A META-ANALYSIS OF PSYCHOLOGICALLY-BASED TREATMENTS OF ADULT ATTENTION-DEFICIT HYPERACTIVITY DISORDER

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CHAPTER I

INTRODUCTION

The topic of Adult Attention Deficit-Hyperactivity Disorder (ADHD) has only received scant attention in the scientific literature. This is especially true when comparing it to the attention that childhood ADHD has received. In doing an EBSCO host research databases search online with the key words *ADHD* and *Adults* there were 810 matches that were listed as of the writing of this paper. The same search with *children* instead of adults elicited 4227 matches. An EBSCO host research database is commonly utilized by libraries to allow users to search databases such as psychinfo. This search engine is utilized at Oklahoma State University which is where the research for this meta-analysis was conducted.

Although there is a huge disparity in the volume of research done on children versus adults, the fact that there were as many matches as there were is evidence that the disorder is becoming more widely accepted as a disorder that affects adults as well. As is clearly demonstrated here, ADHD is generally considered to be a disorder that affects children. However, there is mounting evidence that ADHD is a disorder that affects adults as well as children.

Attention-Deficit Hyperactivity Disorder (ADHD) "was first identified in children in the 19th century" (Adler & Chua, 2002, p. 29). Despite the numerous name changes it

has gone through, “hyperkinetic reaction of childhood in DSM-II to attention-deficit disorder in DSM-III to ADHD in DSM-III-R and DSM-IV” (Spencer, Biederman, Wilens, & Faraone, 2002, p.3), the literature shows this disorder is a long-standing disorder in children. However, adult ADHD was not even discussed in the scientific literature “until 1976, when Wood et al. showed evidence of response to stimulants in a group of adults who presented with the same symptoms as ADHD children” (Adler & Chua, p.29).

Again, this disorder has historically been considered to be a childhood disorder. However, there is mounting evidence that this disorder does affect adults. According to Zametkin & Borcherding (1989) “it is now clear that ADHD symptoms persist in adulthood...Weiss and colleagues, in a fifteen-year follow-up, reported that 66% of their sample still complained of at least one disabling symptom of ADHD” (p. 449). They further state that due to the long-term studies completed that ADHD does appear to be a disorder that does not end in childhood. Further documentation that ADHD continues into adulthood exists from Jadad, Booker, Gauld, Kakuma, Boyle, et al. (1999). They state that approximately 70% of children previously diagnosed with ADHD will meet the diagnostic criteria for the disorder in adolescence and that approximately 65% will meet the criteria as adults. Another study which quotes previous research states that:

> Hill and Schoener reviewed all of the existing longitudinal studies and concluded that there is an exponential decline in the prevalence of the disorder with age. The rate of ADHD in a given age group appears to decline by 50% every 5 years. Hill and Schoener observed that only 8% of children with ADHD will have the disorder at the age of 25 years. A more recent follow-up study by Mannuzza and

> colleagues found that only 4% of adults still had ADHD at the age of 24 years. However, Weiss and Hechtman examined 25-year-old patients who had been hyperactive children and found that two thirds of those adults had at least one symptom of ADHD. These studies suggest that few children with ADHD will meet full criteria for the disorder as an adult, but many will have some residual symptoms in adulthood. (Higgins, 1999, p. 16).

This is evidence that ADHD does exist within adults and there needs to be treatments that are appropriate to the disorder.

Spencer et al. (2002) state that the prevalence of ADHD in adults is anywhere from 1% to 6% and that the disorder has been declared a public health concern by the Centers for Disease Control and Prevention (CDC). Spencer et al. further state "no single etiology has been identified for ADHD, and findings are consistent with a multifactorial hypothesis" (p.5). They also state that there are a variety of risk factors that could be involved in a person developing ADHD as well as any other neurobiological condition. In identifying those factors they state that "prenatal and perinatal risk factors", "heritability", and "candidate genes" (pp. 5-6) could all be a part of the development of ADHD.

Barkley (2002) further identifies the problem of diagnosing adult ADHD by stating that there is not enough of a knowledge base of ADHD in adults in mid or late life as this has not been an age group that has been a target of study. To further iterate the need for appropriate treatments of adult ADHD, there are problems specific to adults with this disorder such as; "employment" (Barkley, 2002, p. 10; Adler & Chua, 2002, p. 30),

"driving" (Barkley, 2002, p. 10; Adler & Chua, 2002, p. 30), and "relationship difficulties (Barkely, 2002, p. 10).

With all of the issues associated with ADHD in adults, there obviously need to be effective forms of treatment for the disorder. As Weiss & Murray (2003) discuss the fact that there is a paucity of empirical research on adult ADHD psychosocial treatments. They go on to discuss that the available psychological treatment options for adult ADHD consist of "psychological interventions, including education about the disorder, involvement in a support group, skills training (e.g., vocational, organizational, time management, financial) and coaching" (Weiss & Murray, p. 719). Weiss and Murray go on to state that it should be explained that ADHD is a "neurobiological developmental disorder" and how the symptoms of ADHD and behaviors relate (p. 719).

Even though the most common form of treatment for adult or childhood ADHD appears to be pharmacological, this meta-analysis reviewed the effectiveness of psychologically-based treatments for ADHD. There are numerous studies that echo Adler and Chua (2002) who state "although educational therapy and psychotherapy are often beneficial for developing skills to cope with the challenges of ADHD, pharmacologic treatment is the mainstay of treatment for children and adults with ADHD" (p. 30). As medication has been recognized as the "mainstay" (Adler & Chua, p. 30) of treatment for children or adults, there has been little recognized need for studies on the effectiveness of psychologically-based treatments of ADHD. However, there are seven studies that show the effectiveness of psychologically-based intervention for ADHD. This clearly indicates that this is a shortage area of research. The research that has been completed was compiled into a single, reviewable source.

The study of adult ADHD has been neglected due to the erroneous belief that ADHD ended after childhood (Murphy & Gordon, 1998). As children age they tend to learn to compensate for the attention difficulties they are experiencing (Johnston, 2002). Also, there are researchers that still "question of the validity of adult ADHD" (Mannuzza & Klein, 2000, p. 721). Historically, there was not a need to diagnose and treat ADHD in adults as they would not self-refer for treatment. On the other hand, children have little choice as to whether they are referred for assessment, diagnosis, and treatment of ADHD. Their health care provider, teacher, and/or parent make this decision for them. Once they become adults they can then choose for themselves as to whether they will continue with treatment. Therefore, a variety of treatment options should be made available to these adults. Both medication and psychologically-based treatments should be available. Therefore, the effectiveness of psychologically-based treatments was assessed.

Prior to treatment of the disorder, an appropriate diagnosis must be made. According to Javorsky and Gussin (1994), there must be a multidisciplinary approach to the diagnosis. This type of approach should include a psychologist who conducts a psychological evaluation or psychoeducational battery, although there is disagreement as to what assessment instruments should be used. Additionally, the individual should have a medical evaluation to rule out other confounding disorders, or differential diagnoses, a neurological evaluation (Javorsky & Gussin), and a continuous performance test to assess for sustained vigilance (Barkley, 1998). There is no one test for ADHD. There must be multiple measures utilized to diagnose the disorder. Johnston (2002) discussed the advancements in the measures that "permit reliable and valid diagnoses of the condition in adulthood" (p. 6-2). She also states that:

> The protocols that have been developed for assessing ADHD in adulthood typically include self-report of both current and retrospective symptoms as well as collaborative reports of the same symptoms from parents and/or spouses. Checklists, interviews, and archival records have all been used to gather the information (Johnston, p. 6-2).

Although the DSM-IV (American Psychiatric Association, 1994) states that individuals must have some symptoms prior to age 7, there is clear evidence that not all individuals who meet criteria as adults would necessarily have been diagnosed in childhood.

Statement of the Problem

Psychologically-based treatments of adult ADHD have received only minimal attention in the scientific literature. Although there are numerous studies that have examined the effectiveness of pharmacological treatments on adult ADHD, there are relatively few studies that have examined the effectiveness of psychologically-based treatments on adult ADHD. This review intended to ascertain which psychologically-based treatments or interventions have been proven to be effective in the treatment of adult ADHD.

The study consisted of a meta-analysis of studies conducted on the effectiveness of psychologically-based treatments and interventions of adult ADHD. The focus was to identify which psychologically-based treatments and interventions of adult ADHD are most effective. The study only examined treatments and interventions that are of a psychologically-based nature. The purpose behind using the terms "treatment" and "intervention" was to ensure that studies that have used either of these terms would be included. Authors have used either term when referring to psychological work. If either

term alone were used, then some studies may have been left out of the meta-analysis that would have otherwise met criteria for inclusion.

Purpose of the Study

This study should help to answer important questions in terms of treating adults with ADHD. Are there any effective treatments or interventions for adult ADHD? If so, which ones are most effective? Which, if any, are most effective? These are important questions that need to be answered when dealing with a disorder of the magnitude of ADHD. This is a disorder that clearly affects adults as well as children (Jadad, Booker, Gauld, Kakuma, Boyle, et al., 1999; Zametkin & Borcherding, 1989). There are fewer studies that examine adults with ADHD than children with ADHD and there have been no identified meta-analyses conducted on the topic of psychologically-based treatments of adult ADHD. Therefore, this was an area of study that needed to be conducted.

In order to demonstrate the importance of a study of this nature, it is important to again quote Weiss & Murray (2003), "there is a scarcity of controlled studies on the efficacy of psychosocial treatments for adults with ADHD" (p. 719). Yet another statement to quote again to demonstrate the need for a study examining effective treatments and interventions for adults with ADHD is Barkley (2002) "because ADHD has not been studied in patients past 26 to 32 years of age, little is known about the disorder in midlife to late life" (p. 10). This type of study will help to demonstrate that adult ADHD is not only a legitimate disorder, but that it is a disorder that is basically ignored. This study should contribute to the scientific knowledge of how to successfully treat adult ADHD through the use of psychologically-based treatments and interventions

as opposed to taking an approach that only utilizes pharmacological treatments or interventions.

As the broad field of psychology has had a movement toward empirically validated treatments (EVT), this meta-analysis can contribute to that movement. This is due to a meta-analysis summarizing the findings of the research literature. The meta-analysis conducted here has summarized the empirical findings of the psychologically-based treatments of adult ADHD. This lends itself to being the first step toward becoming an EVT. Reisner (2005) states that EVT proponents feel for the field of psychology to continue to move forward in the world of third party reimbursement, it must utilize EVT's. He states this is especially true when psychology is competing with psychiatry for this type of reimbursement.

It is hoped this meta-analysis contributes to the broader understanding of how to treat adult ADHD effectively. With enough empirical research conducted on this topic, psychologically-based treatments may have their place within EVT's. The EVT movement came from the "United Kingdom and was initially known as evidence-based medicine" (Chambless & Ollendick, 2001, p. 686). The American Psychological Association (APA) published its first reports on EVT's in 1995 which later resulted in much discussion in the scientific literature (Chambless & Ollendick). The premise behind the United Kingdom's, and later APA's, interest in EVT's is that patient care can be improved due to newly acquired knowledge in the field. Also, it was due to the fact that "clinicians need summaries of evidence provided by expert reviews and instructions on how to access this information during their routine practice" (Chambless & Ollendick,

p. 686). This meta-analysis provides a review of the current data on psychologically-based treatments of adult ADHD.

Research Question

The research question for this study was based on the fact that there has been relatively little empirical research conducted on the effectiveness of psychologically-based treatments for adult ADHD. The search parameters identified for the study were used to identify any existing research that would qualify as empirically based. A review of existing research was conducting with the following parameters: Articles from 1994 to 2006 as the DSM-IV was published in 1994; the terms "psychological, treatment, adult ADHD" and "psychological, intervention, adult ADHD" were used, identifying 60 articles that met the criteria (48 for psychological, treatment, adult ADHD and 12 for psychological, intervention, adult ADHD); adults only as subjects; human subjects only; articles written or translated into English; and peer reviewed studies. These terms were used as parameters of the study to identify research that was relevant to the study.

The research question identified for this study aimed to further the understanding of what qualifies as a sound psychologically-based treatment or intervention for adult ADHD. Much of the research focuses on pharmacological treatment or intervention for adult ADHD. Additionally, much of the research conducted has focused on children and the pharmacological or psychological treatment/intervention for ADHD. This study intended to address what suitable psychologically-based treatments or interventions are available for adults with ADHD. The research question is:

1. Is the psychologically-based treatment of adult ADHD effective, when the use of medication is uncontrolled?

Assumptions:

This paper made assumptions that the studies that were reviewed have accurately reported their findings. It was assumed that the best manner in which to identify studies suitable to the topic of psychologically-based treatments or interventions that will be effective for adults was to use the EBSCO/psychinfo search engine/database. This has been common practice for identifying pertinent research articles by professionals within this field. It has also been assumed that there will be practicing professionals and potential individuals who cope with adult ADHD that may benefit from the synthesized information that comes about from a meta-analytic study of adult ADHD psychologically-based treatments and interventions. Another assumption is that the criteria utilized by the DSM-IV (APA, 1994) and DSM-IV-TR (APA, 2000) is accurate in its description of the symptomatology of adult ADHD. This assumption is generated by the fact that it is the commonly accepted standard for diagnostic purposes of ADHD and all other psychological/psychiatric disorders in the United States.

Limitations:

A limitation to this study was the lack of suitable peer-reviewed research articles that have been conducted on this topic. This is further evidence of the need for continued study of the disorder along with further study of appropriate psychologically-based treatments and interventions for this disorder. Another limitation of this study was that it relied on the use of other researchers work. The study was not a controlled study utilizing laboratory procedures. It is a meta-analysis which by definition requires the use of other research to study the phenomenon of interest.

Definition of Terms:

This review intended to discuss the literature published since 1994. Although this date may seem arbitrary, it was chosen as this is the date of publication for The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (APA, 1994) or DSM-IV for short. The reason for choosing the DSM-IV is that it has been used in practice, research, and teaching since 1994. It has had one revision since, the DSM-IV-TR (APA, 2000), but the diagnostic criteria have remained the same.

In order to understand adult Attention-Deficit Hyperactivity Disorder, one must look to the American Psychiatric Association's definition which appears in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (APA, 1994). The DSM-IV states the "essential feature" (APA, 1994, p.78) of Attention-Deficit Hyperactivity Disorder (ADHD) is "a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development" (APA, p.78).

