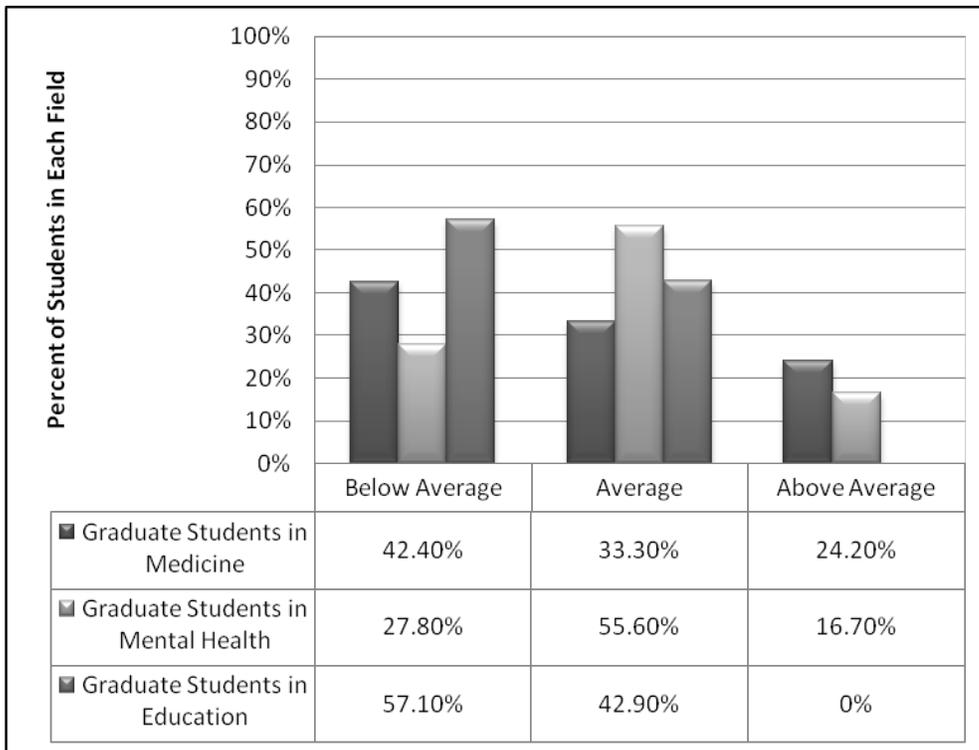
<b>Dependent Variable</b>	<b>(I) Graduate Field of Study</b>	<b>(J) Graduate Field of Study</b>	<b>Mean Difference (I-J)</b>
<b>Self-Perceived Knowledge</b>	Medicine	Mental Health	-.8495*
	Medicine	Education	-.2991
	Mental Health	Education	.5504
<b>Actual Knowledge</b>	Medicine	Mental Health	-15.9333*
	Medicine	Education	-7.9612
	Mental Health	Education	7.9720

\*  $p < .05$

*Do graduate students in medicine, in mental health, and in education think their graduate programs provide them with adequate training in ADHD and ADHD treatment options?*

Graduate students were also asked to rate the level of training regarding ADHD they have received from their graduate programs. Participants (medicine, mental health, and education) were asked to rate their training regarding ADHD from their graduate programs as either below average, average, or above average. Over half of graduate students in mental health (55.6%) rated their training programs in the average range; however, 42.4% of graduate students in medicine and 57.1% of graduate students from education rated their training regarding ADHD in their programs to be below average compared to 33.3% (medicine) and 42.9% (education) who reported average levels of training regarding ADHD (Figure 1). Overall, graduate students in medicine and mental health reported below average to above average levels of training regarding ADHD among their different graduate programs; however, graduate students in education had zero participants rate their graduate programs in the above average range.

**Figure 1: Reported Level of ADHD Training Received by Graduate Students from their Graduate Programs**



*Where do graduate students in medicine, in mental health, and in education obtain knowledge about ADHD and ADHD treatment options and where would graduate students in medicine, in mental health, and in education prefer to obtain knowledge about ADHD and ADHD treatment options?*

Information was collected on where graduate students currently receive information about ADHD and where they would prefer to receive information about ADHD (Tables 6, 7, and 8). Regarding ADHD training in classes the following was reported: only 27.0%, 22.7%, and 20% of graduate students in medicine, mental health,

and education, respectively, reported that they currently receive “the most information” from this source; however, 56.8%, 68.2%, and 30% of respondents reported that they prefer to receive “the most information” from this source. Results indicate that a large portion of graduate students in all three fields prefer to have more training on ADHD provided to them during their classes.

Graduate students in medicine also reported preferring to receive ADHD information from articles (25.7%). Other sources of information varied. For example, 13.9% preferred to receive the most ADHD information from workshops; however, 19.4% preferred to receive the least ADHD information from this source. This variation was also reported concerning electronic media and print media. However, friends was overall the source where graduate students in medicine preferred to receive the “least” amount of ADHD information.

More than half of graduate students in the mental health sample preferred to also receive more information about ADHD from articles (59.1%) and workshops (54.5%). 18.2% to 20% of graduate students in mental health also reported that they currently receive most of their ADHD information from electronic media, print media and friends; however, only 0 to 9.1% of the sample preferred to receive ADHD information from these sources.

50% of graduate students in education reported that they preferred to receive the most ADHD information from workshops, followed by classes and articles (each with 30%). Graduate students in education reported that the amount of ADHD information they receive from electronic media and print media tends to be consistent with their preferred amount of ADHD information from these two sources. Overall, graduate

students in education also reported that they wanted to receive the least amount of ADHD information from friends.

**Table 6: Percentage of Current Sources of ADHD Training and Preferred Source of ADHD Training by Graduate Students in Medicine**

	1 (most)	2	3	4	5 (least)	N
<b>Class</b>						
<b>Current</b>	27.0%	10.8%	32.4%	18.9%	10.8%	37
<b>Preferred</b>	56.8%	24.3%	13.5%	2.7%	2.7%	37
<b>Articles</b>						
<b>Current</b>	5.4%	13.5%	32.4%	18.9%	9.7%	37
<b>Preferred</b>	25.7%	34.3%	22.9%	8.6%	8.6%	35
<b>Workshops</b>						
<b>Current</b>	8.6%	5.7%	11.4%	8.6%	65.7%	35
<b>Preferred</b>	13.9%	13.9%	30.6%	22.2%	19.4%	36
<b>Electronic Media (televisions, radio, etc.)</b>						
<b>Current</b>	10.5%	10.5%	29.0%	26.3%	23.7%	38
<b>Preferred</b>	11.4%	8.6%	25.7%	31.4%	22.9%	35
<b>Print Media (newspaper, magazines, etc.)</b>						
<b>Current</b>	2.8%	16.7%	36.1%	16.7%	27.8%	36
<b>Preferred</b>	8.6%	5.7%	28.6%	31.4%	25.7%	35
<b>Friends</b>						
<b>Current</b>	13.2%	10.5%	28.9%	15.8%	31.6%	38
<b>Preferred</b>	5.9%	2.9%	26.5%	35.3%	29.4%	34

Note: Scores range from 1 (Receive the most information from this source) to 5 (Receive the least information from this source)

**Table 7: Percentage of Current Sources of ADHD Training and Preferred Source of ADHD Training by Graduate Students in Mental Health**

	<b>1</b> <b>(most)</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b> <b>(least)</b>	<b>N</b>
<b>Class</b>						
<b>Current</b>	22.7%	18.2%	22.7%	18.2%	18.2%	22
<b>Preferred</b>	68.2%	13.6%	9.1%	0%	9.1%	22
<b>Articles</b>						
<b>Current</b>	27.3%	36.4%	4.5%	9.1%	22.7%	22
<b>Preferred</b>	59.1%	22.7%	9.1%	0%	9.1%	22
<b>Workshops</b>						
<b>Current</b>	13.6%	22.7%	4.5%	27.3%	31.8%	22
<b>Preferred</b>	54.5%	13.6%	13.6%	4.5%	13.6%	22
<b>Electronic Media (televisions, radio, etc.)</b>						
<b>Current</b>	18.2%	9.1%	27.3%	13.7%	31.8%	22
<b>Preferred</b>	9.1%	9.1%	27.3%	22.7%	31.8%	22
<b>Print Media (newspaper, magazines, etc.)</b>						
<b>Current</b>	19.0%	14.3%	9.5%	23.8%	33.3%	21
<b>Preferred</b>	9.1%	4.5%	22.7%	18.2%	45.5%	22
<b>Friends</b>						
<b>Current</b>	20.0%	0%	10.0%	35.0%	35.0%	20
<b>Preferred</b>	0%	10.0%	20.0%	15.0%	55.0%	20

Note: Scores range from 1 (Receive the most information from this source) to 5 (Receive the least information from this source)

**Table 8: Percentage of Current Sources of ADHD Training and Preferred Source of ADHD Training by Graduate Students in Education**

	1 (most)	2	3	4	5 (least)	N
<b>Class</b>						
<b>Current</b>	20.0%	0%	30.0%	10.0%	40.0%	10
<b>Preferred</b>	30.0%	30.0%	10.0%	10.0%	10.0%	10
<b>Articles</b>						
<b>Current</b>	10.0%	20.0%	40.0%	10.0%	20.0%	10
<b>Preferred</b>	30.0%	20.0%	10.0%	20.0%	20.0%	10
<b>Workshops</b>						
<b>Current</b>	10.0%	10.0%	40.0%	10.0%	30.0%	10
<b>Preferred</b>	50.0%	10.0%	10.0%	20.0%	10.0%	10
<b>Electronic Media (televisions, radio, etc.)</b>						
<b>Current</b>	10.0%	10.0%	50.0%	20.0%	10.0%	10
<b>Preferred</b>	0%	40.0%	40.0%	0%	20.0%	10
<b>Print Media (newspaper, magazines, etc.)</b>						
<b>Current</b>	0%	20.0%	60.0%	0%	20.0%	10
<b>Preferred</b>	10.0%	30.0%	40.0%	0%	20.0%	10
<b>Friends</b>						
<b>Current</b>	0%	20.0%	40.0%	20.0%	20.0%	10
<b>Preferred</b>	11.1%	11.1%	11.1%	55.6%	11.1%	9

Note: Scores range from 1 (Receive the most information from this source) to 5 (Receive the least information from this source)

Results indicated that current sources of ADHD information are not consistent with preferred sources of ADHD information. Graduate students reported that they are currently not receiving as much training regarding ADHD as they would prefer. In addition, graduate students in the three fields requested that training regarding ADHD be presented to them through a variety of sources.