The DSM-IV divides the disorder into three types with each having their own diagnostic codes (APA, 1994). The three types of the disorder (with appropriate codes) are as follows: "314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type", "314.00 Attention-Deficit/Hyperactivity Disorder, Predominantly Inattentive Type", and "314.01 Attention-Deficit/Hyperactivity Disorder, Predominantly Hyperactive-Impulsive Type" (APA, 1994, p.85). The DSM-IV criteria for ADHD assume that this disorder is one that generally only affects children by its wording. There are eighteen specific criteria within the diagnosis of ADHD. The majority of the criteria (fourteen) are targeted solely at children. There are only four instances where the criteria make

reference to the fact that the person suffering from the disorder may be an adult (APA, 1994, pp.83-85). The four criteria that make reference to an adult, or adult issues, also make reference to children. The criteria are as follows:

> A.1.a, often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities...A.1.d, often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)...A.1.g, often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)...A.2.c, often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness) (APA, 1994, pp. 83-84).

Adult:

Any person, male or female, over the age of 18 years.

Psychologically-based treatment or intervention:

Any form of treatment or intervention that utilizes psychologically-based techniques as opposed to pharmacological techniques to treat adult ADHD.

Pharmacological treatment or intervention:

Any form of treatment or intervention that is based on pharmacological or medication based techniques to treat adult ADHD.

DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (American Psychiatric Association, 1994).

Cognitive Treatment: "Emphasizes rational thinking (as opposed to subjective emotion, motivation, or repressed conflicts) as the key to treating mental disorder" (Zimbardo, Weber, & Johnson, 2003, p. G-3).

Cognitive-Behavioral Treatment: "A newer form of psychotherapy that combines the techniques of cognitive therapy with those of behavioral therapy" (Zimbardo, Weber, & Johnson, p. G-3).

Psychoeducational Treatment: A treatment in which persons "examine and change their thoughts, feelings, and actions to improve time management and task completion" (Wiggins, Singh, Getz, & Hutchins, 1999, p. 82).

Psychosocial Treatment: The use of "practical management techniques, such as organizational skills, time management, use of self-verbalization, use of memory aids and learning" (Stevenson, Stevenson, & Whitmont, 2003, p. 94) in the context of an intervention for a mental disorder.

Neurofeedback/Biofeedback Treatment: "A therapy technique for learning relaxation and new visceral responses to stress, involving devices that sense small physical changes and provide immediate feedback to the individual" (Zimbardo, Weber, & Johnson, p. G-2). "Neurofeedback uses the basic principles of biofeedback to provide clients with immediate feedback of brain electrical activity, which leads to their learning to regulate mental states" (Butnik, 2005, p. 622).

Meta-Analysis: "Any literature review that makes explicit use of quantitative methods to express the results of studies or to combine those results across studies" (Hedges, 1987, p. 353).

CHAPTER II

REVIEW OF LITERATURE

Attention-Deficit/Hyperactivity Disorder is a disorder that is most commonly thought of as a disorder that affects children. "ADHD affects 3% to 5% of the school-aged children in the United States, making it the most prevalent childhood behavioral disorder" (Ramsay, 2002, p. 81). The symptoms generally are first seen in childhood but can continue into adulthood. Ramsay states:

> Older adolescents and adults with ADHD face a number of unique challenges that include greater difficulty with psychological adjustment, higher incidence of substance abuse, higher incidence of co-morbid learning disorder, and lower levels of education and occupational achievement than non-clinical controls (p. 81).

As has been shown by the huge disparity of research articles published on this disorder in children versus the number published on adults, it is obvious that adult ADHD still does not receive the attention it deserves (Hesslinger, Tebartz van Elst, Mochan, & Ebert, 2003). Additionally, the number of studies that focus on psychological treatments is minimal at best (Young, 1999). This review of the literature addresses the history of the disorder, the etiology of the disorder, a breakdown of the types of treatments available (non-medication and medication), other studies with similar research questions, and an

elaborated discussion of the criteria used in assessing studies suitability to be included in this meta-analysis.

The definition of ADHD that is being used in this study is the one put forth by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition-Text Revision, or DSM-IV-TR (American Psychiatric Association, 2000). This definition was chosen as it is in the most commonly used manual for diagnostic criteria of mental disorders. One of the original guidelines for inclusion in the study is that a study be published no earlier than 1994. This is due to APA publishing the DSM-IV in 1994. The diagnostic criteria have not changed from the DSM-IV to the DSM-IV-TR. The definition as discussed in Chapter One states that the "essential feature of Attention-Deficit/Hyperactivity Disorder is a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development" (APA, 2000, p.78). The criteria for the disorder focus primarily on children. Therefore, the majority of the scientific literature has focused on children.

The various definitions of treatments put forth by this meta-analysis have been written either by the authors of the studies included in the meta-analysis or by other authors who put forth acceptable definitions. The cognitive treatment category in the meta-analysis encompasses studies that focus on Beck's cognitive therapy, cognitive-behavioral treatment, and a cognitive remediation program. All of these utilize a form of cognitive treatment so they are all put into the cognitive treatment category. The psychosocial treatment definition was put forth by the study authors (Stevenson, Stevenson, & Whitmont, 2003). The psychoeducational treatment definition was taken from Wiggins et al. (1999) discussion of their study. It seemed appropriate to utilize their

discussion of their treatment to define it. Finally, the definition of neurofeedback/biofeedback was taken from Butnik (2005). This definition links neurofeedback and biofeedback to show that they fit within the same category of treatment for this meta-analysis.

This review focuses on the literature related to adults with ADHD. As previously stated, there is a huge disparity in the volume of research targeted toward adults with ADHD versus research targeted toward children. When using "PsycINFO" through an EBSCOhost search, the amount of literature on children with ADHD is nearly four times that of the literature on adults with ADHD.

ADHD has long been viewed as a disorder that simply ends in adolescence (Spencer, 2002; Javorsky & Gussin, 1994). In 2002, Johnston stated that generally the empirical research has not focused on psychologically-based treatments but only focused on co-morbidity of the disorder, diagnostic issues, and medication treatments of the disorder. This appears to be accurate still as there is relatively minimal information on the use of non-medical treatments of adult ADHD (Young, 1999). The majority of the literature has focused on studies other than those related to the empirical studies on the use of some type of psychologically-based treatment for the disorder. Psychological therapies may be effective as an adjunctive to medication based therapies (Young, 1999). Locke, Eiden, Ray, and Boswell (unpublished manuscript) state in their review of psychological treatments for ADHD children "there are numerous empirical studies discussing the types and effectiveness of medication, but few comparing the efficacy of psychological therapies" (p. 3). As with children, there are many studies discussing the effectiveness of medication treatments and very few discussing psychologically-based

treatments. Pelham, Wheeler, and Chronis (1998) discussed treatments for children with ADHD and "unfortunately, no long-term outcome data exist regarding efficacy or effectiveness of pharmacological versus psychosocial versus combined treatments" (p. 201). This appears to be true of studies for adults with ADHD as well.

As it is becoming increasingly more accepted that adults suffer from ADHD, there is a clear need for research on the use of non-medical based treatments. It appears the reason for this lack of literature is due to the belief that as ADHD "children approach adolescence and young adulthood, they will grow out of the hyperactivity and perform well in high school, postsecondary education, social relationships, and the work environment" (Schwiebert, Sealander, & Dennison, 2002, p. 4). Additionally, Schwiebert, Sealander, and Dennison state "despite a decline in their levels of hyperactivity and an improvement in their ability to pay attention and control their impulses, 50% to 80% of children with ADHD are likely to continue to display these symptoms into adolescence" (p. 4). Barkley (2002) adds that as "ADHD has not been studied in patients past 26 to 32 years of age, little is known about the disorder in midlife to late life" (p. 10).

There have been various estimates of the prevalence of ADHD symptoms among the adult population. Young (2000) states "that approximately 0.5% to 1% of the young adult population continues to have symptoms associated with ADHD" (p. 191). Wilens, Biederman, and Spencer (2002) feel that ADHD does continue into adulthood, although the degree to which it does is unclear, as evidenced by long-term follow-up studies. They go on to state that there has been great variability in the rates of ADHD symptom persistence into adulthood. These rates vary from 50%-75% for adolescence and 4%-

60% for adults (Wilens, Biederman, & Spencer, 2002). Studies of children followed into adulthood estimate that there is actually a 5%-66% prevalence rate of ADHD in these individuals (Biederman, 2005). Biederman (2005) also states, "current epidemiologic studies estimate the prevalence of adult ADHD to be between 3% and 5%" (p. 1216). This data also demonstrates that ADHD is not simply a disorder that fades away with time. The disorder is one that continues to affect numerous adults in many areas. These areas include interpersonal functioning, academic performance, vocational performance, and emotional functioning (Barkley, 2002; Wilens, Biederman, & Spencer, 2002; Young, 2000; Hesslinger et al., 2003; Johnston, 2002). The traditional treatments of ADHD have been medical in nature. When other types of treatment options are considered, such as psychologically-based treatments, the gamut of issues affected by ADHD can be addressed as opposed to simply medicating the individual.

Young (2000) reports that "cross-sectional studies have reported ADHD is associated with higher rates of depression and anxiety" (p. 194). Interpersonal functioning is also affected by ADHD. As children mature, their ability to form meaningful peer relationships is hindered due to ADHD (Young, 2000). Another concern is suicidality. Weiss et al. (1985) states that there are more suicide attempts in hyperactive adults. Young (2000) states "there is considerable evidence that academic problems start at an early age for ADHD children and continues throughout their school career and further education" (p. 195). Young (2002) further states that ADHD adults are generally going to have greater difficulties with employment and a lower occupational status than non-ADHD adults. Other authors such as Weiss and Hechtman (1993) agree with this in that ADHD adults have lower than expected occupational status.

There have been numerous studies that have investigated ADHD symptomatology that exists into adulthood. These studies found varying percentages of individuals who had continuation of core symptoms into adulthood. They did find, however, that there were significant numbers of individuals who did display symptoms into late adolescence and early adulthood. Weiss (1979) found that children diagnosed with hyperkinetic child syndrome had continued symptoms at a ten year follow-up.

History of ADHD

"Attention deficit/hyperactivity disorder (ADHD) is the most common emotional, cognitive, and behavioral disorder treated in youth" (Wilens, Biederman, & Spencer, 2002, p. 113). It has more recently become a more widely recognized disorder in adults and "unlike most disorders in the DSM-IV, the diagnostic criteria for and clinical course of ADHD were first developed for children and only later adapted for adults" (Ramsay & Rostain, 2003, p. 320). The history of this disorder as it is commonly known (ADHD) began with the DSM-III-R (American Psychiatric Association, 1987) and has continued with the same nosology through the DSM-IV (American Psychiatric Association, 1994) and now the DSM-IV-TR (American Psychiatric Association, 2000). Prior to the DSM-III-R, ADHD was referred to as Attention Deficit Disorder by the DSM-III (American Psychiatric Association, 1980), or simply as "ADD", which continues to be common jargon today.

Prior to the disorder being known as ADD or ADHD it received attention over the years in the forms of various labels or disorders. For instance, "an English physician, G.F. Still, published (a paper) in the journal Lancet in 1902. He characterized what we now call ADHD as 'abnormal defects in moral control…and wanton mischievousness

and destructiveness'" (Lubar, 1991, p. 202). Lubar goes on to state that in the early 1900s behaviors associated with our current diagnostic criteria of ADHD were "primarily considered to be a defect in moral development" (p.202).

Lubar (1991) states that in the 1930s research suggested that there were a variety of disorders of children which had "some type of minimal brain dysfunction syndrome" (p. 203). According to Lubar (1991), Strauss and Lehtinen attempted to conceptualize minimal brain dysfunction syndrome (MBD) into one overarching disorder or syndrome in 1947. They discovered that there was potential for hyperkinetic behavior as well as distractibility (Lubar). Additionally:

> The first pharmacological attempt to treat this symptom complex was by Dr. Charles Bradley, who in 1937 administered amphetamine sulfate to some children. He found that there was a dramatic improvement in school-related behaviors and an increase in attentiveness. These effects were very drug and dosage dependent (Lubar, p. 203).

This appears to be the beginning of the primary method of treatment for ADHD, whether it is childhood or adult type. What has been found is that the stimulant medications used increase arousal of the central nervous system (DuPaul, Barkley, & Connor, 1998) in people with ADHD. Since this has been effective, it has been the mainstay of treatment for almost 70 years.

Next, ADHD was generally known as hyperkinetic reaction of childhood (DSM-II, APA, 1968). The progression of the disorder from hyperkinetic reaction of childhood to ADHD has occurred over the past 50 plus years. Hyperkinetic reaction of childhood initially was referred to as Hyperkinetic Impulse Disorder. The research in the 1950s

appeared to focus on the investigation of neurological mechanisms that possibly led to hyperactivity in children (Barkley, 1998). The research led to the belief that "hyperactivity was a brain-damage syndrome, even when evidence of damage was lacking" (Barkley, 1998, p. 8).

The DSM-II (APA, 1968) classifies Hyperkinetic reaction of childhood (or adolescence) under the broad classification of "Behavior Disorders of Childhood and Adolescence" (p. 50). The DSM-II (APA, 1968) states the category that Hyperkinetic reaction of childhood (or adolescence) is a category that "is reserved for disorders occurring in childhood and adolescence that are more stable, internalized, and resistant to treatment than *Transient situational disturbances* but less so than *Psychoses, Neuroses,* and *Personality disorders*" (p. 50). It goes on to describe Hyperkinetic reaction of childhood (or adolescence) as a disorder "characterized by overactivity, restlessness, distractibility, and short attention span, especially in young children; the behavior usually diminishes in adolescence" (APA, 1968, p. 50). This description of the disorder makes no references to adults potentially suffering from the disorder. In fact it states that it is outgrown prior to adulthood. As this disorder is the precursor to ADHD, it demonstrates how attention deficit concerns were only thought to exist in children.

The DSM-III (APA, 1980) is the first edition of the diagnostic manual to use the terminology attention deficit disorder. The DSM-III (APA, 1980) states that this disorder will manifest itself in individuals prior to the age of 18. This continued notion that attention problems only affect children is evidenced through the description of Attention Deficit Disorder (ADD). Attention Deficit Disorder's "essential features are signs of developmentally inappropriate inattention and impulsivity" (APA, 1980, p. 41). The

description also implies that it is a disorder that only affects children. To further describe how ADD was viewed as only a disorder of children the DSM-III names several of the disorders that were either similar or related to ADD. "Hyperkinetic Reaction of Childhood, Hyperkinetic Syndrome, Hyperactive Child Syndrome" (APA, 1980, p. 41) are some of the related disorders to ADD. DSM-III goes on to state that:

> In this manual Attention Deficit is the name given to this disorder, since attentional difficulties are prominent and virtually always present among children with these diagnoses. In addition, though excess motor activity frequently diminishes in adolescence, in children who have the disorder, difficulties often persist (APA, 1980, p. 41).

The diagnosis of Attention Deficit Disorder had two subtypes. They were distinguished by either having hyperactivity associated with the attention deficit or not having hyperactivity associated with it. Additionally, the DSM-III states that it was unsure as to whether or not ADD with hyperactivity and ADD without hyperactivity constituted one disorder or two separate disorders (APA, 1980).

The disorder was characterized by behaviors exhibited by children. The description focuses on classroom behaviors, difficulties with parental requests, and difficulty sitting still (APA, 1980). Many of the criteria are the same that are listed in the future revisions (DSM-III-R, DSM-IV, and DSM-IV-TR). To further demonstrate the emphasis of the disorder being one of childhood and not adulthood, the DSM-III (APA, 1980) states:

> Typically, the symptoms of this disorder in any given child vary with situation and time. A child's behavior may be well-organized and appropriate on a one-to-

> one basis but become disregulated in a group situation or in the classroom; or home adjustment may be satisfactory and difficulties may emerge only in school. It is the rare child who displays signs of the disorder in all settings or even in the same setting at all times (p. 42).

There is one reference to ADD possibly existing in adulthood. The DSM-III (APA, 1980) describes the course of the disorder as one where there are three possible paths for the disorder to take. The first course is described as the symptoms of ADD continue into adolescence or adulthood. The second course is where the symptoms end in childhood. The third course states attentional and impulsivity symptoms can continue into adolescence or adulthood, but not hyperactivity (DSM-III, APA, 1980). None of the specific criteria referenced would specifically apply to adults. The criteria could be adapted to adults, but generally refer to children.

In the DSM-III-R (APA, 1987) is the revision that began using the terminology Attention-Deficit Hyperactivity Disorder (ADHD). This revision began to show that ADHD in adults was more of a possibility than was previously shown in the DSM-II and DSM-III. The terminology utilized became more inclusive of adults potentially suffering from the disorder than the previous editions. For example, the DSM-III-R (APA, 1987) states, "the essential features of this disorder are developmentally inappropriate degrees of inattention, impulsiveness, and hyperactivity. *People* (italics added) with the disorder generally display some disturbance in each of these areas, but to varying degrees" (APA, 1987, p. 50). The description of ADHD uses frequent references to settings and behaviors more common to children such as classrooms or interacting with teachers. However, the description does make more of an attempt to give credit to the possibility

that adults may be suffering from the disorder. This is demonstrated by the use of terminology such as people instead of children. Also, the DSM-III-R (APA, 1987) references the workplace which indicates that adults may be dealing with the disorder as well. Of the fourteen criteria for ADHD in the DSM-III-R (APA, 1987) none specifically reference adults. By contrast, one of the eighteen criteria in the DSM-IV (APA, 1994) and DSM-IV-TR (APA, 2000), of which the criteria remained the same, specifically mention adults. However, three additional criteria make references that would be inclusive of adults such as losing tools, making mistakes in work, and reference to the workplace (APA, 2000; APA, 1994).

As referenced above, the criteria for ADHD remained the same from the DSM-IV (APA, 1994) to the next revision, the DSM-IV-TR (APA, 2000)or Text Revision. It appears as though there has been some acceptance of this still being primarily a childhood disorder as opposed to one that affects adults as well. This is due to the mere fact that the diagnostic criteria have not been updated to be more inclusive of adults or reflective of the way in which adults may suffer from the disorder. There is clear evidence that adults do contend with this disorder by the volume of research that has been done on the subject to date.

Neurobiological Basis of ADHD

"Although there cannot be an adult *onset* of ADHD, quite commonly the diagnosis of ADHD is not made until adulthood. ADHD is probably a disorder one is born with, but childhood symptoms are frequently overlooked or misdiagnosed" (Resnick, 2005, p. 531). The key phrase is "probably a disorder one is born with". Although the diagnosis of ADHD is one that must be made by age 7, according to the

DSM-IV-TR (APA, 2000) and previous editions, it is a diagnosis that is commonly made in adulthood or continues from childhood into adulthood. As Mannuzza and Klein (2000) state, "there is no doubt that childhood ADHD persists into adulthood in a proportion of cases" (p. 722).

Wilens, Biederman, and Spencer (2002) state "although the precise neural and pathophysiological substrate of ADHD remains unknown, an emerging neuropsychological and neuroimaging literature suggests the presence of abnormalities in frontal and/or frontostriatal networks" (p. 118). They further state that magnetic resonance imaging (MRI) studies have demonstrated that children with ADHD have differences in their brain structure to that of non-ADHD subjects. There has also been evidence of reduced prefrontal cortex metabolism in adults with ADHD (Wilens, Biederman, & Spencer). Additional findings suggest that catecholamine dysregulation, dopaminergic dysfunction, and norepinephrine dysfunction are all important factors in the development of ADHD.

Barkley (1998) states that is only within the past 10-15 years that there has been evidence that supports ADHD is a neurodevelopmental disorder. This has led to studies that have demonstrated a positive response to stimulant medications. Barkley (1998) discusses that studies have utilized "quantitative electroencephalograph (QEEG) and evoked response potential (ERP) measures taken in conjunction with performance of vigilance tests." The results on this type of research have led preliminary data suggesting that "evoked response patterns related to sustained attention and inhibition suggest an underresponsiveness of ADHD children to stimulation that is corrected by stimulant

medication" (Barkley, 1998, p. 166). This has obviously contributed to the commonly held belief that medication is the best way to treat this disorder.

There has been considerable research suggesting that ADHD is a neurobiological disorder (Biederman, 2005; Wilens, Biederman, & Spencer, 2002; Spencer, Biederman, Wilens, & Faraone, 2002; Swanson, Castellanos, & Murias, 1998). As Biederman (2005) states, "the neurobiology of ADHD is not completely understood, although imbalances in dopaminergic and noradrenergic systems have been implicated in the core systems that characterize this disorder" (p. 1218). Biederman states that there are brain structure abnormalities in ADHD subjects. He defined the abnormalities as being most commonly "smaller volumes in frontal cortex, cerebellum, and subcortical structures (Biederman, p. 1218).

Biederman (2005) suggests "that genetic or early environmental influences on brain development in ADHD are fixed, nonprogressive, and unrelated to stimulant treatment" (p. 1218). Wilens, Biederman, and Spencer (2002) state that although behavior appears to be influenced by stimulants, the neurobiology is not altered permanently. Stimulant medication is considered to be the mainstay of treatment of ADHD (Spencer, Biederman, Wilens, & Faraone, 2002). This is due to these medications generally reducing the observable symptoms of the disorder such as hyperactivity, distractibility, and inattention. Stimulants reduce these symptoms by inhibition of dopamine as well as blocking the reuptake of dopamine and norepinephrine (Biederman, 2005; Wilens, Biederman, & Spencer, 2002). However, as stated above, stimulants have limitations and do not reverse "baseline abnormalities in ADHD" (Wilens, Biederman, & Spencer, 2002, p. 118). Therefore, it would seem necessary to

attempt less invasive forms of treatment, such as non-pharmacological forms of treatment with adults with ADHD.

The genetic component to ADHD is gradually becoming better understood. It is commonly accepted that ADHD "is an early-onset, highly prevalent neurobehavioral disorder, with genetic, environmental, and biologic etiologies that persist into adolescence and adulthood in a sizable majority of afflicted children of both genders" (Biederman, 2005, p. 1218). Through the use of imaging studies the structures of the brain involved with ADHD are becoming better understood (Biederman, 2005; Spencer, Biederman, Wilens, & Faraone, 2002). For instance, the cerebellum and corpus callosum are thought to be involved in the pathophysiology of ADHD. This has led to research that suggests that some of the symptoms of ADHD may be accounted for by these brain structures (Biederman, 2005).

Hesslinger et al. (2003) discuss that co-morbidity of adult ADHD with manic episodes, depressive episodes, substance abuse problems, and dissocial behavior is elevated. They suggest that neurobiological information provides evidence of the co-morbidity of adult ADHD and depression. Hesslinger et al. (2003) state "there is evidence for an association between ADHD and dopamine receptor gene abnormalities. The dopaminergic system is also known to be involved in the pathogenesis of depression" (p. 386). This is further evidence of the neurobiological basis of adult ADHD.

Non-Pharmacological Treatments

The mainstay of treatments for adults with ADHD has historically been medication (Stevenson, Stevenson, & Whitmont, 2003; Wilens, McDermott, Biederman,

Abrantes, Hahesy, & Spencer, 1999). Other traditional treatments of adult ADHD have been behavior modification and cognitive-behavior therapy with the most common of medication treatments being stimulant medications (Barabasz & Barabasz, 1995). This section of the paper focuses on psychologically-based treatments that have historically been utilized as a means of treatment for adult ADHD. There are certainly many medication based treatments that have been used as a means of treatment for adult ADHD as well as childhood ADHD. However, a discussion of those treatments is beyond the scope of this study. For a review see Sneed's (1995) discussion of treatments of ADHD children with medication.

The types of psychologically-based treatments that are discussed include behavioral, cognitive, psychosocial, and neurofeedback/biofeedback. These types of treatments were chosen to be reviewed as they are all psychologically-based. Additionally, these types of treatments were utilized as they were all identified through the search terms chosen for this study. The search terms were intended to be exhaustive of the literature base of psychologically-based treatments of ADHD. This in turn led to the identification of studies that were suitable for the analysis. Hence, the types of treatments mentioned above are the psychologically-based treatments to be reviewed.

There has been debate as to whether psychologically-based treatments are a valid form of treatment for ADHD. In fact, when Murphy wrote on this topic in 1995 he stated that "it must be emphasized that the psychosocial treatment of ADHD in adults does not rest on an empirical database. In fact, to date there have been no controlled scientific studies published in this domain" (as cited in Murphy, 1998, p. 583). It was not until 1997 when Kaiser conducted a study on neurofeedback with adults with ADHD that the

literature base on psychologically-based treatments began. However, this was not a controlled study. Other authors have suggested the use of psychologically-based treatments of ADHD, some for children and some for adults, whether or not the individual is on a medication regimen (Erk, 1997; Wiggins, Singh, Getz, & Hutchins, 1999).

Murphy (1998) stated about psychologically-based treatments that there were "no controlled empirical studies demonstrating the efficacy of these approached with ADHD adults" (p. 582). Since Murphy there have only been seven controlled empirical studies listed in the relevant literature. Although one would prefer to have more studies to review when conducting a meta-analysis, this simply speaks the state of the literature base at this time. It indicates that there needs to be further research conducted on psychologically-based treatments of adult ADHD. Additionally, it indicates that the literature base needed to be reviewed in the form of a meta-analysis to determine the effect of these treatments overall.

Studies with Similar Research Questions

When conducting a search for studies with similar research questions, a review of previous dissertations produced ten meta-analyses. These meta-analyses were identified using the ProQuest Dissertation and Theses database through Oklahoma State University's library. The dissertations reviewed indicated that there were no other meta-analyses that have been conducted on adult ADHD psychologically-based treatments. There was one similar study that was conducted on children. All of the dissertations appear to have reviewed studies that were primarily focused on children. There have

been no meta-analytic studies found in the literature review that have been conducted on psychologically-based treatments of adult ADHD.

The meta-analysis dissertations that were able to be reviewed focused on issues relevant to children with ADHD. The meta-analyses had a wide range of studies incorporated into them. The range of studies used is from 10 (Goode, 2001) to 115 (Crenshaw, 1997). There have been additional meta-analytic studies conducted with fewer than 20 studies. It appears there is no set number of studies needed to conduct a meta-analysis. Instead, it appears as though exhausting the literature base to identify all of the relevant articles is needed. That is what has been done with this study.

Additional meta-analyses within the broad social science field have been identified that have fewer than 20 studies. A sample of the meta-analyses identified with fewer than 20 studies will be discussed. These meta-analyses range from studies on medication effectiveness (de Rossi, Donda, & Bellantuono, 2001), to job satisfaction in school psychologists (Vanvoorhis, 2003), to gender differences in caregiving (Miller & Cafasso, 1992), and a variety of other topics. These meta-analyses range from seven usable studies (de Rossi et al.) to 14 studies (Miller & Cafasso, 1992; Preece, 1987). To further discuss these meta-analyses does not appear warranted here; however, several meta-analyses will be listed with the number of studies included in their analyses. de Rossi et al., had seven usable studies; Vanvoorhis had eight studies in his analysis; Perskalla, Lee, Stein, Anderson, and Nickerson (2004) had nine studies; Sanchez Meca, Olivares Rodriguez, and Alcazar (1998) had 12 studies in their analysis; Epstein and Wing (1980) had 13 studies; Miller and Cafasso had 14 studies as did Preece. This demonstrates that a meta-analysis can be conducted with less than optimal numbers of

studies to be included. Additionally, it elucidates that there is not a pre-determined number of studies needed to conduct a meta-analysis.

CHAPTER III

METHODOLOGY

This chapter will include a description of the sample of studies reviewed and a description of the procedures used to identify potential studies. In addition, the inclusion criteria used to select the studies included in this analysis are presented. Finally, the research question is addressed and the methods used to answer this question will be presented.

Criteria for Inclusion

This meta-analysis was conducted on studies obtained from an exhaustive review of the scientific literature base on adult ADHD. An EBSCO search utilizing Psycinfo as the primary search engine was conducted in order to find articles meeting the criteria set forth for inclusion in the study. However, other databases were reviewed as well. As a review of the criteria, articles published from 1994 or later were the original criteria to be used as this is when the DSM-IV (American Psychiatric Association, 1994) was published. As the DSM-IV-TR (American Psychiatric Association, 2000) contained no revision to the criteria set forth for a diagnosis for ADHD, the date of publication of the DSM-IV was what was originally chosen for the date of inclusion in the study. However, the date restriction was removed when such a small number or studies was found to be published.