## Chapter V

### Discussion

The present study assessed the relationship between self-perceived and actual knowledge of ADHD and compared scores on these two variables between graduate students in medicine, mental health, and education. A significant correlation was found between self-perceived and actual knowledge. The results from the study indicated that, in general, graduate students' self-perceived knowledge was consistent with their actual knowledge of ADHD; however, when the analysis was further divided based on field of graduate study, the correlation for the education sample was not significant. This indicates that graduate students in education may have self-perceived knowledge that is discordant with actual knowledge. The education sample had the smallest sample size of the three groups assessed; therefore, additional research assessing self-perceived and actual knowledge with a larger sample size of graduate students in education may be warranted.

The findings of an overall positive correlation between self-perceived and actual knowledge are consistent with research measuring self-perceived and actual knowledge of ADHD (Hofer, 2008; Kos, Richdale, & Jackson 2004); however, they are inconsistent with previously discussed literature measuring self-perceived and actual knowledge unrelated to ADHD (Park, Cheong-Yi., 2000; Ruble, N., Walters, C., Yu, Y., & Setchel, K., 2001; Tenenberg, J. & Murphy, L., 2005). The discrepancy may be the result of the type of variable being measured in this study, ADHD. Because ADHD is a recognized and increasingly common disorder, the subjects in the ADHD studies may be better able to recognize the lack of knowledge they have in this area (i.e., all of the components,

myths, and treatments that encompass this disorder). Another potential reason for the positive correlation between self-perceived and actual knowledge may be due to the population sampled, graduate students. Danforth and Navarro (2001) reported that as education increases the discrepancy between self-perceived and actual knowledge decreases. Graduate students in these three fields seem to have at least a basic knowledge of ADHD and may have enough insight to know when additional training regarding ADHD is needed.

In addition, some graduate programs emphasize the importance of recognizing areas of competencies (Leigh et al., 2007). Graduate students in competency-based training programs may be able to more accurately assess their knowledge and determine areas of strengths and weaknesses. The ability to accurately assess current knowledge is an important skill to possess, because students can inform graduate programs about the type and level of training they need. If programs assess their students' level of knowledge, they can then use the information collected to help guide their training/programming and to help determine the need for additional training.

Although, scores on the self-perceived and actual knowledge questionnaire were consistent for the overall sample of graduate students, as previously mentioned, they were not significantly correlated for the sample of graduate students in education. Similar to the other two fields assessed, graduate students in education have extended training/education based on their graduate status; however, their self-perceived knowledge of ADHD may be more inconsistent with their actual knowledge of ADHD than for students in medicine and mental health. Compared to the other two fields, graduate students in education may not play as large of role in diagnosing and treating

ADHD. Their depth of knowledge regarding ADHD does not necessarily have to be as vast as those in the other two fields. Graduate students in medicine and mental health need to know symptoms of ADHD, diagnostic criteria, and available treatments compared to graduate students in education who may have to recognize symptoms of ADHD in order to refer to school mental health professionals and then subsequently, implement classroom-based behavioral treatments. However, further research regarding the discrepancy between self-perceived and actual knowledge for graduate students in education may be useful in providing more information about the reasons for this discrepancy and the potential effects this may have on children and adolescents with ADHD.

On the KADDS (actual knowledge of ADHD), graduate students overall average score was 62.8% of questions correct. This overall score was higher than scores on previous studies that used the KADDS (Bender, 1996; Hofer, 2008; Sciutto & Terjesen, 2004). In these studies a group of elementary education majors had 42% of answers correct, an undergraduate sample of education, psychology and other majors had 35% of answers correct, and a sample of college students from other majors averaged 45% of answers correct. This indicates that overall the sample of graduate students in the fields of medicine, mental health, and education have more actual knowledge of ADHD and ADHD treatments than students previously sampled from similar fields at the undergraduate level (i.e., education, psychology, etc.). The higher overall score on the KADDS (62.8% correct) may be due to the level of training that is provided at the graduate level compared to the undergraduate level and the fields of the graduate students who participated in the study (medicine, mental health, and education).

Significant differences were found in self-perceived knowledge and actual knowledge of ADHD and ADHD treatment options based on field of graduate study. Graduate students in mental health had the highest levels of self-perceived and actual knowledge, followed by graduate students in education and then graduate students in medicine. Further analysis revealed significant differences in self-perceived and actual knowledge between graduate students in medicine and mental health. No significant differences were found between graduate students in education compared to the other two groups (medicine and mental health). Graduate students in education fell between graduate students in mental health and medicine on both measures.

Before conducting the analysis, it was hypothesized that graduate students in mental health would have the highest self-perceived and actual knowledge between the three different fields of study. This was hypothesized due to the level of training graduate students in mental health are expected to have regarding diagnosing and providing psychosocial treatments for children and adolescents with ADHD (APA, 2009; Cushman et al., 2004). However, it is important to note that graduate students in medicine are typically the professionals who receive initial concerns from parents and schools regarding symptoms of ADHD (Stein et al., 2008; Williams et al., 2004). Based on the results of this study, graduate students in medicine may not have sufficiently high self-perceived or actual knowledge to make these diagnostic and treatment decisions for children with ADHD. In addition, although graduate students in mental health tended to score higher on self-perceived and actual knowledge, it is still unclear what is considered an adequate level of knowledge for these future practitioners. Furthermore, this study brings up the overall question, what is an adequate level of knowledge for graduate

students in medicine, mental health, and education? Should the graduate students in these three fields have the same level of knowledge? One would expect to find some differences between the groups considering graduate students in medicine and mental health diagnose and treat children with ADHD and educators may play a lesser role, but where are the cutoff points? Based on level of training and future job descriptions, it may be presumed that graduate students in mental health should have the highest level of knowledge followed by graduate students in medicine, and then graduate students in education. However, this was not found in the results of this study and a validated cutoff score that is indicative of adequate knowledge is not available. Nevertheless, the results indicate that there are discrepancies between knowledge of ADHD between the three groups and this may further indicate the importance of collaboration and consultation when working with a child with ADHD.

Although the findings from this study came from a sample with methodological limitations, results may substantiate the need for additional, larger studies that may promote the importance of collaboration and consultation between professionals working with children and adolescents with ADHD. ADHD is considered both a medical and mental health disorder that has educational implications; therefore, collaboration and consultation among medical providers, mental health providers and educators may be important throughout the diagnostic and treatment process. Graduate students in these three fields seem to have varying levels of ADHD knowledge and therefore, they may be able to assist each other in areas where they may have less familiarity. For example, educators and specialty trained mental health providers may have more knowledge regarding services available to children/adolescents with ADHD in the schools than

medical providers and non-school trained mental health providers. Similarly, there may be differences based on graduate field of study regarding knowledge of ADHD treatments. Medical providers and some mental health providers may be the most knowledgeable about ADHD medication, and mental health providers and some educators may have more knowledge concerning psychosocial treatments (i.e., parent training, classroom-based behavioral interventions, etc.) and available educational resources. Collaboration and consultation can help fill in some of the gaps in knowledge found in this study.

Another consideration is that none of the fields were homogenous in their training. ADHD training may be different based on specific field of study (i.e., future physicians compared to nurse practitioners compared to physician's assistants). In addition, specific fields may be further divided; for example, graduate students in medical school may also have various levels of training regarding ADHD depending on specialty area (i.e., psychiatry, general practice, pediatrics, etc.). Further dividing each group may help provide additional and useful information for training programs. In addition, more training does not always mean better training; therefore, it is important for training programs to determine which students (i.e., specialty areas) need additional training in ADHD and what type of information needs to be presented. The answers to these questions will probably vary by the three broad fields of medicine, mental health, and education; however, they may also be different based on specialty areas within the three fields (e.g., pediatricians, general practitioners, and psychiatry).

Results also suggest that graduate students in medicine and mental health have significantly different levels of actual knowledge; however, in what areas are these

differences present? For example, are graduate students in medicine less knowledgeable about ADHD than graduate students in mental health, or is their knowledge discordant only in certain areas of ADHD (e.g., treatment). Knowing the specific area of deficit could help provide training programs with information regarding the precise areas of ADHD that need more attention. Further analysis of the data revealed that more than half of the medicine and education samples tended to answer “incorrectly/don’t know” in all three areas measured by the KADDS (Symptoms/Diagnosis, Associated Features, and Treatment); however, more than half of the mental health sample only missed items in the Associated Features and Treatment areas. Table 9 illustrates questions that were most frequently answered “incorrectly/don’t know” by each field.

**Table 9: Frequently Missed Questions: Percent of Incorrect/Don’t Know Responses by Graduate Field of Study**

	<b>Medicine</b>	<b>Mental Health</b>	<b>Education</b>
<i>Symptoms/Diagnosis</i>			
5. In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7. (True)	<b>63.2%</b>	40%	<b>80%</b>
8. ADHD children often have a history of stealing or destroying other people's things. (False)	<b>55.3%</b>	15%	0%
<i>Associated Features</i>			
1. Most estimates suggest that ADHD occurs in approximately 15% of school age children. (True)	<b>73.7%</b>	35%	<b>50%</b>
4. ADHD children are typically more compliant with their fathers than with their mothers.	<b>78.9%</b>	<b>75%</b>	<b>70%</b>

19. Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.	<b>60.5%</b>	40%	<b>50%</b>
24. A diagnosis of ADHD by itself makes a child eligible for placement in special education.	<b>71%</b>	20%	30%
27. ADHD children generally experience more problems in novel situations than in familiar situations.	<b>92.1%</b>	<b>85%</b>	<b>90%</b>
28. There are specific physical features which can be identified by medical doctors (e.g., pediatrician) in making a definitive diagnosis of ADHD.	44.7%	10%	<b>50%</b>
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.	<b>65.8%</b>	<b>50%</b>	<b>50%</b>
33. Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.	<b>57.9%</b>	25%	<b>50%</b>
<b><i>Treatment</i></b>			
8. Antidepressant drugs have been effective in reducing symptoms for many ADHD children.	<b>76.3%</b>	<b>80%</b>	<b>60%</b>
23. Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.	<b>71%</b>	<b>70%</b>	<b>80%</b>
34. Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.	<b>76.3%</b>	45%	<b>100%</b>
35. Electroconvulsive Therapy (i.e., shock treatment) has been found to be an effective treatment for severe cases of ADHD.	<b>68.4%</b>	40%	<b>50%</b>

Programs may want to assess the types of questions their graduate students are most frequently missing. One of the questions regarding behavioral/psychological interventions (question 34; Treatment) was missed by more than half of the medicine (76.3%), all of the education sample (100%), and almost half of the mental health sample (45%). This is important information, because according to this sample, graduate

students in the three fields may be unclear about what type of symptoms are addressed in behavioral/psychological interventions. Providing all three fields with more specific information regarding behavioral/psychological interventions may not only help increase knowledge, but it also may increase awareness of the benefits of behavioral treatments and therefore, may be more likely to be recommended as a treatment option to parents of children with ADHD. Question 24 (Associated Features) addresses the availability of special education to children with ADHD and outcomes for this question showed that the majority of graduate students in medicine (71%) are unaware of the school services that can be offered to a child diagnosed with ADHD. This is also useful information, because many children may receive treatment from a physician only. If the physician is unaware of the potential services offered through the schools, then who is informing the parents of potential school resources? Parents may be relying on their physicians to provide them with resources for their child diagnosed with ADHD; however, it appears that graduate students in medicine may be unaware of the different types of school services available. Dissecting assessment questionnaires can help pinpoint current areas of need for the sampled population.

Although the comparison sample did not have a sufficient sample size to be used in the analysis, descriptive statistics (means) were reported for this group regarding scores on the self-perceived and actual knowledge questionnaires. The scores indicated that the comparison sample had the lowest level of self-perceived (mean = 1.50) and actual knowledge (m = 28.63%). This is what would be expected based on the comparisons group's areas of graduate study (i.e., engineering, economics, political science, and communication). A larger comparison sample would have provided a

baseline of comparison for the other scores in the three different fields and would have determined if the comparison sample's scores were significantly different from the other three groups. The comparison's group scores would have also indicated a starting score that the graduate students in medicine, mental health, and education would have been expected to surpass based on their training and the probability that they will work with someone diagnosed with ADHD.

Graduate students who participated in the study were also asked to rate their level of training regarding ADHD from their current programs. They were asked to rate their program as either being below average, average, or above average. The majority of graduate students in mental health rated their programs as average in providing ADHD information; however, a large portion of graduate students (medicine, 42.4%; education, 57.0%) from the other two programs reported mostly below average ratings. This appears to be consistent with previous research indicating medical providers and educators request more training regarding ADHD (Curtis, Pisecco, Hamilton, & Moore, 2006; Goldstein, 2002; Shaw et al., 2004; Snider, Busch, & Arrowood, 2003; Williams et al., 2004). This may be especially true for the sample of graduate students in education who had 0% report above average training regarding ADHD from their graduate programs.

Information was also collected on current sources of ADHD information and preferred sources of ADHD information among graduate students in medicine, mental health, and education. Overall, graduate students in the three fields reported that they wanted to receive more ADHD information from their graduate classes. Graduate students in medicine also reported that they wanted more ADHD information from

articles, workshops, electronic media, and print media. The only area they did not request more information from was from their friends. Graduate students in mental health requested more ADHD information from articles and workshops. Graduate students in education requested more ADHD information from all sources including their friends. Results suggest that the mental health sample is focused on receiving increased training regarding ADHD from three main sources: classes, articles, and workshops. These methods are all typically supported by training programs and are encouraged through professional development. Graduate students in medicine and education also requested more information in these three areas; however, they also wanted increased training through other sources too. This suggests that overall, graduate students in medicine and education would like more information regarding ADHD and request this training through multiple methods and a variety of sources.

Research has also shown that medical providers, mental health providers, and educators recognize the important role they play in diagnosing and treating ADHD; however, this study continues to support previous research that indicates professionals in these fields consistently request more ADHD focused training (Curtis, Pisecco, Hamilton, & Moore, 2006; Goldstein, 2002; Shaw et al., 2004; Snider, Busch, & Arrowood, 2003; Williams et al., 2004).

### *Limitations*

There are limitations to this study that are important to consider. The first limitation of this study is that participants were not a random sample. Participants self-selected to participate in the study which can result in selection bias. Results may be different with the sample of students who volunteered to participate in the study versus a randomly selected sample of students. Students who self-selected to participate may not

be representative of those students that did not select to participate in the study. This limits the generalization of these findings to other populations.

Another limitation of this study is the sample size in each field of graduate study. There was a low response rate for all fields of graduate students, (less than 5% response rate). It is difficult to determine why there was low participation; however, this is important to note and future studies may want to consider other ways to structure their online surveys (i.e., decrease the length of the email invitation) and also may want to consider including other formats of the study (i.e., paper surveys). In addition, the education sample was less (N= 10) than both the mental health (N= 22) and medical (N= 41) sample. This low sample size was partially due to the difficulties encountered by the principal investigator when requesting approval for graduate student participation in the Department of Curriculum Instruction at the University of Houston.

It is unclear what motivated the graduate students that did participate in the study. Graduate students who participated may have agreed to the study for a number of reasons. One hypothesis is that those that participated sympathized with having to do a dissertation and/or conduct other research. Graduate students who participated may understand the importance of recruiting participants and the difficulties that can be encountered in recruiting. Other participants may have had a specific interest in the area of ADHD. They may have either specialized in this area or possibly, may have general interest based on other experiences (e.g., friend/family member diagnosed with ADHD). In addition, other participants may have been motivated by the ADHD information that was given to them upon completion of the study. Future studies may want to ask

participants through an open-ended or multiple choices format their reason for participating in the study.

A third limitation to the study is that the mental health sample did not include doctoral students in clinical psychology. Permission was not able to be obtained for students in the clinical psychology program at the University of Houston. It is difficult to determine if the results would have been different if this sample was included in the study.

A fourth limitation to the study is that multiple specialty training areas comprise each of the fields. It is difficult to determine if groups within each field are significantly different from another with regards to self-perceived and actual knowledge because of the small sample size. A fifth limitation of the study is the small size of the comparison sample. A sufficient N from the comparison sample would have allowed for analysis of self-perceived and actual knowledge scores between four fields of graduate study versus three groups (medicine, mental health and education). The comparison sample would have provided a baseline of comparison for the other three groups regarding self-perceived and actual knowledge scores.

A sixth limitation is the use of online survey research. Using online surveys does not allow the experimenter to control the setting of the participant. For instance, some participants may have external stimuli distracting them during the survey which may affect their scores. In addition, online surveys may pose a threat to the accuracy of information collected, because some participants may not read the questions and may just fill in the answer choices, or some participants may have resources regarding ADHD in front of them that could also skew the results.

### *Future Directions*

There are a number of future research directions indicated by this study. More research is needed in the area of graduate training programs and their preparation of future professionals in working with children with ADHD, and possibly other disabling conditions. Are training programs providing adequate instruction in the area of ADHD? Furthermore, what is considered to be adequate knowledge of ADHD for each profession?

Given the overall knowledge of graduate students, this study also indicates the need for more research regarding collaborative consultation models among the three professions. Specifically, it would be helpful to obtain more information regarding collaborative consultations models in multiple settings (i.e., hospitals, schools, etc.) and to determine barriers to using these models in those settings. In addition, assessing whether training programs are educating their students on the importance of collaboration would also be helpful. The study found that overall graduate students seem to know how much knowledge they have regarding ADHD; however, do they know how they can fill in their gaps in knowledge and training? Graduate students may not be aware of the benefits of collaborating with professionals from other disciplines and the level of ADHD knowledge that other professionals may have. It may be helpful for future studies to not only assess different professionals' knowledge of consultation/collaboration, but also provide them with education on the potential benefits. Finally, it is also important to determine the efficacy of these models in multiple settings.

In addition, the KADDS can be broken down into three subscales; Associated Features, Symptom/Diagnosis, and Treatment (Scuitto, 2000), it may be informative to

assess whether graduates' scores on the KADDS remain consistent based on field of study if subscale scores are investigated. Would there be a difference between knowledge of ADHD based on these subscales? As previously discussed, dividing the measure by subscale can provide useful information for training programs.

Participation in this study was a convenience sample in the Houston/Galveston area. It may be helpful to increase the population of graduate students sampled by seeking participation from other graduate programs both in the Houston area and nationally. This would help increase the overall sample size and also help increase the generalization of the study.

It also may be helpful to collect more qualitative information regarding training in ADHD. Likert scales and simple yes or no questions were asked of participants; however, a more open-ended questionnaire could be created to provide more in-depth information regarding current ADHD training and areas of ADHD training that are lacking. For instance, future studies may want to further assess how much training regarding ADHD graduate students expect from their graduate programs (e.g., what should be included in the training). In addition, the three separate ratings (below average, average, and above average) were used to provide brief descriptions of participants' perceptions of their programs training in ADHD; however, if further analysis is warranted, supplementing qualitative with quantitative data may help provide more information regarding levels of training regarding ADHD.