The criteria from the DSM-IV were chosen due to it being the commonly accepted standard for diagnosis of mental disorders. Also, the studies used had to be empirical in nature. In other words, the studies must have used human subjects to test the effectiveness of psychologically-based treatments of adult ADHD. Additionally, the subjects must be over the age of 18 as this is when a person reaches the legal age of adulthood in the United States. The studies must have at least 10 subjects to be included in the analysis. The studies must also have a control group or have pre-post measures in order to calculate the effect size. The studies must also utilize subjects who met the criteria for ADHD as adults or have met the criteria of having some type of attention deficit by the study authors of the studies being reviewed. The studies may have co-morbid conditions being studied in conjunction to adult ADHD. All of the studies must have a psychologically-based treatment as the method of treatment being investigated and not a medication based treatment as the primary method. The studies reviewed can have treatments that utilize medication as a control group. This is due to the fact that there are so few studies that investigate the effectiveness of psychologically-based treatments for individuals with ADHD who are not also taking medication for the disorder as well. Finally, no single case studies or qualitative studies were included.

Initially, it was hoped to find twenty studies for inclusion. However, the review of the existing literature base only found only seven empirical studies that investigated psychologically-based treatments. As stated previously, a review of studies from Psycinfo was conducted. This database was chosen as it is the most comprehensive database of articles pertaining to psychological issues. The search was expanded to other databases after Psycinfo only returned a total of seven studies that were suitable for

inclusion. Prior to expanding the search into other databases, the criteria for inclusion were expanded on the criterion of date of publication. The date of 1994 was removed to ascertain if any relevant studies had been conducted prior to this date. There were no empirical studies of adult ADHD found that were published prior to 1997.

When the expansion of criteria that was conducted to allow for articles published prior to 1994 resulted in no additional studies, the search was expanded to additional databases. The review of these databases yielded no additional studies for inclusion. Prior to this expansion of criteria, it was planned to only utilize studies that utilized predominantly psychologically based treatments of adult ADHD, such as cognitive-behavioral, behavioral, insight-oriented, etc. When this only resulted in fewer studies than hoped for, it was then determined that the meta-analysis would focus on psychologically-based treatments as opposed to simply psychological based treatments of adult ADHD. This included EEG or biofeedback/neurofeedback (Tinius & Tinius, 2000) and psychosocial intervention (Stevenson, Stevenson, & Whitmont, 2003). It was determined that the criteria for inclusion would be a type of treatment or intervention that was generally related to the field of psychology. This meant that treatments or interventions that practitioners of psychology might generally employ with their clients were reviewed. Additionally, the articles needed to be able to be located through the databases listed in the Procedures section of this chapter.

At this point, the fact that only seven studies of psychologically-based treatments of adult ADHD have been found reveals that this is a critical need area for research on this topic. The studies were found by utilizing a variety of search terms throughout the various search engines. The various search terms are as follows and are grouped by the

overall search: psychological, treatment, adult ADHD; psychological, intervention, adult ADHD; psychological therapy, ADHD; psychosocial, treatment, adult ADHD; psychosocial, intervention, ADHD; psychological, treatment, AD/HD; psychotherapy, treatment, ADHD; psychotherapy, adult, ADHD; neurofeedback, treatment, ADHD; neuropsychological, treatment, ADHD; neuropsychological, intervention, ADHD; hypnosis, treatment, ADHD; adult, ADHD, alternative treatment; counseling, treatment, ADHD; and behavioral, treatment, ADHD.

Procedures

The search for relevant studies evolved based on the fact that there were no studies published on psychologically-based treatments prior to 1995 (Murphy, 1998). This fact led to 1995 being the starting point for a review of the relevant literature. This was to find all empirical studies that have been conducted to date on psychologically-based treatments of adult ADHD. The procedure utilized for this meta-analysis was to conduct an exhaustive search of the relevant literature from 1995 forward. This meta-analysis even removed the date restriction and still found no other published studies on psychologically-based treatments of adult ADHD. The search was done through a literature review of commonly used social science databases. Databases such as Psycinfo, Family Index Database, Annual Reviews of Biomedical Sciences-Psychology, Annual Reviews of Social Sciences-Psychology, Humanities abstracts, and Social Sciences Databases (which encompasses the databases of Education: A SAGE Full-Text Collection; ERIC; Linguistics and Language Behavior Abstracts; Psychology: A SAGE Full-Text Collection; Social Services Abstracts; and Sociological Abstracts), and Digital

Disserations were reviewed. The search terms described in the "criteria for inclusion" section of this chapter shows what were the exact terms utilized for this study.

The meta-analysis was conducted on all of the studies that met the criteria for inclusion already described. It was the goal of this study to have twenty studies for inclusion. As this was a non-feasible goal, the study utilized all available studies of psychologically-based treatments of adult ADHD. The study calculated effect sizes as described by Kavale and Glass (1981). This is:

> A statistic that represents the magnitude of experimental effect transformed to a common scale. The magnitude of experimental effect or 'effect size' (ES), is defined by $ES = X_E - X_C/S_C$ where X_E = average score for experimental group on outcome measure, X_C = average score for control group on outcome measure, and S_C = standard deviation of the control group (p. 533).

As Kavale and Glass state, "the calculated ES describes the experimental effect in standard deviation units. Individual study findings are thus transformed into a common metric. Because ES represents a standardized mean difference, comparisons based on different outcome measures are statically comparable" (p. 533) after the ES has been calculated.

Studies Included in the Analysis

This section will give an overview of the sample utilized in this meta-analysis. The sample consists of the studies reviewed. Appendix A gives a complete citation for each study included in the meta-analysis. Table 1 gives the descriptive statistics for each study. The overall sample had seven studies included for analysis. Effect sizes were calculated for each measure in each study (the interested reader should refer to Appendix

C for this information). Effect sizes were averaged across measures by study to give an overall effect size for each study. Individual measures of effect sizes were also averaged across similar measures across studies to provide overall effect sizes by measures. The overall effect sizes by study were averaged across studies to give an overall effect size for the meta-analysis. Additionally, studies with similar treatments overall effect sizes were averaged to create effect sizes by category of treatment.

The sample of studies included in the analysis consisted of studies of psychologically-based treatments of adult ADHD. These types of treatments are those that practitioners of psychology or counseling might typically employ in their practice. The categories of treatment included cognitive treatment, psychosocial treatment, pscyhoeducational treatment, and neurofeedback treatment. These categories were identified based on the types of studies obtained for inclusion in the meta-analysis.

All of the studies included in the meta-analysis were empirical studies published in peer-reviewed journals which can be located through usual literature review search engines such as psychinfo. Out of the seven studies included in the analysis, there were a total of 195 subjects. The studies were published internationally as one study was published in the Australian and New Zealand Journal of Psychiatry (Stevenson, C. S., Whitmont, S., Bornholt, L., Livesey, D., & Stevenson, R. J., 2002).

The sample consists of studies that were all investigating the effectiveness of psychologically-based treatments of adult ADHD. The majority of the studies utilized subjects that were already taking medication or they did not identify if the subjects were taking medication. The studies all had subjects that either met criteria for ADHD or

TABLE I

DESCRIPTION OF SAMPLE STUDIES USED IN THE META-ANALYSIS

Study	# of Subjects	Mean Age of Subjects	# of Outcome Measures	Type of Measure	Long Term Follow Up	Type of Treat-ment	Type of Control Group
Safren et al., 2004	31	41.5	7	Ind. Eval. & Self report	No	CT Cogni-tive Behav-ioral therapy	Medi-cation
Hesslinger et al., 2002	15	31.9	4	Self report	No	CT Dialectic Behav-ioral therapy	Wait List
Wilens et al., 1999	26	42.4	7	Ind. Eval. & Self report	No	CT Adap-tation of Beck's CT	Pre and Post test measures on subjects
Stevenson et al., 2002	43	35.85	5	Self report	Yes-2 months post treatment & 1 year post trmnt	CT Cognitive remed-iation program	Wait List
Stevenson et al., 2003	35	38.9	5	Self report	Yes-2 months post treatment	Psycho-social Self Directed Psycho-social interven-tion	Wait List

Wiggins et al., 1999	17	42.25	7	Self report	No	Psycho-educa-tional Brief Group based interven-tion	Wait List
Tinius & Tinius, 2000	41	31.25	7	Objec-tive & Self report	No	NFT EEG Biofeed-back and Cogni-tive Re-training	No clinical issues group, did not receive any treatment

some type of attention concern was present. The majority had a diagnosis of ADHD as a requirement for entry into the study.

There were several types of psychologically-based treatments that were reviewed in this meta-analysis. There are four studies that focused on forms of cognitive therapy as a treatment for adults with ADHD. These studies examined different cognitive approaches to the treatment of adult ADHD. One study focused on psychosocial treatment and one focused on psychoeducational treatment. There was one study that focused on neurofeedback/biofeedback treatment.

A study that utilized cognitive therapy was by Wilens et al. (1999). This study utilized an adapted form of Beck's Cognitive Therapy. Their findings indicated that when cognitive therapy (CT) is used with medication therapy, CT appears to be a viable form of treatment for adults with ADHD (Wilens et al., 1999). This study was "an exploratory, retrospective chart review of consecutively referred adults treated

naturalistically with a novel, ADHD-based CT for at least 1 month by an experienced cognitive therapist" (Wilens et al., 1999, p. 216). This study looked at the adaptation of Cognitive Therapy for ADHD adult which was proposed by the second author of the study. The authors state "these modifications are based on an analysis of the cognitive and emotional components of ADHD, their sequel, and their impediments to standard CT treatment in ADHD adults" (Wilens et al., 1999, p. 216). They addressed specific symptoms of ADHD and allowed for the use of medication during treatment. The authors found that "CT appeared to enhance the response beyond that attained with medications alone" (Wilens et al., 1999, p. 222). In other words, CT with subjects who generally were on medication appeared to reduce symptoms of ADHD.

Stevenson, Whitmont, Bornholt, Levees, and Stevenson (2002) utilized a cognitive remediation program (CRP) for treating adults with ADHD. This is yet another variation of the cognitive therapy approaches utilized in controlled studies on the treatment of adult ADHD. Their study attempted to "target problems commonly associated with adult ADHD, namely, attention problems, poor motivation, poor organizational skills, impulsivity, reduced anger control and low self-esteem" (Stevenson et al., 2002, p. 610). Their goal was to reduce cognitive impairments by improving cognitive functions, give additional compensatory strategies for ADHD, and maximize functioning by improving the subjects' environments (Stevenson et al., 2002).

This study utilized a group format to facilitate therapy sessions. The protocol was the same for the group each week of the eight week cognitive remediation program. The groups utilized homework and attempted to teach new skills to the subjects to improve coping with ADHD. This group was another example of a group that allowed subjects to

continue on medication throughout the group. The only stipulation was that the subjects maintain the medication regimen throughout the program that they began with. They found no difference between the subjects on medication and non-medicated subjects on the outcome measures (Stevenson et al., 2002). Their findings indicated that the CRP was successful in reduction of ADHD symptoms at the two-month follow-up and at a one-year follow-up. Stevenson et al. (2002) reported that the subjects stated "that their ADHD symptoms were less problematic, that their organizational abilities improved, their self-esteem increased and that their anger management improved" (p. 614).

A study by Hesslinger, Tebartz van Elst, Nyberg, Dykierek, Richter, et al. (2002) was a pilot study to use a "structured skill training program particularly tailored for adult patients with ADHD. The program is based on the principles of cognitive-behavioral treatment for borderline personality disorder developed by M. Linehan" (p. 177). They conducted the study due to their statement that there are adults with ADHD who seek additional treatment for ADHD other than just medication treatment. Their study found that their treatment produced positive outcomes for the adults in the study.

Hesslinger et al. (2002) state that there is comorbidity with ADHD and borderline personality disorder (BPD) and that subjects have previously responded positively to Dialectical Behavioral Therapy (DBT), which is a form of CBT. The authors had utilized DBT with ADHD adults and adults who were diagnosed with BPD, therefore they "decided to offer elements of DBT skills training to a group of patients with ADHD alone" (Hesslinger et al., p. 178). They used a modified treatment manual in a group setting to see if this therapy was useful. The subjects engaged in two hour weekly therapy sessions for 13 weeks. The subjects also completed outside assignments as part

of the treatment protocol. In addition to the DBT, the subjects followed a "naturalistic design medical treatment" (Hesslinger et al., p. 179). In other words, the subjects made their own decisions regarding medical treatment during the study. The authors chose to give written information regarding ADHD diagnoses to the subjects as well as information regarding the course of treatment. This was done in an effort to help subjects with the objective of the treatment which was to learn "the ability to control ADHD rather than to be controlled by ADHD" Hesslinger et al., p. 180).

Safren, Otto, Sprich, Winett, Wilens, and Biederman (2005) chose to "examine the potential efficacy, patient acceptability, and feasibility of a novel, cognitive-behavioral therapy (CBT) for adults with attention-deficit hyperactivity disorder (ADHD) who have been stabilized on medications but still show clinically significant symptoms" (p. 831). This study was one that was willing to use a psychologically-based treatment of ADHD while comparing it with medication based treatments. In fact, this study combined the CBT treatment with medication and tested it against adults with just medication treatment alone. Their results indicate that CBT for adults with ADHD is a worthwhile treatment approach.

Safren et al. (2005) approached the treatment from the CBT perspective and is in the broad category of Cognitive Treatments. They utilized three core and three optional modules which "contained elements of motivational interviewing, and practice, repetition and review of previously learned skills" (p. 834). The modules focused on psychoeducation of ADHD, learning how to reduce distractions, and cognitive restructuring in the core modules (Safren et al.). The optional modules were completed if the subjects experienced clinically significant difficulties with procrastination,

anger/frustration management, and communication skills (Safren et al.). The modules were utilized to help the subjects learn skills to assist them with these problem areas. The treatment appears to have been a success as no patients randomized to the experimental group dropped out of the study (Safren et al.).

There was one study that investigated a self-directed psychosocial intervention of adult ADHD (Stevenson, Stevenson, & Whitmont, 2003). It was a variation of the primary authors earlier study (Stevenson et al., 2002). This psychosocial treatment "was substantially redesigned to reduce the need for therapist contact" (Stevenson et al., 2003, p. 94). The authors wrote and utilized a self-help book that focused on issues related to ADHD. The issues were: education about ADHD overcoming difficulties with attention and motivation, listening, impulse control, and organizational skills, cognitive techniques to deal with anger management and self-esteem problems. This study had only three sessions with therapists and were at the beginning, middle, and end of the program. The sessions were to review information, monitor progress, and continue to motivate the subjects to complete the study (Stevenson et al., 2003). The participants completed exercises in the workbook, attended the three sessions and had contact with support people throughout the program.