Other data that was collected in this study but was not used in the analysis was the percent of students surveyed who had a friend/family member diagnosed with ADHD. Responses indicated that 42.5% of graduate students in medicine, 68.1% of graduate

students in mental health, and 40% of graduate students in education have a friend or family member diagnosed with ADHD (see Appendix A). Almost 30% more graduate students in mental health have a friend/family member diagnosed with ADHD. There are a number of potential implications for this high number. The first hypothesis may be that having a friend/family member diagnosed with ADHD increases a person's knowledge of ADHD which is why graduate students in mental health had the most knowledge. Another hypothesis may be that people who have friends/family members diagnosed with ADHD may develop an interest in mental health disorders and may therefore pursue a graduate degree in the field of mental health. Future studies may want to further explore the relationship between having a friend/family member diagnosed with ADHD and level of knowledge of ADHD. Furthermore, it may be helpful to determine other variables that may affect knowledge of ADHD.

In conclusion, the present study showed that graduate students in medicine, mental health, and education have varying levels of self-perceived and actual knowledge in the area of ADHD and ADHD treatment options. These professionals are expected to play essential roles in diagnosing and treating ADHD; therefore, graduate training programs may want to assess graduate students level of ADHD knowledge and provide them with current and empirically supported information concerning this common and growing disorder. This study answered the presented research questions; however, many more questions resulted from the outcomes. Results may help promote the need for future studies regarding knowledge of ADHD.

## References

- Accreditation Council for Graduate Medical Education (2007). *Common Program Requirements: General Competencies*. Retrieved on September 22, 2009, from <http://www.acgme.org/Outcome/comp/GeneralCompetenciesStandards21307.pdf>.
- American Academy of Nurse Practitioners (2007). *Position Statement on Nurse Practitioner Curriculum*. Retrieved on September 20, 2009 from <http://www.aanp.org/NR/rdonlyres/59523729-0179-466A-A7FB-BDEE68160E8E/0/NPCurriculum.pdf>
- American Academy of Pediatrics (2000). Clinical practice guideline: Diagnosis and evaluation of the child with Attention-Deficit/Hyperactivity Disorder. *Pediatrics*, 105, 1158-1170.
- American Academy of Pediatrics (2001). Clinical practice guideline: Treatment of the school-aged child with Attention-Deficit/Hyperactivity Disorder. *Pediatrics*, 1033, 1033-1044.
- American Academy of Physician Assistants (n.d.). *Our Practice Areas*. Retrieved on September 20, 2009, from <http://www.aapa.org/about-pas/our-practice-areas>)
- American Board of Medical Specialties (2006). *Which Medical Specialist for You*. Retrieved March 19, 2009, from <http://www.boardcertifieddocs.com/supplement/which.pdf>
- American Mental Health Counselors Association (2009). *About AMHCA*. Retrieved on September 22, 2009 from <http://www.amhca.org/about/>
- American Psychiatric Association (2000). *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, text revision. Washington, DC: American Psychiatric

Press.

American Psychological Association (2002, December). Ethical principles of psychologists and code of conduct 2002. *American Psychologist*. 57, 1060-1073.

American Psychological Association, Division 12: Society of Clinical Psychology (n.d.). *About Clinical Psychology*. Retrieved September 21, 2009 from <http://www.div12.org/about-clinical-psychology>

American Psychological Association: Division of School Psychology (n.d.). *Division 16 Goals and Objectives*. Retrieved September 21, 2009 from <http://www.indiana.edu/~div16/goals.html>

American Psychological Association: Society of Counseling Psychology Division 17 (n.d.). *About Counseling Psychologists*. Retrieved September 21, 2009 from [http://www.div17.org/students\\_defining.html](http://www.div17.org/students_defining.html)

Anastopoulos, A.D., DuPaul, G. & Barkley, R.A. (1991). Stimulant Medication and parent training therapies for Attention Deficit-Hyperactivity Disorder. *Journal of Learning Disabilities*. 24, 210-218.

Barkley, R. (2009, July). ADHD: Recent advances in research and interventions. Presentation presented at the Region 4 meeting in Houston, Texas.

Barkley, R. (2003). Issues in the diagnosis of attention-deficit/hyperactivity disorder in children. *Brain and Development*. 25, 77-83.

Barkley, R.A., Cook, E.H., Dulcan, M., Campbell, S., Prior, M., Atkins, M., et al. (2002). Consensus statement on ADHD. *European Child and Adolescent Psychiatry*. 11, 96-98.

Barkley, R. (1998). Attention-deficit hyperactivity disorder. *Scientific American*. 279,

44-49.

- Baroni, A., Lunsford, J.R., Luckenbaugh, D.A., Towbin, K.E., & Leibenluft, E. (2009). Practitioner review: The assessment of bipolar disorder in children and adolescents. *Child Psychiatry and Psychology*. 50, 203-215.
- Brown, R.T. (2005). Recent advances in pharmacotherpaies for the externalizing disorders. *School Psychology Quarterly*, 20, 118-133.
- Bussing, R., Gary, F.A., Mills, T.L., & Garvan, C.W. (2007). Cultural variations in parental health beliefs, knowledge, and information sources related to attention-deficit/hyperactivity disorder. *Journal of Family Issues*. 28,291-318.
- Calderon, O., & Ruben, L. (2008). A contextual, multidimensional, interdisciplinary approach to assessment of ADHD: A best practice clinical model. *Best Practices in Mental Health*. 4, 59-79.
- Center for the Study of Teaching and Policy (2008). *University of Washington: Center for the Study of Teaching and Policy*. Retrieved on September 20, 2009 from <http://depts.washington.edu/ctpmail/>
- Curtis, D., Pisecco, S., Hamilton, R.J., Moore, D.W. (2006). Teacher perceptions of classroom interventions for children with ADHD: A cross-cultural comparison of teachers in the United States and New Zealand. *School Psychology Quarterly*. 21, 171-196.
- Cushman, T., LeBlanc, M., & Porter, G. (2004). ADHD: Results of a national survey of School Psychologists. *Ethical Human Psychology an Psychiatry*. 6, 183-192.
- Dattalo, P. (2008). *Determining Sample Size: Balancing power, precision, and practicality*. New York: Oxford University Press.

- Danforth, S. & Navarro, V. (2001). Hyper talk: Sampling the social construction of ADHD in everyday language. *Anthropology and Education Quarterly*. 32, 167-190.
- Drabick, D.A.G., Gadow, K.D., & Sprafkin, J. (2006). Co-occurrence of conduct disorder and depression in a clinic-based sample of boys with ADHD. *Journal of Child Psychology and Psychiatry*. 47, 766-774.
- DuPaul, G.J. & Weyandt, L.L. (2006). School-based intervention for children with Attention Deficit Hyperactivity Disorder: Effects on academic, social, and behavioural functioning. *International Journal of Disability, Development and Education*. 53, 161-176.
- Epstein, J.N., Rabiner, D., Johnson, D.E., FitzGerald, D.P., Chrisman, A., Erkanli, A., Sullivan, K.K., March, J.S., Margolis, P., Norton, E.C., & Conners, C.K. (2007). Improving Attention-Deficit/Hyperactivity Disorder treatment outcomes through use of a collaborative consultation treatment service by community-based pediatricians. *Pediatric Adolescent Medicine*. 161, 835-840.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*. 39, 175-191.
- Findling, R.L. (2008). Evolution of the treatment of Attention-Deficit/Hyperactivity Disorder in children: A review. *Clinical Therapeutics*. 30, 942-957.
- Froehlich, T.E., Lanphear, B.P., Epstein, J.N., Barbaresi, W.J., Katusic, S.K., Kahn, R.S.

- (2007). Prevalence and Treatment of ADHD in a National Sample of U.S. Children. *Archives of Pediatrics and Adolescent Medicine*. 2007; 161(9): 857-864.
- Glass, C.S. & Wigar, K. (2000). Teacher perceptions of the incidence and management of Attention Deficit Hyperactivity Disorder. *Education*. 121, 412-420.
- Goldstein, L.F. (2002). Special Education. *Education Week*. 22, 6.
- Greenhill, L., Kollins, S., Abikoff, H., McCracken, J., Riddle, M., Swanson, J., et al. (2006). Efficacy and safety of immediate release of Methylphenidate treatment for preschoolers with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry*. 45, 1284-1293.
- Guevara, J.P., Rothbard, A., Shera, D., Zhao, H., Forrest, C.B., Kelleher, K., & Schwarz, D. (2007). Correlates of behavioral care management strategies used by primary care pediatric providers. *Ambulatory Pediatrics*. 7, 160-166.
- Hair, J.F., Anderson, R.E., Tatham, R.L., & Black, W.C. (1998). *Multivariate data analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall.
- Handler, M.W. & DuPaul, G.J. (2005). Assessment of ADHD: Differences across psychology specialty areas. *Journal of Attention Disorders*. 9, 402-412.
- Hofer, S.B. (2008). *Self-perceived and actual knowledge of Attention Deficit Hyperactivity Disorder: A comparison between future teachers and other undergraduate majors*. Unpublished Candidacy report, University of Houston, Houston.
- Kapalka, G. (2008). Pediatrician/psychologist collaboration: Opportunities for clinical child psychologists. *Journal of Contemporary Psychotherapy*. 39, 127-133.

- Kelleher, K.J., McInerney, T.K., Gardner, W.P., Childs, G.E., & Wasserman, R.C. (2000). Increasing identification of psychosocial problems: 1979 – 1996. *Pediatrics*. 105, 1313-1321.
- Kos, J.M., Richdale, A.L., & Jackson, M.S. (2004). Knowledge about Attention-Deficit/Hyperactivity Disorder: A comparison of in-service and preservice teachers. *Psychology in the Schools*. 41,517-526.
- Leigh, I.W., Smith, I.L., Bebeau, M.J., Lichtenberg, J.W., Nelson, P.D., Portnoy, S., Rubin, N.J., & Kaslow, N.J. (2007). Competency assessment model. *Professional Psychology: Research and Practice*. 38, 463-473.
- Lopez, M.A., Toprac, M.G., Crismon, M.L., Boemer, C., & Baumgartner, J. (2005). A psychoeducational program for children with ADHD or depression and their families: Results from the CMAP Feasibility Study. *Community Mental Health Journal*. 41, 51-66.
- Maughan, D.R., Christiansen, E., Jenson, W.R., Olympia, D, & Clark, E. (2005). Behavioral parent training as a treatment for externalizing behaviors and disruptive behavior disorders: A meta-analysis. *School Psychology Review*. 34, 267-286.
- MTA Cooperative Group (1999). A 14 month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. *Archives of General Psychiatry*. 56, 1073-1086.
- Muse, M. & McGrath, R.E. (2010). Training comparison among three professions

prescribing psychoactive medications: Psychiatric nurse practitioners, physicians, and pharmacologically trained psychologists. *Journal of Clinical Psychology*. 66, 96-103.

National Association of School Psychologists (2000). *Who Are School Psychologists?*

Retrieved on September 22, 2009 from

[http://www.nasponline.org/about\\_sp/whatis.aspx](http://www.nasponline.org/about_sp/whatis.aspx)

National Board for Professional Teaching Standards (2002). *What Teachers Should*

*Know And Be Able To Do*. Retrieved on January 10, 2010 from

[http://www.nbpts.org/UserFiles/File/what\\_teachers.pdf](http://www.nbpts.org/UserFiles/File/what_teachers.pdf)

National Council for Accreditation of Teacher Education (2008). Professional Standards for the Accreditation of Teacher Preparation Institutions. Washington, NCATE.

National Organization of Nurse Practitioner Faculties and American Association of

Colleges of Nursing (2002). *Nurse practitioner primary care competencies in*

*specialty areas*. Rockville, MD: Division of Nursing Department of Health and Human Services.

Odom, S.E. (1996). Effects of an educational intervention on mothers of male children

with attention deficit hyperactivity disorder. *Journal of Community Health*

*Nursing*. 13, 207-220.

Olfson, M., Marcus, S.C., Wesisman, M.M., & Jensen, P.S. (2002). National trends in

the use of psychotropic medications by children. *Journal of the American*

*Academy of Child and Adolescent Psychiatry*. 41, 514-521.

Parens, E. & Johnston, J. (2008). Understanding the agreements and controversies

surrounding childhood psychopharmacology. *Child and Adolescent Psychiatry and Mental Health*. 2, 1-9.

Park, Cheong-Yi. (2000). News Media Exposure and self-perceived knowledge: The illusion of knowing. *International Journal of Public Opinion Research*. 13, 420-425.

Pelham, W.E. & Fabiano, G.A. (2008). Evidence-based psychosocial treatment for Attention-Deficit/Hyperactivity Disorder. *Journal of Clinical Child and Adolescent Psychology*. 37, 184-214.

Pelham, W.E., Fabiano, G.A., & Massetti, G.M. (2005). Evidence-based assessment of Attention Deficit Hyperactivity Disorder in children and adolescents. *Journal of Clinical Child and Adolescent Psychology*. 34, 449-476.

Pliszka, S.R., Crismon, M.L., Hughes, C.W., Conners, K., Emslie, G.J., Jensen, P.S., ... the Texas Consensus Conference Panel on Medication Treatment of Childhood Attention-Deficit/Hyperactivity Disorder (2006). The Texas Children's Medication Algorithm Project: Revision of the algorithm for pharmacotherapy of Attention-Deficit/Hyperactivity Disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*. 45, 642-657.

Pliszka, S.R., Lopez, M., Crismon, M.L., Toprac, M.G., Hughes, C.W., Emslie, G.J., & Boemer, C. (2003). A feasibility study of the Children's Medication Algorithm Project (CMAP) algorithm for the treatment of ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry*. 42, 279-287.

Pliszka, S.R., Greenhill, L.L., Crismon, M.L., Sedillo, A., Carlson, C., Conners, K.,

... the Texas Consensus Conference Panel on Medication Treatment of Childhood Attention-Deficit/Hyperactivity Disorder (2000a). The Texas Children's Medication Algorithm Project: Report of the Texas Consensus Conference Panel on medication treatment of childhood Attention-Deficit/Hyperactivity Disorder. Part I. *Journal of the American Academy of Child and Adolescent Psychiatry*. 39, 908-919.

Pliszka, S.R., Greenhill, L.L., Crismon, M.L., Sedillo, A., Carlson, C., Conners, K., ...the Texas Consensus Conference Panel on Medication Treatment of Childhood Attention-Deficit/Hyperactivity Disorder (2000b). The Texas Children's Medication Algorithm Project: Report of the Texas Consensus Conference Panel on medication treatment of childhood Attention-Deficit/Hyperactivity Disorder. Part II: Tactics. *Journal of the American Academy of Child and Adolescent Psychiatry*. 39, 920-927.

Polaha, J., Cooper, S.L., Meadows, T., & Kratochvil, C.J. (2005). The assessment of Attention-Deficit/Hyperactivity Disorder in rural primary care: The portability of the American Academy of Pediatrics guidelines to the "Real World." *Pediatrics*. 115, 120-126.

Polanczyk, G., Silva de Lima, M., Horta, B.L., Biederman, J., & Rohde, L.A. (2007). The worldwide prevalence of ADHD: A systematic review and metaregression analysis. *American Journal of Psychiatry*. 164, 942-948.

Posner, K., Melvin, G.A., Murray, D.W., Gugga, S.S., Fisher, P., Skrobala, A., Cunningham, C., Vitiello, B., Abikoff, H.B., Ghuman, J.K., Kollins, S., Wigal, S.B., Wigal, T., McCracken, J.T., McGough, J.J., Kastelic, E., Boorady, R.,

- Davies, M., Chuang, S.Z., Swanson, J.M., Riddle, M.A., & Greenhill, L.L. (2007). Clinical presentation of Attention-Deficit/Hyperactivity Disorder in Preschool children: The Preschoolers with Attention-Deficit/Hyperactivity Treatment Study (PATS). *Journal of Child and Adolescent Psychopharmacology*, 5, 547-562.
- Public Law print of PL 107-110, the *No Child Left Behind Act of 2001*. Retrieved on September 26, 2009 from <http://www.ed.gov/policy/elsec/leg/esea02/107-110.pdf>
- Ruble, N., Walters, C., Yu, Y., & Setchel, K. (2001). Actual versus perceived knowledge of child development in a therapeutic context: A survey of therapists. *The American Journal of Family Therapy*, 29, 173-180.
- Sciutto, M.J., Nolfi, C.J., & Bluhm, C. (2004). Effect of child gender and symptom type on referrals for ADHD by elementary school teachers. *Journal of Emotional and Behavioral Disorders*, 12, 247-253.
- Sciutto, M.J. & Feldhammer, E. (2000). The Knowledge of Attention Deficit Disorders Scale (KADDS). [Test manual]. Unpublished test manual.
- Sciutto, M.J., Terjesen, M.D., & Frank, A.S.B. (2000). Teachers' knowledge and misperceptions of Attention-Deficit/Hyperactivity Disorder. *Psychology in the Schools*, 37, 115-122.
- Shaw, K.A., Mitchell, G.K., Wagner, I.J., & Eastwood, H.L. (2002). Attitudes and practice of general practitioners in the diagnosis and management of attention-deficit/hyperactivity disorder. *Journal of Paediatric Child Health*, 38, 481-486.
- Snider, V.E., Busch, T. & Arrowood, L. (2003) Teacher knowledge of stimulant medication and ADHD. *Remedial and Special Education*, 24,46-56.

- Stein, R.E.K., Horwitz, S.M., Storfer-Isser, A., Heneghan, A., Olson, L., & Hoagwood, K.E. (2008). Do pediatricians think they are responsible for identification and management of child mental health problems? Results of the AAP Periodic Survey. *Ambulatory Pediatrics*. 8, 11-17.
- Tenenberg, J. & Murphy, L. (2005). Knowing what I know: An investigation of undergraduate knowledge and self-knowledge of data structures. *Computer Science Education*. 15, 297-315.
- Thomas, C.R. & Holzer, C.E. (2006). The continuing shortage of child and adolescent psychiatrists. *Journal of the American Academy of Child and Adolescent Psychiatry*. 45, 1023- 1031.
- Williams, J., Klinepeter, K., Palmes, G., Pulley, A., & Foy, J.M. (2004). Diagnosis and treatment of behavioral health disorders in pediatric practice. *Pediatrics*. 114, 601-606.
- University of Houston, College of Education: Department of Curriculum and Instruction (September 2008). *Doctoral Degree Program Guide*. Retrieved on September 5, 2009 from <http://www.coe.uh.edu/mycoe/cuin/docs/DocGuidelines.pdf>
- University of Houston, College of Education: Department of Curriculum and Instruction (August 2008). *Master's Degree Program Guide*. Retrieved on September 5, 2009 from <http://www.coe.uh.edu/mycoe/cuin/docs/MAGuidlines.pdf>
- U.S. Government Accountability Office (March, 2004). *New No Child Left Behind Flexibility: Highly Qualified Teachers*. Retrieved on October 3, 2009 from <http://www.ed.gov/print/nclb/methods/teachers/hqtflexibility.html>
- Van Den Berg, S., Shairo, D.A., Bickerstaffe, D., & Cavanagh, K. (2004). Computerized

cognitive-behaviour therapy for anxiety and depression: A practical solution to the shortage of trained therapists. *Journal of Psychiatric and Mental Health Nursing*. 11, 508-513.

Van der Oord, S., Prins, P.J.M., Oosterlaan, J., & Emmelkamp, P.M.G. (2008). Efficacy of methylphenidate, psychosocial treatments and their combination in school-aged children with ADHD: A meta-analysis. *Clinical Psychology Review*. 28, 783-800.