The study found that the self-help program that was to teach strategies to manage ADHD symptoms was successful at a two month follow-up for participants having close adherence to the psychosocial intervention. This study did not have a long-term follow-up as the 2002 study, but did have a two-month follow-up at which they found that "treatment gains were maintained for ADHD symptoms" (Stevenson, 2003, p. 97). The

subjects stated that they had a reduction in ADHD symptoms, improved organizational and anger management skills, as well as increased self-esteem (Stevenson, 2003).

One study utilized a psychoeducational format for treatment. Wiggins et al. (1999) utilized a brief psycho-educational group as a psychologically-based treatment for adult ADHD. The authors used a four-session psycho-educational group intervention in their study. Prior to the 1999 study by Wiggins et al., he had published his dissertation on this topic. It appears as though the Wiggins et al. article is a reproduction of his dissertation and therefore the 1995 dissertation will not be reviewed here.

Wiggins et al. (1999) study utilized his self-administered checklist from 1995. This checklist was utilized to identify subjects' issues in seven areas. These areas are issues of: self-esteem; hyperactivity; interpersonal problems; organization; impulsivity; emotional lability; and inattention (Wiggins et al.). Subjects were also given an organizational skills checklist to identify issues pertinent to ADHD. Also, they were given a self-assessment regarding thoughts, feelings, and actions in regard to ADHD symptoms that was based on a model by Hutchins and Vaught (1997). After all of this, the subjects were informed of results of testing and participated in four sessions. They utilized The Group Pentagon based on Hutchins (1993) work. In this model the group leader conducts brief group sessions that are supposed to incur behavior change (Wiggins et al.). They found that the intervention was successful in improving organizational skills. Wiggins et al. also found that the group intervention had a significant effect on difficulties with inattention.

The final category of psychologically-based treatment is neurofeedback or biofeedback. There was one study that have utilized neurofeedback/biofeedback as the

primary form of psychologically-based treatment for adult ADHD. Rasey, Lubar, McIntyre, Zoffuto, and Abbott (1996) discuss that neurofeedback has been used for approximately the past 30 years in the treatment of ADHD in children and adults. Kaiser (1997) states that "neurofeedback training is an operant conditioning technique used to reinforce or inhibit specific forms of EEG activity" (p. 1).

Tinius and Tinius (2000) studied the effects of biofeedback but also looked at cognitive retraining. Tinius and Tinius discussed that people with mild Traumatic Brain Injury (mTBI) can have psychological effects from a minimal loss of consciousness. They also state that adults diagnosed with mTBI or ADHD, inattentive type "showed significant changes in sustained attention on the Intermediate Visual and Auditory (IVA) Continuous Performance Test (CPT) (Tinius & Tinius).

Tinius and Tinius (2000) stated "the purpose of this study was to measure the changes in adults diagnosed with mTBI or ADHD who were treated with EEG biofeedback in combination with cognitive retraining compared to a control group that did not receive training" (p. 28). The authors utilized simultaneous EEG biofeedback and cognitive retraining during approximately 20 treatment sessions. The goal was to complete treatment as rapidly as possible (Tinius & Tinius). Some of the ADHD subjects "completed treatment in less than twenty sessions due to termination of insurance benefits" (Tinius & Tinius, p. 29). The treatment sessions lasted 30 to 45 minutes and utilized audio and visual feedback (Tinius & Tinius). Each treatment session was tailored specifically to the subjects' symptoms. They found that this psychologically-based treatment was effective when used with adults with ADHD. "The treatment model of simultaneously providing EEG biofeedback (neurotherapy) and cognitive retraining

exercises significantly improved scores" (Tinius & Tinius, p. 37) for ADHD subjects compared to the control group on a measure of sustained attention.

Research Question

The following research question was planned to be addressed: Is the psychologically-based treatment of adult ADHD effective? However, it should be noted that while it was initially the desire of this researcher to exclude studies not controlling for the use of medication based treatment, this would have resulted in the elimination of most of the studies; therefore, a more accurate question is: Is the psychologically-based treatment of adult ADHD effective, when the use of medication is uncontrolled?

Analysis of Data

This study is a meta-analysis of the existing studies conducted on psychologically-based treatments of adult ADHD. Kavale and Glass (1981) discuss previous research by Glass (1976, 1977) and Glass, McGaw, and Smith (1981) that "proposed meta-analysis, the analysis of analyses, as a means for statistically integrating a body of literature" (p. 532). Kavale and Glass further state that a meta-analysis will allow for a "systematic and statistical summarization of study findings" (p. 532).

As Kavale and Glass (1981) state, meta-analysis is simply an integration of the findings from various analyses. They further define that in a meta-analysis the dependent variable is the ES that has been derived from the studies in the analysis. They identify that the independent variables "are the features considered important characteristics of the studies surveyed" (Kavale & Glass, p. 535).

They discuss an important argument that has been raised against meta-analyses which is that this type of research may be integrating results from very different types of

studies. Kavale and Glass (1981), however, state that these are the types of studies that need to be integrated because if only similar studies are synthesized into a meta-analytic design, we would obviously already know the answer to the question being researched: similar studies would yield similar results. This lends evidence to utilizing a meta-analytic approach to evaluating the effectiveness of psychologically-based approaches to the treatment of adult ADHD. These studies are all relevant to one another due to the fact that they are all investigating treatments of adult ADHD. However, the studies investigated here have different approaches to treating the disorder. Therefore, synthesizing the findings from the various studies in this analysis sheds light on whether psychologically-based treatments are effective with this clinical population. This study also will include a qualitative analysis component.

This study intended to prove that there are legitimate psychologically-based treatments for adult ADHD. The initial review of the studies indicated that all of the studies found that some type of ADHD symptom or symptoms were reduced due to the treatment. This led to the tentative conclusion that by analyzing the data, there would be a substantial effect found from the psychologically-based treatments of adult ADHD. Of course the results have to be tempered with the knowledge of the relatively small number of representative studies. However, since all of the available studies that met inclusion criteria were utilized in this meta-analytic review, it can be stated that the results are cautiously generalizable to the broader public.

As with any meta-analytic review, it was hoped to find all of the available studies for inclusion. With the technological advances made in the last 10 years, it is assumed that all of the available studies have been located and utilized in this study. However, it

is possible that there are some studies that have been somehow overlooked. Again, the results need to be cautiously interpreted.

Each study included in the analysis was given a study identification number, or study ID. Each of the studies were categorized based on their type of psychologically-based treatment. Appendix B is a copy of the coding sheet utilized for the meta-analysis that lists the identified variables and categories of treatment. Initially, there were six categories of treatment to be utilized for the meta-analysis. However, upon closer examination, one of the categories turned out not to be a viable category. This category was peer-mediated interventions. The study that fell into this category was by Wisniewski (2002) and was not a viable study as it was a qualitative study with no identified control group to use as a comparison group. Additionally, the cognitive and cognitive-behavioral categories were combined into one category as they were all broadly cognitive based studies.

There were three additional studies that did not meet inclusion criteria and were removed from the study as well. All four of these studies will be discussed in more detail in the discussion chapter. This did not affect the analysis in the removal of an entire category as there were other studies that were usable studies in the other categories. It did, however, leave three categories with only one identified study per category. These categories were Psychosocial Treatment/Intervention, Psychoeductional Treatment/Intervention, and Neurofeedback Treatment/Intervention. Psychosocial only had one study initially identified for this category to begin with, but Psychoeducational had two studies, one of which had to be removed due to it being a case study, not a quantitative analysis. This left the meta-analysis with four categories of treatment:

Cognitive, Psychosocial, Psychoeducational, and Neurofeedback. Again, table 1 is a listing of all studies in the meta-analysis. It lists variables such as number of subjects, mean age of subjects, number of outcome measures, type of measure (independent evaluator rated or self-report), long-term follow-up, type of treatment, and type of control group.

CHAPTER IV

FINDINGS

This chapter focuses on results of the statistical analyses conducted for this study. This chapter includes the effect sizes for each of the outcome measures identified for the study. The research question is also discussed in detail in this chapter. This chapter has two sections, discussion of the research question and additional measures.

Discussion of the Research Question

This section will focus on the research question identified for this study, is the psychologically-based treatment of adult ADHD effective? This section will answer the question quantitatively as well as qualitatively. In order to answer the research question, the data have been classified according to type of treatment. This resulted in four categories of treatment. The four categories were A) cognitive/cognitive behavioral (4 studies), B) neurofeedback (1 study), C) psychosocial (1 study), and D) pscyhoeducational (1 study). Of these studies, four were individual treatment exclusively, one was group treatment only, and two were combined group and individual treatment.

Is the psychologically-based treatment of adult ADHD effective when the use of medication is uncontrolled? It can be stated that psychologically-based treatment of adult ADHD is potentially effective. This is based off of the overall and category effect sizes

obtained. The global effect size for the meta-analysis was obtained by analyzing the data in three separate manners. The three effect sizes were very similar, but it seemed prudent to look at all manners of viewing the data to obtain the effect sizes. The first manner was computed by taking the total of each of the four categories of treatment/intervention overall effect sizes and averaging them together. This led to an effect size of .97, a large effect size as described by Cohen (1988). The second manner was computed by taking the total of each of the seven studies overall effect sizes and averaging them together. This led to an effect size of .91, which again, is a large effect (Cohen). The third manner was computed by taking the total of all individual effect sizes obtained and finding the mean of these effect sizes. There were 42 individual effect sizes obtained from the seven studies utilized in the meta-analysis. These effect sizes were for all of the different measures that each study utilized. The global effect size for this manner of calculation was .91, which is a large effect (Cohen). Next will be a discussion of effect sizes by category of treatment. Finally, a discussion of global effect sizes as well as individual effect sizes by category of measures is presented.

Table 2 lists the effect sizes for each category of treatment. It indicates that the smallest overall effect size was with Cognitive/Cognitive-Behavioral Treatment of adult ADHD. This effect size was .82 which is a large effect as defined by Cohen (1988). If this category is further reduced to be two categories, Cognitive-Behavioral Treatment (CBT) and Cognitive Treatment (CT), then CBT had only a medium effect of .65 (Cohen). CT had a large effect (Cohen) on its own, .99. The largest overall effect size was with Psychoeducational Treatment. This effect size was 1.25. Neurofeedback

TABLE II

MEAN EFFECT SIZES (Δ) AND NUMBER OF STUDIES FOR EACH OF THE FOUR CATEGORIES OF TREATMENT

Category of Intervention	Δ	n
Cognitive	.82	4
Psychosocial	1.07	1
Psychoeducational	1.25	1
Neurofeedback	.75	1

(NFT) Treatment had an effect size of 1.20 which is a large effect (Cohen). The Psychosocial Treatment category had an effect size of 1.07.

Again, table 2 lists the effect sizes of each category of treatment/intervention (from here on it will be referred to as treatment). Table 2 shows how effective each overall category of psychologically-based treatment was for adult ADHD. These are the global effect sizes for each category of psychologically-based treatment. These effect sizes were obtained by averaging all effect sizes obtained in each study, then averaging the study's effect size with other study's effect sizes in that particular category of treatment. Again, in reviewing the information from this table it demonstrates that Psychoeducation Treatment is the most effective (ES=1.25) form of psychologically-

based treatment. Table 2 indicates that all forms of psychologically-based treatment had large or medium (Neurofeedback) global effect sizes (Cohen, 1988) for their treatment (when Cognitive Treatment is reduced to CBT and CT, CBT did have a medium effect).

Each category of treatment appears to be an effective form of psychologically-based treatment for adult ADHD. As stated above, Psychoeducation Treatment and Psychosocial treatment (each with only one study in their categories) are the two treatments with the largest effect sizes. Cognitive is the treatment with the next largest effect size of .82 (four studies). Neurofeedback had the smallest of effects (medium ES with only one study). Its effect size was .75 and this indicates that this category of treatment may also be a viable form of psychologically-based treatment. As this category of treatment also only had one study that met criteria for membership in the category, the effect size is representative of that study individually.

Table 3 illustrates the effect sizes for the ADHD/Attention measures utilized by the various studies in the overall analysis. This may be a more pure measure of whether or not psychologically-based treatment of adult ADHD is effective because it only looks at the measures designed to assess ADHD/Attention. As Table 3 shows, Neurofeedback (NFT) had the smallest effect size, which was .83. This is again a large effect as defined by Cohen (1988). As all of the remaining category effect sizes are larger than this, it can be inferred that they are all large effect sizes as defined by Cohen and that will not be stated further. The largest effect was obtained by the Psychosocial Treatment category. The effect size was 1.65. However, as previously stated, this category only has one study included. The remainder of effect sizes are listed next. Psychoeducational Treatment's effect size was 1.19. Again, this category had only one study. Cognitive Treatment had

TABLE III

MEAN EFFECT SIZES (Δ) AND NUMBER OF STUDIES FOR EACH OF THE FOUR CATEGORIES OF TREATMENT FOR ADHD/ATTENTION MEASURES

Category	Δ	n
Cognitive	1.05	4
Psychosocial	1.65	1
Psychoeducational	1.19	1
Neurofeedback	.83	1
Global Average	1.18	1.75

an effect size of 1.05. The global average of effect sizes for ADHD/Attention measures was 1.18. As all of the effect sizes were large it appears as though psychologically-based treatments of adult ADHD are effective forms of treatment.

When further reducing the Cognitive Treatment category to CBT and CT, CBT had an overall effect size of .81. CT had an overall effect size of 1.23 without CBT studies. This indicates that purely cognitive treatments may be more effective in the reduction of ADHD symptoms as reported by the subjects and evaluators in the studies.

As stated previously, ADHD measures and attention measures were grouped together to examine overall effects of ADHD measures. The measures were identified by the study authors as ADHD measures or attention measures. Certain measures, such as hyperactivity, impulsivity, inattention, and organization were identified by this author as viable measures of ADHD or attention by review of the studies and by review of DSM-IV (1994) criteria of ADHD. The majority of the studies had easily identifiable ADHD or attention measures. This was due to either ADHD or attention being in the title of the measure being utilized.

Table 3 indicates that each study's ADHD measures were grouped together to obtain an effect size for ADHD measures. Then, those measures were averaged together by category of treatment effect size for ADHD measures for that treatment category. Next, each treatment category's ADHD measures were averaged together to create a global, or overall, effect size for ADHD measures. This shows each treatment category's ADHD measure as a single variable as well as the overall global average of each treatment category's ADHD measure as a single variable.