APPENDIX A  
DEMOGRAPHIC INFORMATION

**Percent of the Age of Participants Distributed Across the Four Graduate Fields of Study**

	<b>18-22</b>	<b>23-27</b>	<b>28-32</b>	<b>33-37</b>	<b>38-42</b>	<b>42 plus</b>	
Graduate Students in Medicine	5	26	2	1	2	5	
Graduate Students in Mental Health	0	10	6	5	1	0	
Graduate Students in Education	0	3	4	0	1	2	
Graduate Students in the Comparison Group	0	2	3	1	0	0	
<b>Total (N)</b>	<b>5</b>	<b>41</b>	<b>15</b>	<b>7</b>	<b>4</b>	<b>7</b>	<b>79</b>
<b>Total (Percent)</b>	<b>6.3%</b>	<b>51.3%</b>	<b>19.2%</b>	<b>9.0%</b>	<b>5.2%</b>	<b>9.0%</b>	<b>100.0%</b>

**Demographic Information of Participants: Gender, Years of Graduate Training, Current Diagnosis of ADHD, and Friend/Family Member Diagnosed with ADHD**

<b>Variable</b>	<b>Graduate Students in Medicine</b>	<b>Graduate Students in Mental Health</b>	<b>Graduate Students in Education</b>	<b>Graduate Students in the Comparison Group</b>
<b>Female</b>	75%	86.4%	80%	0%
<b>1-3 years of graduate training</b>	82.9%	63.6%	80%	66.7%
<b>Current/previous diagnosis of ADHD</b>	2.5%	4.5%	10 %	16.7%
<b>Friend /family member diagnosed with ADHD</b>	42.5%	68.1%	40%	16.7%

APPENDIX B

CONSENT TO PARTICIPATE

/w EPDw UJMJA1n Consent to Participate

“Self-perceived and actual knowledge of Attention Deficit Hyperactivity Disorder: A comparison between graduate students in medicine, mental health, and education.”

You are being invited to participate in a research project conducted by Stephanie Bieltz Hofer from the Department of Educational Psychology at the University of Houston. This study is part of dissertation research that is conducted under the supervision of Thomas Kubiszyn, Ph.D. in the Department of Educational Psychology at University of Houston.

#### NON-PARTICIPATION STATEMENT

Your participation is voluntary and you may refuse to participate or withdraw at any time without penalty or loss of benefits to which you are otherwise entitled. You may also refuse to answer any question during completion of the study. As a student, a decision to participate or not or to withdraw your participation will have no effect on your standing.

You must be at least 18 years old, before consenting to participate in this study. Individuals under 18 years old cannot participate without parental consent.

#### PURPOSE OF THE STUDY

The purpose of this study is to determine current knowledge of Attention Deficit Hyperactivity Disorder and Attention Deficit Hyperactivity Disorder treatment options among graduate students in medicine, mental health, and education.

#### PROCEDURES

You will be one of approximately 200 subjects to be asked to participate in this project.

The study will be conducted online through a questionnaire on Survey Monkey (online survey device).

Participants in this study will be asked to fill out a background data form and two sets of questionnaires related to ADHD knowledge. Participants will fill out a self-perceived knowledge online questionnaire and an actual knowledge online questionnaire concerning ADHD and ADHD treatment options. The background data form will take approximately 5 minutes to complete. The length of the first questionnaire will take approximately 5 minutes and the second questionnaire will take approximately 10 minutes. Once the second questionnaire is completed, the participants' participation in the study will be concluded. The estimated total time commitment for this study is approximately 20 minutes.

#### ANONYMITY

Your participation in this study is anonymous. Please do not put your name or other identifiable information on any materials to be returned to the investigator. Each data set will be assigned a number by the principal investigator. This code number will appear on all materials, but will not be linked to any identifying information.

#### RISKS/DISCOMFORTS

Although unlikely, information discussed in the questionnaire may make students question their training and lack of knowledge about ADHD. In addition, people who have family members or friends or who themselves have been diagnosed with ADHD may feel some discomfort when answering the questions concerning ADHD diagnosis and treatment options.

#### BENEFITS

The benefits of participating in this study are that participants who complete both questionnaires will receive information concerning current knowledge about ADHD and ADHD treatment options (i.e., diagnosis of ADHD and evidenced-based treatments).

In addition, participation will help the investigator determine the level of knowledge graduate students in medicine, mental; health, and education have concerning ADHD and ADHD treatment options and compare that knowledge across the different groups and to a control sample.

#### ALTERNATIVES

Participation in this project is voluntary and the only alternative to this project is non-participation.

#### INCENTIVES/REMUNERATION

Participants, who participate in this study and choose to provide their email address, will be put in a random drawing of four \$20.00 gift cards to Amazon (online retailer).

#### PUBLICATION STATEMENT

The results of this study may be published in professional and/or scientific journals. It may also be used for educational purposes or for professional presentations. However, no individual subject will be identified.

#### QUESTIONS OR CONCERNS

If you have any questions before filling out this questionnaire, then please email the principal investigator Stephanie Bieltz Hofer, [sabieltz@uh.edu](mailto:sabieltz@uh.edu).

This project has been reviewed by the University of Houston Committee for the Protection of Human Subjects (713 743-9204).

**\*1. I have read the information provided above and voluntarily agree to participate in this study. (Note: you should print a copy of this form before you leave this page.)**

I have read the information provided above and voluntarily agree to participate in this study. (Note: you should print a copy of this form before you leave this page.) I Agree

I Disagree

**2. Date**

Principal Investigator: Stephanie Bieltz Hofer, School Psychology Graduate Student

APPENDIX C

SELF-PERCEIVED KNOWLEDGE QUESTIONNAIRE

<b>Self-Perceived Knowledge of Attention Deficit Hyperactivity Disorder</b>						
For this questionnaire there are no right, wrong, or best answers so please respond as honestly as you can. We are interested in identifying how much knowledge graduate students have about children and adolescents with Attention Deficit Hyperactivity Disorder (ADHD). For each of the following items, please rate your knowledge level as honestly and accurately as you can.						
Please indicate how well you know the following questions according to the provided Likert scale; with 1 indicating that you have “no knowledge” about the topic and 5 indicating you have “very high knowledge” about the topic.						
		No Knowledge		Some Knowledge		Very High Knowledge
1.	How much knowledge do you have concerning the percentage of school age children diagnosed with ADHD?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2.	How much knowledge do you have concerning the kinds of educational services children with ADHD are eligible for?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3.	How much knowledge do you have concerning the course of ADHD (i.e., until what age are symptoms associated with ADHD present)?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4.	How much knowledge do you have concerning the behaviors typically associated with children with ADHD?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5.	How much knowledge do you have concerning the criteria used for	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

	diagnosing ADHD?					
6.	How much knowledge do you have concerning the different subtypes of ADHD?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7.	How much knowledge do you have about the effects of behavioral treatments on children with ADHD?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8.	How much knowledge do you have about the effects of medication on children with ADHD?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9.	How much knowledge do you have about the effects of dietary interventions on children with ADHD?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10.	How much knowledge do you have about the effects of neurofeedback on children with ADHD?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
11.	How much knowledge do you have about the effects of other treatments (not listed above) on children with ADHD? (Please indicate name(s) of treatment below.)	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
	Name of treatments:					

APPENDIX D

KNOWLEDGE OF ATTENTION DEFICIT DISORDERS SCALE (KADDS)

<b>Knowledge of Attention Deficit Disorders Scale</b>
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.
<p><b>1. Most estimates suggest that ADHD occurs in approximately 15% of school age children.</b></p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p> <p><input type="checkbox"/> Don't Know</p>
<p><b>2. Current research suggests that ADHD is largely the result of ineffective parenting skills.</b></p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p> <p><input type="checkbox"/> Don't Know</p>
<p><b>3. ADHD children are frequently distracted by extraneous stimuli.</b></p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p> <p><input type="checkbox"/> Don't Know</p>
<p>4. ADHD children are typically more compliant with their fathers than with their mothers.</p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p> <p><input type="checkbox"/> Don't Know</p>
<p><b>5. In order to be diagnosed with ADHD, the child's symptoms must have been present before age 7.</b></p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p> <p><input type="checkbox"/> Don't Know</p>
<p><b>6. ADHD is more common in the 1st degree biological relatives (i.e. mother, father) of children with ADHD than in the general population.</b></p> <p><input type="checkbox"/> True</p> <p><input type="checkbox"/> False</p> <p><input type="checkbox"/> Don't Know</p>
<p><b>7. One symptom of ADHD children is that they have been physically cruel to other people.</b></p>

<input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>8. Antidepressant drugs have been effective in reducing symptoms for many ADHD children.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>9. ADHD children often fidget or squirm in their seats.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>10. Parent and teacher training in managing an ADHD child are generally effective when combined with medication treatment.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>11. It is common for ADHD children to have an inflated sense of self-esteem or grandiosity.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>12. When treatment of an ADHD child is terminated, it is rare for the child's symptoms to return.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>13. It is possible for an adult to be diagnosed with ADHD.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>14. ADHD children often have a history of stealing or destroying other people's things.</b></p> <input type="checkbox"/> True

<input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>15. Side effects of stimulant drugs used for treatment of ADHD may include mild insomnia and appetite reduction.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>16. Current wisdom about ADHD suggests two clusters of symptoms: One of inattention and another consisting of hyperactivity/impulsivity.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>17. Symptoms of depression are found more frequently in ADHD children than in non-ADHD children.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>18. Individual psychotherapy is usually sufficient for the treatment of most ADHD children.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>19. Most ADHD children "outgrow" their symptoms by the onset of puberty and subsequently function normally in adulthood.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>20. In severe cases of ADHD, medication is often used before other behavior modification techniques are attempted.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>21. In order to be diagnosed as ADHD, a child must exhibit relevant symptoms in two or more settings (e.g., home, school).</b></p> <input type="checkbox"/> True

<input type="checkbox"/> False <input type="checkbox"/> Don't Know
<b>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.</b> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<b>23. Reducing dietary intake of sugar or food additives is generally effective in reducing the symptoms of ADHD.</b> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<b>24. A diagnosis of ADHD by itself makes a child eligible for placement in special education.</b> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<b>25. Stimulant drugs are the most common type of drug used to treat children with ADHD.</b> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<b>26. ADHD children often have difficulties organizing tasks and activities.</b> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<b>27. ADHD children generally experience more problems in novel situations than in familiar situations.</b> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<b>28. There are specific physical features which can be identified by medical doctors (e.g., pediatrician) in making a definitive diagnosis of ADHD.</b> <input type="checkbox"/> True

<input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>29. In school age children, the prevalence of ADHD in males and females is equivalent.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>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.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>31. Children with ADHD are more distinguishable from normal children in a classroom setting than in a free play situation.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>32. The majority of ADHD children evidence some degree of poor school performance in the elementary school years.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>33. Symptoms of ADHD are often seen in non-ADHD children who come from inadequate and chaotic home environments.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>34. Behavioral/Psychological interventions for children with ADHD focus primarily on the child's problems with inattention.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>35. Electroconvulsive Therapy (i.e. shock treatment) has been found to be an effective treatment for severe cases of ADHD.</b></p>

<input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>36. Treatments for ADHD which focus primarily on punishment have been found to be the most effective in reducing the symptoms of ADHD.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>37. Research has shown that prolonged use of stimulant medications leads to increased addiction (i.e., drug, alcohol) in adulthood.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>38. If a child responds to stimulant medications (e.g., Ritalin), then they probably have ADHD.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know
<p><b>39. Children with ADHD generally display an inflexible adherence to specific routines or rituals.</b></p> <input type="checkbox"/> True <input type="checkbox"/> False <input type="checkbox"/> Don't Know

APPENDIX E

PERCEIVED AND ACTUAL SOURCES OF KNOWLEDGE

<b>Perceived and Actual Sources of Information</b>					
Please complete the questions below to determine where you currently receive information about Attention-Deficit Hyperactivity/Disorder and where you would prefer to receive information.					
1. How do you rate the amount of training your graduate program has given you regarding ADHD?					
<input type="checkbox"/> Below Average <input type="checkbox"/> Average <input type="checkbox"/> Above Average					
2. Where do you currently receive information concerning ADHD?					
	<b>1 (the most from this source)</b>	<b>2</b>	<b>3 (some from this source)</b>	<b>4</b>	<b>5 (the least from this source)</b>
<b>Class</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Articles</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Workshops</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Electronic Media (television, radio, etc.)</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Print Media (newspaper, magazines, etc.)</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Friends</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Other (please specify)</b>					

3. Where would you like to receive information concerning ADHD?					
	1 (the most from this source)	2	3 (some from this source)	4	5 (the least from this source)
<b>Class</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Articles</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Workshops</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Electronic Media (televisions, radio, etc.)</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Print Media (newspaper, magazines, etc.)</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Friends</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>Other (please specify)</b>					
<p>4. Do you have friends or family members diagnosed with Attention Deficit Hyperactivity Disorder?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>					
<p>5. Have you ever been diagnosed with Attention Deficit Hyperactivity Disorder?</p> <p><input type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p>					

APPENDIX F  
DEMOGRAPHIC QUESTIONNAIRE

<b>Demographic Information</b>	
<b>1. Age:</b>	<input type="checkbox"/> 18-22 <input type="checkbox"/> 23-27 <input type="checkbox"/> 28-32 <input type="checkbox"/> 33-37 <input type="checkbox"/> 38-42 <input type="checkbox"/> 42 plus
<b>2. Gender:</b>	<input type="checkbox"/> Male <input type="checkbox"/> Female
<b>3. Years in graduate school:</b>	<input type="checkbox"/> 1 to 3 years <input type="checkbox"/> More than 3 years
<b>4. Field of Study:</b>	<input type="checkbox"/> Medicine <input type="checkbox"/> Mental Health <input type="checkbox"/> Education <input type="checkbox"/> Other Other (please specify) <input style="width: 300px; height: 20px;" type="text"/>
<b>5. Future Profession:</b>	<input type="checkbox"/> Medical Doctor <input type="checkbox"/> Physician's Assistant <input type="checkbox"/> Nurse Practitioner <input type="checkbox"/> Psychologist (Ph.D.) <input type="checkbox"/> Therapist/Counselor/School Psychologist (master's level) <input type="checkbox"/> Educator (Ph.D. or Ed.D.) <input type="checkbox"/> Educator (master's level) <input type="checkbox"/> Other (please specify) <input style="width: 300px; height: 20px;" type="text"/>

**6. Please indicate your current area of study?**

- Medical Doctors
- Physician's Assistants
- Nurse Practitioners
- Clinical psychology (masters)
- Clinical psychology (doctoral)
- Counseling psychology (masters)
- Counseling psychology (doctoral)
- School psychology (masters)
- School psychology (doctoral)
- Educational psychology (masters)
- Educational psychology (doctoral)
- Education (masters)
- Education (doctoral)
- Economics (masters)
- Economics (doctoral)
- Political Science (masters)
- Political Science (doctoral)
- English (masters)
- English (doctoral)
- Engineering (masters)
- Engineering (doctoral)
- Communication (masters)
- Communication (doctoral)

Other (please specify)

## APPENDIX G

### INFORMATION REGARDING DIAGNOSIS AND TREATMENT OF ADHD

<b>Information Regarding Diagnosis and Treatment of ADHD</b>
<b>Criteria for Diagnosing ADHD</b>
<p><b>DIAGNOSIS of ADHD</b></p> <p>This is the criteria used to diagnosis ADHD according to the American Psychiatric Association. This is not for you to conduct diagnoses; however, it is to provide you with information on how a person may receive a diagnosis of ADHD.</p> <p>Diagnostic and Statistical Manual of Mental Disorder-IV (DSM-IV) Criteria for ADHD</p> <p>I. Either A or B:</p> <p>Six or more of the following symptoms of inattention have been present for at least 6 months to a point that is disruptive and inappropriate for developmental level:</p> <p><b>Inattention</b></p> <p>Often does not give close attention to details or makes careless mistakes in schoolwork, work, or other activities.</p> <p>Often has trouble keeping attention on tasks or play activities.</p> <p>Often does not seem to listen when spoken to directly.</p> <p>Often does not follow instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions).</p> <p>Often has trouble organizing activities.</p> <p>Often avoids, dislikes, or doesn't want to do things that take a lot of mental effort for a long period of time (such as schoolwork or homework).</p> <p>Often loses things needed for tasks and activities (e.g., toys, school assignments, pencils, books, or tools).</p> <p>Is often easily distracted.</p> <p>Is often forgetful in daily activities.</p> <p>Six or more of the following symptoms of hyperactivity-impulsivity have been present for at least 6 months to an extent that is disruptive and inappropriate for developmental level:</p> <p><b>Hyperactivity</b></p> <p>Often fidgets with hands or feet or squirms in seat.</p>

Often gets up from seat when remaining in seat is expected.

Often runs about or climbs when and where it is not appropriate (adolescents or adults may feel very restless).

Often has trouble playing or enjoying leisure activities quietly.

Is often "on the go" or often acts as if "driven by a motor".

Often talks excessively.

#### Impulsivity

Often blurts out answers before questions have been finished.

Often has trouble waiting one's turn.

Often interrupts or intrudes on others (e.g., butts into conversations or games).

Some symptoms that cause impairment were present before age 7 years.

Some impairment from the symptoms is present in two or more settings (e.g., at school/work and at home).

There must be clear evidence of significant impairment in social, school, or work functioning.

The symptoms do not happen only during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder. The symptoms are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Based on these criteria, three types of ADHD are identified:

ADHD, Combined Type: if both criteria 1A and 1B are met for the past 6 months

ADHD, Predominantly Inattentive Type: if criterion 1A is met but criterion 1B is not met for the past six months

ADHD, Predominantly Hyperactive-Impulsive Type: if Criterion 1B is met but Criterion 1A is not met for the past six months.

American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Washington, DC, American Psychiatric Association, 2000.

<b>Evidence Based Treatments of ADHD</b>
<p><b>Medication:</b> Psychostimulants (Ritalin and Adderall), Norepinephrine Re-uptake Inhibitors (Strattera, Intuniv), and Atypical medications (Wellbutrin and Catapres) are types of medications that may be prescribed for children with ADHD. Some of these medications are more effective than others at treating certain symptoms of ADHD. Medication has been proven the most effective; however, medication treats symptoms of ADHD, but it does not teach someone new ways to cope or control their symptoms.</p> <p><b>Parent Training:</b> Parent training seeks to accomplish a number of goals including working with the parents' or caregivers' management of their children and how they deal with problem behaviors, helping parents or caregivers understand what causes problem behaviors, improving the child or adolescents compliance with their parents' directions or requests, and making family life more enjoyable and enabling a more functional dynamic in the family with less conflict between parent and child.</p> <p><b>Behavioral Classroom Interventions:</b> Examples of interventions used in the classroom are daily report cards, classroom lottery, response cost, token economy, and cooperative discipline. Many of these interventions use positive reinforcement to improve appropriate behavior. Each intervention has its own pros and cons, and should be chosen based on what would be the most likely to have a positive impact on the student's behavior, and which intervention is most likely to be implemented and maintained.</p> <p><b>Summer Treatment Programs:</b> Intensive behavior interventions implemented in peer group/recreational settings (e.g., summer programs) is the fourth empirically supported intervention for ADHD with children and adolescents. The peer-focused behavioral interventions typically consist of day-long programs that are held for multiple weeks (five to eight weeks) and typically provide two hundred to four hundred hours of treatment. During treatment, children and adolescents engage in activities that consists of training in social skills, coached group play in recreational activities concurrent with contingency management systems (e.g., point system, time out) and school-home collaboration that consists of home rewards contingent upon peer interactions. The main focus of the treatment is to enhance social skills and improve peer interactions in a variety of contexts. Skills are evaluated through objective observations and frequency counts of observed social skills. Adults also rate social skills behaviors to determine child/adolescent progress.</p>
<b>Useful Websites</b>
<p><a href="http://interventioncentral.com/">http://interventioncentral.com/</a> Provides evidence based interventions for individuals and the classroom.</p> <p><a href="http://www.nimh.nih.gov/">http://www.nimh.nih.gov/</a> The National Institute of Mental Health (NIMH) is a nationally run site that provides</p>

information on specific disorders and other health related topics.