When taking into account the studies being classified as individual treatments or group treatments, the following results were obtained. The four studies that had individual treatment as their primary treatment component obtained an overall effect size of .86, a strong effect (Cohen, 1988). The three studies that had group treatment as their primary treatment component obtained an overall effect size of .97, again a strong effect (Cohen). This is interesting in that the individual and group treatment components appear to have only negligible differences. Neither appears to be more effective than the other mode of treatment.

Qualitative Discussion of the Studies

The following is a discussion of the qualitative components of the meta-analysis. As previously stated there are only seven studies that met criteria for inclusion into the meta-analysis (see Table 1). This lends itself to a thorough discussion of each study. The following issues will be discussed about each study: number of subjects, randomization, duration of the study, make-up of control groups and experimental groups, medication status of the subjects, follow-up (if any) by the study authors, and co-morbidity issues. By describing each of the studies in detail, each study will have been thoroughly reviewed and the reader can make a better informed decision about the utility of a meta-analytic review of these types of studies.

Safren et al. (2005) will be the first study reviewed. This study fell into the Cognitive Treatment category. The subjects in this study were stabilized on medication for the treatment of adult ADHD. The subjects still had symptoms of ADHD that were clinically significant (Safren et al.). There were a total of 31 subjects in this study, all of which "met DSM-IV criteria for ADHD in adulthood…with external validation of childhood onset" (Safren et al., p. 833). The study authors utilized the "Structured Clinical Interview for DSM-IV" (Safren, p. 835). The subjects were randomized between the experimental and control groups. The experimental group (n=16) received the CBT in conjunction with the medication they had been stabilized on. The control group (n=15) continued on their medication regimen alone. The study lasted for the duration of the CBT modules which consisted of three core modules and three optional modules or for 15 weeks. At the end of the CBT modules or 15 weeks is when the outcome assessment was utilized.

Safren et al. (2005) had mostly equal numbers of men and women. There were 14 men and 17 women. This study did report on ethnic minorities in the study. The authors reported having four minority subjects. The age range was 18 to 65. There was no long-term follow-up for this study. The study did not report any co-morbid disorders, however it did report exclusionary criteria which included mood disorders, psychotic disorders, developmental disorders, substance use disorders, current suicidality, lowered IQ (verbal IQ below 90), and history of treatment with CBT (Safren et al.).

Hesslinger et al. (2002) was the second Cognitive Treatment study in the meta-analysis. The 15 subjects all met criteria for a diagnosis of ADHD. The study authors stated that the subjects must have met DSM-IV criteria for a diagnosis of ADHD to be in the study. Also, the Wender-Utah-Rating Scale and the ADHD Check List were utilized in the diagnostic procedure. This study had only eight subjects in the experimental group. Four of the subjects were taking medication during the study. There were five males and three females. The control group was compromised by a high drop out rate. Only three of seven of the control group were available for follow-up comparison. All three had begun a pharmacological treatment for ADHD during the time of the study. A comparison of the two groups was still made, however. The treatment was offered to patients at the study authors' clinic who met criteria for eligibility in the study. The treatment was two hour dialectical behavior therapy sessions. There were 13 sessions which lasted for three months. The ethnicity of the subjects was not reported in this study. The average age of the experimental group was 31.9 years old, with a range of 19 to 44. The average age of the control group was 32.7, with a range of 18 to 53. There were five males and two females in the control group; however, as previously stated, only

three subjects were available for final comparisons. There was no long-term follow-up reported. There were exclusionary criteria recent substance abuse, bipolar disorder, schizophrenia, suicidality, borderline personality disorder (Hesslinger et al., 2002). The authors also utilized the terminology "mental handicap" (Hesslinger, 2002, p. 178) as an exclusion, but did not clarify what this meant. They did identify that three subjects had comorbidity of recurrent depressive disorder, two had social phobia, and two suffered from insomnia.

The third study to be discussed is also from the cognitive treatment category. This study was conducted by Wilens et al. (1999). All of the subjects in this study had been diagnosed with ADHD. The authors state that "all diagnoses were made by board-certified psychiatrists at intake using DSM-III-R criteria bases on interviews with the patient and upon review of relevant history and psychological testing" Wilens et al., 1999, p. 217). This study was a retrospective chart review of subjects who were treated with Cognitive Therapy for ADHD. There were 26 subjects in this study. All subjects in this study received the experimental treatment. The subjects were referred for treatment due to history of positive ADHD symptomology. There was exclusionary criteria in this study based on subjects with an IQ less than 75 or if diagnosed with a psychotic disorder. This was due to contraindications with CT.

There was no identified control group in this study as the study had pre and post measures to identify possible improvement in ADHD symptoms due to the experimental treatment. Effect sizes were calculated in this study by using the scores on the measurement tools at the point of medication stabilization. Wilens et al. (1999) stated "stabilization on medication refers to the time point at which there was a stable

therapeutic response and medications were no longer titrated" (p. 218). This was the pretest measure. There were baseline measures taken prior to medication stabilization to demonstrate the effects of medication on symptom reduction. The posttest measure for the meta-analysis was the score for CT plus medication. This allowed for effect sizes to be calculated. This also demonstrated that medication plus a psychologically-based treatment reduced ADHD symptoms further than medication alone.

Wilens et al. (1999) study was to ascertain the effectiveness of a form of cognitive therapy on adult ADHD. The study lasted for an average of 11.7 $\pm$ 8 months with a range of total time of 3 to 30 months. The range of CT sessions was 10 to 103 sessions with an average of 36 $\pm$ 24. There was no long-term follow-up after the conclusion of the CT treatment to further assess if the addition of CT to medication had improved the subjects ADHD symptoms. There was considerable comorbidity such as major depressive disorder, atypical depression, generalized anxiety disorder, substance use disorder, antisocial personality disorder, bipolar disorder, and eating disorder (Wilens et al., 1999).

The fourth study to be discussed is by Stevenson et al. (2002). This study focused on a cognitive remediation program (CRP) for the treatment of adult ADHD. Their goal was to reduce cognitive impairments by improving cognitive functions, give additional compensatory strategies for ADHD, and maximize functioning by improving the subjects' environments (Stevenson et al., 2002). The diagnosis of ADHD was made by the use of the Semi-Structured Interview for Adult ADHD; the Wender Utah Rating Scale; the Parent Rating Scale which is a checklist of childhood behaviors of ADHD that is completed by someone who knew the subject as a child (although participants were not excluded if they had no one to complete this form); and a DSM-III-R symptom checklist.

There were 43 subjects in this study, 29 were male and 14 female. The treatment group had 16 males and 6 females. The control group had 13 males and 8 females. The subjects came into the study stabilized on medication for ADHD or they were unmedicated (Stevenson et al., 2002). Subjects on medication were asked to continue with the same type and dosage of medication through the two month follow-up. Subjects were randomly assigned to treatment and control groups. The control group was a wait-list group. There were close to equal numbers of medicated and non-medicated in both conditions. The mean age of subjects was 35.85. The study lasted for eight weeks with two long-term follow-ups. These were at two months and one year post treatment. The authors stated that treatment gains at completion of the study were generally maintained at the follow-up measures. There was no data on ethnicity of subjects. Comorbidity was not specifically addressed, however, the measures utilized indicate that self-esteem and anger were issues the authors were interested in. The authors did utilize exclusionary criteria on the basis of alcohol or drug problems, mental retardation, antisocial behavior, and history of psychosis.

The fifth study to be reviewed was by Stevenson et al. (2003). This study was focused on psychosocial treatment. It had minimal therapist intervention. This study was based off of the Stevenson et al. (2002) study discussed above. It "was substantially redesigned to reduce the need for therapist contact" (p. 94). Over 95% of subjects were previously diagnosed with ADHD when they began the study (Stevenson et al., 2003). As with the Stevenson (2002) study, subjects completed the Wender Utah Rating Scale and Parent Rating Scale. They also completed the Barkley Semi-Structured Interview for Adult ADHD in order to assess for a diagnosis of ADHD. The subjects also had to

endorse DSM-IV ADHD criteria. One additional factor is that the subjects were recruited from psychiatrists and support groups that specialize in ADHD.

This study had a total of 35 subjects. There were 22 males and 13 females. The treatment group had 10 males and 7 females. The control group had 12 males and 6 females and was a wait list group. The subjects were randomly assigned to either group. As with the 2002 study, subjects were admitted either unmedicated or on their optimum dose of medication for ADHD symptoms. This study did not report any data on ethnicity of subjects. This study also lasted for eight weeks with a long-term follow-up at two months. Gains for ADHD symptom reduction were reportedly maintained at the two month follow-up. There was no comorbidity reported, however, as with the 2002 study, the measures utilized indicate that self-esteem and anger were issues the authors were interested in as they utilized identical outcome measures. Exclusionary criteria were similar to the 2002 study as well: current alcohol or drug problems, mental retardation, anti-social behavior, and history of psychosis.

Wiggins et al. (1999) is the sixth study to be discussed. It focused on the effects of a psychoeducational group for ADHD. This was a four session psychoeducational group targeting organizational deficits (Wiggins et al.). There were 17 subjects, all of which were Caucasian. The diagnosis of ADHD utilized by the study authors was given to all subjects in the study prior to entrance in the study. This diagnosis was made by a psychologist, psychiatrist, or neurologist (Wiggins et al.). The authors did not state if the subjects were randomly assigned to the treatment or control groups. The treatment group consisted of one male and eight females whereas the control group was equally divided with four males and four females. The control group was a wait list group to receive the

treatment after the completion of the study. The study did not address ethnicity of subjects, if subjects were taking medication, or if there were any comorbid disorders. The authors suggest that their treatment may have led to a reduction in disorganization issues experienced by the subjects in the study (Wiggins et al.).

The final study to be discussed is by Tinius and Tinius (2000). It is the second NFT study to be reviewed. It was another study with a focus on a type of traumatic brain injury. This study had three groups identified by the authors, a mild traumatic brain injury (mTBI) group, an ADHD group, and a control group. This study intended to identify if subjects with mTBI or ADHD had increases in sustained attention after treatment with EEG biofeedback and cognitive retraining (Tinius & Tinius). There were 44 total subjects between the three conditions. For the purpose of the meta-analysis, only the data on the ADHD group and the control group was utilized. This took the number of subjects to 28. The ADHD subjects were given a diagnosis of ADHD, inattentive type through meeting six of nine DSM-IV criteria (Tinius & Tinius). The control group subjects had no history of neurological or neuropsychological conditions.

There were 13 ADHD subjects (experimental condition) and 15 control subjects who received no treatment in the Tinius and Tinius (2000) study. The treatment group had four males and nine females, whereas the control group had eight males and seven females. Ethnicity as well as medication status was not reported on. The subjects in the ADHD group were referred for evaluation and diagnosed with ADHD (Tinius & Tinius). The control group was recruited from the local area with no history of neuropsychological or neurological disorders (Tinius & Tinius). Therefore, the subjects were not randomly assigned to treatment conditions. The study lasted for 20 sessions.

The authors identified this as the optimal stopping point of treatment due to their clinical experience. There were three of the ADHD subjects that terminated treatment in less than 20 sessions. The control group, who did not receive any treatment, were assessed "on two separate occasions approximately three to seventeen weeks apart" (p. 29). The authors found that sustained attention of ADHD (and mTBI) subjects improved due to the treatment. They did not report any long-term follow-up data. There was no data on comorbity reported.

As this meta-analysis is comprised of studies with generally equal numbers of women and men (42% and 58 % respectively), it appears as though psychologically-based treatment is effective with both sexes. The studies did not report if treatment gains were made more for women or men. However, with the studies being equally representative of the two sexes, it can be stated with some certainty that the treatment is equally effective for women and men. There were 114 males and 81 females.

Ethnicity was identified as a variable of interest in this study. However, there was poor reporting by the study authors on the ethnicity of their subjects. Safren et al. (2005) reported on ethnicity in their study. They reported that 13% of their subjects were ethnic minorities, specifically, Hispanic/Latino, Native American, African American, and Asian. This means that there were 4 of 31 subjects that were ethnic minorities. It can be assumed from there reporting of four ethnic minority categories that there was one member of each ethnic minority represented. Wiggins et al. (1999) identified that all of their participants were Caucasian. The remainder of the studies did not report any data on ethnicity or race of their subjects. This makes it difficult to infer what ethnic group or racial group might better benefit from this type of treatment.

Age was another identified variable of interest. All subjects were at least 18 years old. Some studies identified age ranges (Safren et al., 2005; Hesslinger et al., 2002; and Wilens et al., 1999). One study did not give the mean age of subjects (Safren et al.). Therefore, an overall mean age will be reflective of only the studies that included mean ages for their subjects. The overall mean age of subjects was determined by averaging all mean age scores from each study together. The studies that gave mean ages for the control and experimental groups were first averaged together so that study had its own mean age. The overall mean age of subjects for the meta-analysis was 36.4. It is notable to mention that only one mean age range was in the 20s. This was the control group for Tinius & Tinius (2000). This is notable as many believe ADHD to be a disorder that is grown out of by adulthood. As the average age is mid-thirties, this indicates that many people are still suffering from ADHD symptoms well into adulthood. It appears as though psychologically-based treatments are potentially effective for adults in the age range of mid-twenties to mid-forties. This is due to the age ranges presented by the study authors being in these age ranges. Three studies did not indicate age ranges. Safren et al. gave an age range of 18 to 65, but no mean age.

It appears as though many individuals who sought treatment through these studies suffered from co-morbid disorders. The co-morbid disorders included, but were not limited to, depressive disorders, anxiety disorders, social phobia, insomnia, substance use disorders, personality disorders, eating disorders, bipolar disorders, and closed head injury. This is relevant to mention as to indicate that co-morbid disorders do not necessarily rule out effective treatment of adult ADHD by non-medication means.

Mental retardation, “mental handicap” (Hesslinger et al., 2002, p. 178), or a verbal IQ below 90 (Safren et al., 2005) was a general exclusion from five of seven studies. Wiggins et al. (1999) and Tinius and Tinius (2000) did not state any exclusions based on intelligence level. Tinius and Tinius did have a third subject group. This group was comprised of Mild Traumatic Brain Injury patients. This group was excluded from analysis as this study already had a control group and an ADHD group as an experimental group. Therefore, the MTBI group was extraneous to this study. Finally, sexual orientation was originally identified as a variable of interest; however, none of the studies identified the sexual orientation of their subjects.