<http://www.apa.org/>

This site provides information concerning disorders, research in the field of psychology, psychosocial treatments, and an APA psychologist in your area.

<http://www.chadd.org/>

Children and Adults with Attention Deficit Hyperactivity Disorder is a national non-profit agency that provides information about ADHD including causes, symptoms, treatments, and important facts.

<http://www.ldonline.org/>

Provides information on ADHD and children with Learning Disabilities. Features instructional strategies for educators and articles on topics related to ADHD and LD.

<http://www.ed.gov/rschstat/research/pubs/adhd/index.html>

The US Department of Education has a series of publications on identifying, treating and teaching children with ADHD.

APPENDIX H

FLYER TO REQUEST PARTICIPATION

## **Participate in a research study that measures knowledge concerning Attention Deficit Hyperactivity Disorder.**

The following study “**Self-perceived and actual knowledge of Attention Deficit Hyperactivity Disorder: A comparison between graduate students in medicine, mental health, and education**” is being conducted in the College of Education as part of dissertation research.

**Participants:** Graduate students in the fields of medicine, mental health, education and a control sample from other disciplines (i.e., communication, engineering, etc.)

**Accessing the study:** The study is online and can be accessed through (a web address will be provided here, but will not be created until the researcher receives formal approval from CPHS). Copy this web address into your browser, and you will be directed to the study.

**Length of study:** The study takes approximately 20 minutes to complete.

**Purpose:** Information collected based on the study will help compare ADHD knowledge between graduate students in medicine, mental health, education and a control sample of other graduate students.

**Anonymity:** All information will be anonymous. Data from the study will not be linked to identifying information of participants.

**Benefits:** Participants who complete the study will receive information concerning current knowledge about ADHD and ADHD treatment options (i.e., diagnosis of ADHD and evidenced-based treatments). In addition, participation will help the investigator determine the level of knowledge graduate students have concerning ADHD and ADHD treatment options and compare that knowledge between graduate students in medicine, mental health, and education.

**Incentives:** Completion of the study will give you the opportunity to enter into a drawing where four participants will be randomly selected to receive a **\$20.00 gift card** to Amazon.

**If you have any questions or concerns, Please contact the principal investigator, Stephanie Bieltz Hofer, [sabieltz@uh.edu](mailto:sabieltz@uh.edu)**

*This project has been reviewed by the University of Houston Committee for the Protection of Human Subjects (713) 743-9204.*

**APPENDIX I**

**PERMISSION FOR GRADUATE STUDENT PARTICIPATION FROM GRADUATE  
PROGRAMS**

**Graduate Students in Medicine**

**Physician Graduate Students**

Date: Mon 1/11/10  
From: janetr@bcm.tmc.edu

You have my permission to send this out to our medical students at the listserv msc-med@bcm.edu. Good luck!

Janet

**Physician's Assistants Graduate Students**

Subject: FW: Request for student participation in dissertation research  
Date: Wed, 25 Nov 2009 14:54:12 -0600  
From: cfasser@bcm.tmc.edu  
To: egan77450@hotmail.com  
Good Afternoon Ms. Hofer:

Your inquiry about involving students in the PA Program as participants in your research regarding what select groups know about ADHD was forwarded to my attention. Please know I do not see any difficulty having the PA students involved with the knowledge that their participation is voluntary.

Carl Fasser, PA  
Professor and Director  
Physician Assistant Program.

**Nurse Practitioner Graduate Students**

Date: Mon 11/09/09  
From: [Kathleen.Reeve@uth.tmc.edu](mailto:Kathleen.Reeve@uth.tmc.edu)

These types of requests are routed through Sandra Hanneman [sandra.k.hanneman@uth.tmc.edu](mailto:sandra.k.hanneman@uth.tmc.edu)<<mailto:sandra.k.hanneman@uth.tmc.edu>>. She will need the "script" for student participation, a copy of the U of Houston IRB approval, and copy of the proposal. Then, she assesses the risk-benefit of student participation and, if determined a favorable balance, will forward to the CPHS office for waiver of approval. If she determines an unfavorable balance, she will let you know. Good luck with your study. Dr. Reeve

**Graduate Students in Mental Health**

**School Psychology Masters Students**

Date: Sun 1/03/10  
From: cheramie@uhcl.edu  
RE: Reques

I don't remember receiving this email but it is likely that I overlooked it if it came at the end of the semester. I will be back in the office next week (Jan. 12 to be exact) and if you email the questionnaire to me, I will email it to my students with a request that they help out with this research.

**Clinical Psychology Masters Students**

Date: Mon 11/07/09  
From: pledger@uhcl.edu

Stephanie, I will poll our faculty about your request, as we don't have a set policy for this situation. I expect we may agree but with the condition that we send out the request and link to your online site, thereby safeguarding the contact information for our students. I'll let you know our decision as soon as possible.

Raymond H . Pledger, Jr., Ph.D.  
Director, Master's Program in Clinical Psychology  
University of Houston-Clear Lake  
2700 Bay Area Blvd. | Houston, TX 77058  
281-283-3524

**Counseling Psychology Masters and Doctoral Students**

Date: Tue 1/12/10  
From: bmcph@uh.edu

Approved.

**School Psychology Doctoral Students**

Date: Tue 1/5/10  
From: tkubiszyn@uh.edu  
RE: Request for student partic

Stephanie,  
Permission granted (thanks for asking!). You might try on-line recruitment first and follow up in class if necessary.  
Tom K.

Thomas Kubiszyn, Ph.D., Professor and Chair  
Department of Educational Psychology  
Co-Director of Training, Ph.D. in School Psychology Program  
491 Farish Hall  
University of Houston  
Houston, TX 77204-5019  
713-743-9865 (phone)  
713-743-4996 (fax)

### **Graduate Students in Education**

#### **Education Doctoral Students**

Date: Tue 1/12/10  
From: lhutchison@uh.edu

Dear Stephanie,

I am copying Dr. Lilia Ruban (lruban@uh.edu) because I recommend contacting her to determine if you could survey her doctoral students who will be enrolled in EDUC 8381 during the spring 2010 semester.

Regards,

Vera Hutchison

Date: Tue 1/12/10  
From: cwolters@uh.edu

S-

I don't have a problem with you soliciting the doctoral students in my program to participate.

The best thing to do would be to construct a email request with the link and send it to me. I can then

forward it to the student listserv (or you can just have Victorial do it). Just make sure the study has CPHS approval before soliciting participation.

caw

### **Education Masters Students**

Date: Mon 1/11/10  
From: rhouston@uh.edu

I would suggest that you come to my class one Monday at 5:00pm to give the students a background on your study and the importance of their perceptions, then ask them to complete the test by email. There will probably be about 30 masters students, most being teachers.

If this sounds reasonable, contact me when you receive Protection of Human Subjects approval and we can find a convenient time for you to explain the study.

W. Robert Houston  
John and Rebecca Moores Professor of Education  
Executive Director, Institute for Urban Education  
Phone: 713-743-5049  
Fax: 713-743-4989  
email: [rhouston@uh.edu](mailto:rhouston@uh.edu)  
Date: Thu 12/31/09  
From: nandrews@mail.coe.uh.edu  
RE: Request for student participation in dissertation research

Hi, Stephanie.

I hope your holidays have been nice. I am fine with you emailing my graduate students, but I am not responsible for all of Curriculum and Instruction...Only Early Childhood.

You would need to email Dr. Hutchison to receive permission for Curriculum and Instruction.

Good luck!  
Nicole

### **Comparison Sample**

### **Political Science Graduate Students**

Date: Fri 1/08/10  
From: GWeiher@UH.EDU  
RE: Request for

Stephanie,

Sounds OK to me, if/when you've received human subjects clearance. Do you plan to approach all of our grad students, or just the teaching assistants? In any case, I think it will be OK if you contact them directly by e-mail, if that works for you.

**Economics Graduate Students**

Date: Fri 1/08/10  
From: cjuhn@Central.UH.EDU

I don't see why not. Yes, please email and ask our students directly.

Chinhui Juhn

**Communication Graduate Students**

Date: Mon 1/04/10  
From: mhaun@central.uh.edu  
RE:

Hi Stephanie... Who is your supervising professor?

Let me know when you have IRB approval and I'll have my assistant post the link to our graduate listserv.

Warm regards,

Martha J. Haun, Ph.D.  
Martha J. Haun, Ph.D.  
Director of Graduate Studies  
Founder & Director, Center for Health and Crisis Communication

**Engineering Graduate Students**

Date: Wed 12/30/09  
From: RKrishna@Central.UH.EDU  
RE: Request for student participation in dissertation

Dear Stephanie

Thanks for your email.

After consulting with my colleagues here, I believe it should be fine for you to solicit participation from the Chemical & Biomolecular Engineering graduate students.

The best course of action would be for you to work with Linda Keng (cc'd here) to get your email out to the right constituency of graduate students.

Please let me know if there is anything further.

Best wishes

Ramanan

APPENDIX J

PERMISSION TO USE KADDS

**Permission to Use KADDS**

Re: Requesting use of the Knowledge of Attention

From: Mark Sciutto (sciutto@muhlenberg.edu)

Sent: Mon 8/31/09 8:32 AM

To: Stephanie Hofer (stephanie.hofer@hotmail.com)

Hi Stephanie,

Yes, I grant permission for you to use the KADDS for your dissertation. I look forward to hearing about your results. Good luck with your study.

Mark

Mark J. Sciutto, Ph.D.

Department of Psychology

Muhlenberg College

Allentown, PA 18104

(484) 664-3649

sciutto@muhlenberg.edu