As the effect sizes listed in Table 2 indicate, each treatment or intervention showed a large effect (Cohen, 1988). Table 6 shows that each individual study had at least a medium effect (Cohen), with the only exceptions being Hesslinger et al. (2002) and Keller (2001) in regard to depressive symptomology and Tinius and Tinius (2000) on the Wisconsin Card Sort Measure. These three were all small effects (Cohen). This indicates that the treatments or interventions may be effective enough to warrant their use. There are factors to be considered in addition to the effect sizes. One such factor is the fact that there were only seven psychologically-based studies that met criteria for entrance into the meta-analysis. This leads to difficulty in generalizing the results to the greater population due to the small number of studies. Additionally, the seven studies only had a total of 195 subjects between them. Again, this makes for some difficulty in generalizing results to the greater population. Also, there was only minimal reporting of ethnic minorities being involved in the studies. However, the studies did all show medium to large effects in terms of their overall effect size. Additionally, all studies but

Safren et al. (2004) showed large effect sizes in regard to measures specifically addressing ADHD or attention symptoms. Safren et al. had a medium effect size (see Table 6). This demonstrates that psychologically-based treatments are potentially viable forms of treatment or intervention for adult ADHD.

Additional Measures

Appendix C is a listing of each effect size calculated in each study. Each individual effect size calculated to determine overall effect sizes is listed in this appendix. Appendix D is a listing of all different effect sizes calculated for this study broken down by categories. The effect sizes are grouped by category. Category groupings include: category of treatment, effect sizes by similar type of measure, and overall effect sizes.

Some of the studies had multiple types of effect sizes. For instance, all studies had ADHD measures that contributed toward those effect sizes. Some studies, however, had affect measures and general impairment measures which created categories of their own. Effect sizes were computed for each of these categories as well. Some of the studies had measures that did not fit into any of the categories deemed necessary for this study. However, effect sizes were still computed on these measures (unless they were irrelevant to the study) and will be listed as well in Appendix D.

The majority of the measures utilized to obtain effect sizes for the meta-analysis resulted in negative effect sizes. This was due to the control group mean being a larger value than the experimental group mean. This led to a negative value which was then divided by the standard deviation (a positive number). As always, a negative value divided by a positive value equals a negative value. This was dealt with by reviewing the studies to ascertain if a negative effect size would mean a positive effect of treatment. In

every study the measures that produced negative effect sizes indicated positive effects of treatment. This was due to the measure being utilized to evaluate effects of treatment having a lower score value (which indicated improvement) after treatment than before treatment. Therefore, the experimental group had a lower mean score than the control group which indicated that the experimental condition had a positive effect. After ascertaining that a negative score was indeed indicative of a positive effect of treatment, the negative values were reversed into positive values for ease of comparison.

Table 4 lists descriptive statistics for the four psychologically-based treatment categories for depressive and affect measures utilized by studies. Depressive and affect measures were grouped together to examine overall effects of these measures. The measures were identified by the study authors as depressive and affect measures. These categories were identified by this author as categories relevant to the meta-analysis as they bring a qualitative component to the current study. By examining the effects of these psychologically-based treatments on these measures, it will help to identify if there is some secondary benefit obtained by utilizing these psychologically-based treatments with adults with ADHD.

The effect sizes for depressive measures were medium to large. These measures were grouped together based off of their similarity. They all measured depressive symptoms, affect, or self-esteem which all are related features. The DSM-IV (1994) assesses depression through changes in affect as well as lowered self-esteem or self-worth. Therefore, it seemed appropriate to use all of these measures in the broader category of depression. When taken by category of treatment, the effect sizes for depressive measures ranged from .69 (CT), .90 for Psychosocial, to 1.33 for

TABLE IV

MEAN EFFECT SIZES (Δ) AND NUMBER OF STUDIES FOR EACH OF THE FOUR CATEGORIES OF TREATMENT FOR DEPRESSION/AFFECT MEASURES

Category	Δ	n
Cognitive	.69	4
Psychosocial	.90	1
Psychoeducational	1.33	1
Neurofeedback	n/a	
Global Average	.97	2

Psychoeducational. The Neurofeedback study did not utilize any depressive measures. Overall, these effects are indicative of positive secondary gains made in treatment in the reduction of depressive symptomology by psychologically-based ADHD treatments for adults.

Table 5 lists the descriptive statistics for the four psychologically-based treatment categories for general impairment measures utilized by studies. The measures were identified by the study authors as general impairment measures. These categories of measures were also identified by the author as categories of measures relevant to the current study as they bring another qualitative component to the current study. By

TABLE V

MEAN EFFECT SIZES (Δ) AND NUMBER OF STUDIES FOR EACH OF THE FOUR CATEGORIES OF TREATMENT FOR GENERAL IMPAIRMENT MEASURES

Category	Δ	n
Cognitive	.84	3
Psychosocial	N/A	
Psychoeducational	N/A	
Neurofeedback	1.40	1
Global Average	1.12	2

*There were only 4 studies which utilized General Impairment measures.

examining the effects of these psychologically-based treatments on general impairment, it will help to identify if adults with ADHD who have participated in these studies had a reduction in general impairment symptoms.

Effect sizes for general impairment were medium to large. These measures were also grouped together based off of their similarity. All measures utilized some type of scale to measure general impairment of functioning, such as the Global Assessment of Functioning or GAF (DSM-IV, 1994). The effect sizes for general impairment, when

taken by category of treatment were .46 and 1.40. Not all categories utilized general impairment measures. The categories that did utilize general impairment measures were CT and Neurofeedback.

Table 6 lists the overall effect sizes that were obtained for each study. It lists the global effect size for the study as well as the effect sizes for each general type of measure used by the studies. This shows that each study can have either one overall effect size or multiple effect sizes depending on how the information is utilized.

Table 6 shows the studies grouped together by category of treatment utilized, i.e., Cognitive, Psychosocial, etc. This table lists specifically which studies fell into which categories of treatment. Cognitive Treatment had four studies. These studies were by Safren et al. (2004), Hesslinger et al. (2002), Wilens et al. (1999), and Stevenson, et al. (2002). Psychosocial Treatment had one study included in this category. This study was by Stevenson, et al. (2003). Group Treatment had only one study included in this category which was by Wiggins, et al. (1999). Neurofeedback Treatment also had one study for this category of treatment. It was by Tinius and Tinius (2000).

Each of the studies can be counted as a single variable, by averaging each study's effect sizes into a single effect size. Conversely, each study can have multiple variables by counting each effect size from each study as a variable. Each method of calculation was completed and is reviewed here. This section will focus on the global effect size for each study, so that each study can be viewed as a single variable as well as looking at each study having multiple variables. The only variable (effect size) that will be addressed here aside from the global effect size is the ADHD effect sizes that were calculated for each study. This is due to the fact that the majority of the studies had

TABLE VI

OVERALL AND INDIVIDUAL MEASURES EFFECT SIZES (Δ) BY STUDY

Category	Overall Δ	ADHD Δ	Depr. Δ	Gen. Imp. Δ	Other Δ
Cognitive					
(Safren et al., 2004)	.71	.72	.67	.73	.75 (Anx)
(Hesslinger et al., 2002)	.59	.90	.41	.52	N/A
(Wilens et al., 1999)	.90	.91	.78	1.26	.77 (Anx)
(Stevenson, et al., 2002)	1.07	1.65	.90	N/A	.58 (Anger)
Psychosocial					
(Stevenson, et al., 2003)	1.07	1.65	.90	N/A	.58 (Anger)
Psychoeducational					
(Wiggins, et al., 1999)	1.25	1.19	1.33	N/A	N/A
Neurofeedback					
(Tinius & Tinius, 2000)	.75	.83	N/A	1.40	.26 (WCST)
Global Average	.91	1.12	.83*	.98**	N/A***

*This score is inclusive of studies 1-6 only as study 7 did not have any depressive measures reported.

**This score is inclusive of studies 1, 2, 3, and 7 only, as studies 4, 5, and 6 did not have any general impairment measures reported.

***No global average was calculated here as there were too many different measures utilized.

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different types of variables they studied, so that discussion of them is better suited for Chapter Five as they bring a more qualitative component to the study as opposed to a purely quantitative component. Still, they are listed as variables grouped together in Table 6 and also each measure is listed individually in Appendix C.

The Cognitive Treatment studies will be discussed first. Safren et al. (2004) had a global effect size of .71 for the study. This means that all the effect sizes of measuresutilized by Safren et al. averaged together to an effect size of .71, which is a medium effect (Cohen, 1988). The various measures utilized by Safren et al. were next separated to determine effect sizes for each type of measure. Table 6 lists all the measures effect sizes by category of measures. However, special attention is called to the ADHD measures. This study's ADHD measures had an overall effect size of .72, a medium effect (Cohen). All of the ADHD measures utilized by Safren et al. were averaged together to create an effect size for this type of measure. This was the weakest of all ADHD measures effect sizes for all studies in the meta-analysis. The remainder of the effect sizes calculated for this study, as well as the other seven studies, are listed in Appendix C. They will be discussed further in chapter five as they contribute a qualitative component to the meta-analysis as opposed to a purely quantitative component as the meta-analysis originally was designed to only assess the effectiveness of ADHD measures.

The second Cognitive Treatment study was by Hesslinger et al. (2002). This study had a global effect size of .59, a medium effect size (Cohen, 1988). This was the weakest global effect size by an individual study. It did, however, have a large effect size (.90) for the ADHD measure utilized by the study. It should be noted that this study was the only study to have only one ADHD measure utilized. Every other study had a minimum of two ADHD measures averaged together to create an overall ADHD effect size.

Wilens et al. (1999) will be the third Cognitive study discussed. It had a global effect size for their study of .90, a large effect (Cohen, 1988). This means that all the effect sizes of measures utilized by Wilens et al. averaged together to an effect size of .90. Next, all of the ADHD measures utilized by Wilens et al. were averaged together to create an effect size for this type of measure. The overall ADHD effect size for this study was .91, again a large effect as defined by Cohen.

The fourth Cognitive Treatment study was by Stevenson, et al. (2002). This study had a global effect size for the study of 1.07, a large effect (Cohen, 1988). Again, when all effect sizes of measures utilized by Stevenson et al. (2002) were averaged together, the total effect size was 1.07. The ADHD measures effect size for Stevenson et al. (2002) was 1.65, a large effect (Cohen). This effect size was the largest effect size for the Cognitive Treatment studies or any of the studies ADHD measures. It was the exact same effect size obtained on ADHD measures as the study by Stevenson, et al. (2003).

Psychosocial Treatment will be discussed next. It had only one study that met criteria for entry into the category of treatment. This may artificially inflate the effect sizes for the category of treatment, as this one study constitutes the entire category of

treatment. The study that was in this category was conducted by Stevenson, et al. (2003). It had the same global effect size as Stevenson et al. (2002) of 1.07. As previously stated, all of the effect sizes of measures utilized by Stevenson et al. (2003) were averaged together and a total effect size of 1.07 was obtained. This is a large effect (Cohen, 1988). The ADHD measures effect size for Stevenson et al. (2003) was 1.65, a large effect (Cohen). It was the exact same effect size obtained on ADHD measures as the study by Stevenson, et al. (2002). Both studies utilized the same measures for their studies. The studies were by the same authors, although Stevenson (2002) had two additional authors to Stevenson (2003).

Psychoeducational Treatment also had two studies initially identified as meeting criteria for entry into this category. However, one of the studies was not a usable study for the meta-analysis which left only Wiggins, et al. (1999) study as a viable study for this category. As this one study constitutes the entire category, this may artificially inflate the effect sizes for the category of treatment. Wiggins et al. study's global effect size was 1.25, a large effect (Cohen, 1988). When all of the ADHD measures utilized by Wiggins et al. were averaged together to create an effect size for this type of measure, it was 1.19, a large effect (Cohen). It had the second largest global and ADHD measures effect sizes of all studies.

Neurofeedback Treatment is the final category of treatment. It had one study included in this category. It was by Tinius and Tinius (2000). This study had a global effect size of .75, a medium effect (Cohen, 1988). Again, this means that all the effect sizes of measures utilized by Tinius and Tinius averaged together for an effect size of .75.

Tinius and Tinius ADHD measures averaged together yielded an effect size of .83, another large effect (Cohen).

As can be seen from the above discussion, all global effect sizes for each study were in the medium to large range (Cohen, 1988). Also, all ADHD measures global effect sizes for each study were in the medium to large range (Cohen). The global average of all studies global effect sizes was .91, a large effect (Cohen). This indicates that the studies had an overall large effect (Cohen) when taken together as an overall form of psychologically-based treatment of adult ADHD. The global average of all studies ADHD measures global effect sizes was 1.12, again, a large effect (Cohen). This further indicates that the studies had an overall large effect (Cohen) when analyzing the effectiveness of psychologically-based treatments as a whole on ADHD symptomology.

By obtaining effect sizes for each category of treatment, the meta-analysis is able to identify which has the most potential for being an effective form of psychologically-based treatment of adult ADHD. This demonstrates which types of treatment had the largest effects. Also, this demonstrates where future directions of research may want to be targeted by looking at which category had the largest effects. This is potentially more productive than looking at each study individually to determine which was most effective.

There were five measures that a positive effect size indicated a positive effect of treatment. One measure was the VAS, or "visual analogue scale to measure the overall personal health status" (Hesslinger et al., 2002, p. 181). The second measure was the GAF or Global Assessment of Functioning (American Psychiatric Association, 1994, p.32). This scale is one that measures a persons overall level of functioning on a scale of

1 (worst) to 100 (best). Therefore, if a score increases it is indicative of positive change. This scale was utilized by Wilens et al. (1999) study. The third measure was utilized by Stevenson et al. (2002). It was a measure of self-esteem "where an increase in score denotes improvement" (Stevenson, 2002, p. 613). The fourth measure was utilized by Stevenson et al. (2003). It again was a measure of self-esteem "where an increase in score denotes improvement" (Stevenson, 2003, p. 97). The fifth measure was from Wiggins et al. (1999). It was a measure of self-confidence/self-esteem in which a positive effect size indicated a positive effect from treatment. This measure, however, produced a negative effect size which indicated the experimental condition did not have a positive effect on self-confidence/self-esteem.

There were additional types of measures that had effect sizes calculated. These types of measures were anxiety, anger, reaction time, number of errors, and Wisconsin Card Sort and are all listed in Appendix D. Anxiety measures were found on two studies, specifically Safren et al. (2005) and Wilens et al. (1999). Safren et al. was a CT study and Wilens et al. was also a CT study. The anxiety measures yielded similar effect sizes. Safren et al. had an effect size of .75 and Wilens et al. had an effect size of .77, both medium effects (Cohen, 1988).

Anger measures were found on two studies, specifically Stevenson et al. (2002) and Stevenson et al. (2003). These two studies utilized identical measures. They both utilized the State-Trait Anger Expression Inventory or STAXI (Stevenson, et al., 2002). Additionally, both studies had identical effect sizes on this measure of .58, a medium effect (Cohen, 1988). Tinius and Tinius (2000) utilized the Wisconsin Card Sort as an additional way to ascertain improvement in ADHD symptoms.

Issues within the Studies

There were numerous common issues noted through the review of the studies included in the analysis. The primary issue that is noted through the analysis is the paucity of studies available for review on this topic. This has led to difficulty ascertaining if one treatment category is actually more effective than any other category as the categories range in number of studies from one to four. This makes it difficult to state with any certainty that one type of psychologically-based treatment is superior to another.

The studies themselves had methodological issues as well. There was poor reporting on many of the identified variables of interest for this meta-analysis. For instance, ethnicity was only reported in one study. This makes it difficult to infer what ethnic groups may benefit from this treatment. Also, sexual orientation was not reported in any of the studies in the analysis.

A major issue was the small sample size of subjects in each study. The overall subject total for the seven studies was 195. Again, this leads to difficulty generalizing the results to any population. Another problem was that one of the studies had a problem with attrition of subjects (Hesslinger et al., 2002). The control group of this study lost four of the seven subjects. Several of the studies had more subjects who met criteria for inclucion but chose not to participate (Hesslinger et al., 2002; Stevenson, et al., 2002; Stevenson, et al., 2003). Had these studies had more participants then that would have increased the overall number of subjects in the analysis.

Another issue within the analysis is that the exclusion criteria were not consistent across studies. This led to some studies having subjects excluded on the bases that other

studies may not have. Five of the studies in the meta-analysis excluded on the basis of lowered IQ (Hesslinger et al., 2002; Safren et al., 2004; Stevenson, et al., 2002; Stevenson, et al., 2003; Wilens et al., 1999). Additionally, the studies did not all utilize the same type of control group. Wilens et al. (1999) did not have a control group, but a pre-post measure.

The majority of the studies did not have any long-term follow up. This lack of long-term follow-up was consistent across studies except for Stevenson, et al. (2002) which had a long-term follow-up of one year. This leads to difficulty inferring long-term success of the psychologically-based treatment over time.

The studies did not have control over medications utilized by participants in the studies. Some studies attempted to deal with this through randomization of subjects on medication to either the experimental or control groups. Other studies did not report on medication usage by subjects. This was a common component to the studies in that medication was not always controlled for. There were no studies that reported that the study was designed to have only subjects not on any medication for ADHD.

The studies all utilized different outcome measures, with the exception of Stevenson, et al. (2002; 2003). These two studies yielded identical effect sizes on all measures utilized in the study. Upon closer examination, the studies utilized identical measures. They were conducted by the same first author. Additionally, both studies had the same secondary authors; however Stevenson et al., (2002) had two additional secondary authors. It is unclear as to how the same scores were obtained on all of the measures as these were two distinct studies with distinct treatment protocols. Stevenson (2002) was a CT study and Stevenson (2003) was a psychosocial study. Both studies had

a different number of subjects as well. This is addressed as it is unusual to have two studies with the exact same scores on all measures which led to identical effect sizes.

Many of the studies utilized similar measures, but there were a variety of different measures utilized by the various studies authors. This led to this author having to group together similar measures for categories of measures overall effect sizes. It would be useful to have future studies utilize a common metric for determining what types of measures would be utilized to assess outcome.

CHAPTER V

CONCLUSION

The meta-analysis conducted here has introduced a compilation of the data on psychologically-based treatments of adult ADHD to this point. The data suggest that psychologically-based treatments are an overall effective form of treatment for adults. This conclusion is tentative due to the fact that there were only seven controlled studies of these types of treatments in the literature base. As previously discussed, medication has been the primary form of treatment for this disorder for adults, as well as children (Adler & Chua, 2002). This analysis is indicative of the need to continue with research in this area as it appears to be a viable form of treatment.

The results of the meta-analysis indicate that each category of psychologically-based treatment was effective in the treatment of adult ADHD. When reviewing the data obtained, it suggests that when breaking Cognitive Treatment down into Cognitive and Cognitive-Behavioral Treatment of adult ADHD, CBT is the least effective form. This is somewhat surprising as it intuitively seems that incorporating a component of behavior modification techniques would bring about better results. This form of treatment produced a medium effect size, which is still indicative of a form of treatment that holds promise in the treatment of this disorder.

The only category to not have a large effect size (Cohen, 1988) was Neurofeedback Treatment. The remainder of the categories of treatment all produced

large effect sizes in regard to each study's overall effect size. Cognitive Treatment had the weakest of all the large effect sizes. Psychosocial Treatment was slightly more effective than Cognitive Treatment. Psychoeducational Treatment had the largest effect size. All of these categories of treatment indicate promise for treatment of this disorder. This indicates that it is not a particular form of treatment that provides the most promise for adult ADHD. As there were so few studies per category, it is too early to state that one category is better than the others.

The overall effect size for psychologically-based treatments of adult ADHD was .97 when averaging together the overall effect sizes from each category of treatment. This is a large effect for psychologically-based treatments as a whole (Cohen, 1988). When looking only at the ADHD measures effect size, it increases to 1.18, again a large effect (Cohen). Overall, this indicates that not only do the specific forms of treatment hold promise in the treatment of adult ADHD, but the overall psychologically-based treatment appears to be effective.

Across the broad spectrum of treatments investigated here, this form of treatment does appear to work. It should be emphasized that this is a tentative conclusion about the effectiveness of psychologically-based treatments of adult ADHD. As this review indicates, the treatments have potential to be useful to clinicians working with adults with ADHD. This review indicates that the types of psychologically-based treatments that have been utilized by practicing clinicians may have merit and should be investigated further. This meta-analysis lends tentative credit to utilization of psychologically-based treatments as opposed to solely utilizing pharmacological approaches to the management of adult ADHD.

As some would argue that ADHD is a childhood disorder, there would be critics of an analysis of this nature. However, when the review of average ages of subjects in the studies included in the meta-analysis took place it was found to be in the mid-thirties, which indicates that many people are still suffering from ADHD symptoms well into adulthood. Therefore, a meta-analysis of this nature is prudent in that it has shown that many people who have "outgrown" the generally accepted age range of ADHD will seek treatment. Additionally, not only will people seek treatment, they are willing to try non-conventional forms of treatment. As this study indicates, the non-conventional forms of treatment (psychologically-based treatments) are potentially effective for this age of people.

An aspect of this meta-analysis that proved to be problematic was finding suitable studies to be included. The literature review was exhaustive of the behavioral sciences literature base, as previously discussed. This review of literature initially led to a total of 12 studies that appeared to meet criteria for inclusion in the meta-analysis. Upon closer review of all 12 studies, only seven actually met criteria for inclusion. The other five studies were removed from the analysis for a variety of reasons.

The first study removed from the analysis was by Newbern, Dansereau, Czuchry, and Simpson (2005) which was identified as a study to be included in the Cognitive Treatment category. Newbern et al. reviewed the use of node-link mapping in individual counseling. They were studying how this impacts drug abuse counseling and also clients with ADHD behaviors. According to the authors, "node-link maps are visual displays that can be used by the client and counselor to enhance communication, attention, and problem solving" (Newbern, Dansereau, Czuchry, and Simpson, p. 93). The authors

further state that node-link mapping is similar to cognitive theorists use of diagrams to aide in decision making or problem solving. They state that node-link mapping has had demonstrated success in working with drug abuse treatment. The reason for studying node-link mapping with drug abuse counseling is due to their statement that people with ADHD have a higher risk for substance abuse problems (Newbern, Dansereau, Czuchry, and Simpson, p. 96). This study did not meet criteria as it provided information on issues such as monthly attendance in counseling, session characteristics, and psychological status of subjects. These are all important variables, but it did not give information on whether the use of node-link mapping was a useful treatment strategy in the treatment of adult ADHD.

The next study removed from the analysis was by Wisniewski (2002). Wisniewski focused on peer-mediated interventions as a treatment for adult ADHD. Wisniewski's study focused on college students. This study focused on peer counseling, what type of students will self-select peer-mediated interventions, and what is peer counseling. This study utilized small group interactions as part of the intervention. According to Wisniewski, the primary contribution of the study was the theory of how peer-mediated interventions work for college students with ADHD. This study was removed from the analysis as it was a case study. It did not have a control group for comparison to the experimental subjects. This study was not a quantitative analysis which does not allow for calculation of effect sizes.

The third study removed from the analysis was conducted by Yahr (2001). This study was initially identified as one that would fall into a Group/Psychoeducational Treatment category. It focused on the use of the treatment to address ADHD symptoms

and problems they cause for couples. He designed an intervention for couples when only one of the couple has ADHD. The study was conducted due to the minimal amount of literature on treatment for adults with ADHD, especially when looking at treatment for couples when one of the partners has ADHD. Yahr created a treatment within a group context to address ADHD issues and how that affects the couple. He found that the empirical measure that had been chosen were inappropriate treatment gauges for studying ADHD in relationships. However, Yahr states that the subjects were able to learn to compensate for the ADHD behaviors and that they reported improvements in their relationships. He stated that the study was not a quantitative success, but a qualitative one. This would have been acceptable for the meta-analysis, however, the study that was originally designed to have multiple couples in the treatment group ended up being a case study, according to Yahr. Therefore, this study was not one that could be utilized within this meta-analysis.

The fourth study to be removed from the analysis was by Keller (2001). Keller evaluated neurofeedback on subjects with closed head injuries. The study was to see if those subjects could benefit from neurofeedback in regard to their attention deficits. Their study identified that the subjects who received the treatment improved significantly more than controls in tests of attention. Overall, Keller found that neurofeedback holds promise in treating individuals with attentional problems and traumatic brain injuries. This study was removed as the subjects were not diagnosed with adult ADHD.

The final study removed from the analysis was by Kaiser (1997). This study was initially identified to be a part of the Neurofeedback Treatment category. Kaiser's study was "to evaluate the efficacy of neurofeedback for ADHD adults seen in the clinical

practice of EEG Spectrum and its affiliated offices as measured by the Test of Variables of Attention" (p. 1). This is due to there having been numerous studies that investigated the impact of neurofeedback on children (Kaiser). He found that there was significant improvement on the variables studied of inattention, impulsivity, and variability of response time; however, there was no control group. According to Kaiser, it was not an actual publication, simply a summary of clinical work by a clinical network (D. A. Kaiser, personal communication, September 13, 2006), that was posted online. As there was no control group it could not have effect sizes calculated. Additionally, it was not published in a peer-reviewed journal.

Another aspect of this meta-analysis that was problematic was that not all studies reported the same data. The studies in the meta-analysis were identified to be a part of the analysis due to their primary focus on the psychologically-based treatment of adult ADHD. However, the studies did not all utilize identical measures to assess outcome of treatment of ADHD. Additionally, as the studies varied in type of psychologically-based treatment, there were additional measures utilized by the individual study authors. These measures ranged from those utilized to assess affect, anxiety, general impairment, and other measures the authors deemed necessary. This led to the calculation of effect sizes for these measures as well. As not all studies utilized the same type of measures, not all of the studies can be directly compared on the different types of measures.

Yet another aspect of this study to be dealt with was the possible effect of medication on the treatment groups. Five of the studies identified that at least some of the participants in the experimental group were on medication while receiving the experimental treatment. The problem this introduces is determining if the experimental

treatment would be as effective without the effects of medication in conjunction with the experimental treatment. It is important to note that four of the five studies that stated that some of the participants in the experimental group were taking medication also indicated that some of the participants in the experimental group were not taking medication. This does lend credibility to the experimental treatment being effective without medication. Three of the studies did not indicate if the participants, control or experimental, were taking medication. Taking into account that it is unknown exactly how many of the experimental subjects were on medication, it does further indicate the need for research into this area with subjects who are not taking medication while receiving the experimental treatment.

Limitations

There were numerous limitations to this study. The most glaring limitation was the small number of studies suitable for the meta-analysis. As already discussed this limits the ability to conclude with certainty that the effects of psychologically-based treatments are replicable and generalizable. Only having seven studies in the analysis is acceptable as discussed previously. This is due to other published meta-analyses having as few as six studies in their analysis. However, one would like to see more studies in an overall analysis of the literature. This being said, this analysis is a synthesis of the entire literature base of psychologically-based treatments of adult ADHD.

Another limitation to this study is an overall small sample size of total subjects in the meta-analysis. This is a direct reflection of the small number of studies in the meta-analysis. Due to the nature of the phenomenon under study, adult ADHD, there is going to be a smaller pool of subjects to choose from. This is due to many people having

learned to cope with the disorder (Johnston, 2002), believing it is not a real disorder (Mannuzza & Klein, 2000), or the belief that people grow out of the disorder (Murphy & Gordon, 1998). The total number of subjects was 195. Studies ranged in sample size from 15 subjects to 43 subjects. Larger subject groups per study would have been ideal. One would like to see more subjects in the analysis in order to have more ability to generalize the study to a wide range of people. Along that same line, the studies in the meta-analysis had only minimal numbers of ethnic minorities reported to be a part of their studies. In fact, only one study reported on minority participants. The remainder of the studies either did not report on this or reported only Caucasian participants. This makes it impossible to generalize with confidence the results of the meta-analysis to ethnic minorities.

The use of medicated subjects as controls is yet another limitation of the meta-analysis. This brings about questions of how well subjects would have responded to the experimental treatment without medication. Would the experimental condition have been as effective without subjects being previously stabilized on medication? It would be prudent to have future research that addresses this very issue. The fact that some of the experimental and control subjects did not have medication is useful in counteracting the argument that medication positively influenced the effects of the experimental condition. The study by Hesslinger et al. (2002) was "compromised by the high drop out rate and medication effects" (p. 179) for the control group. This led to difficulty in comparison of the experimental group with the control group.

A limitation of the studies was that not all studies utilized the same measures. This is understandable in that not all authors will utilize the same measures for a variety

of reasons. However, this does lead to some difficulty generalizing the results as some studies utilized more measures than others. Some studies utilized more measures to assess ADHD symptomology. Additionally, not all studies utilized the same types of measures, such as affect measures, anxiety measures, or general impairment measures.

Another limitation is exclusion of adults with lower IQ. This indicates that this form of treatment is not something that could be utilized with subjects with lower IQs. As five of seven studies excluded subjects on the basis of IQ, it appears that the results of this analysis are not generalizable to subjects with below average IQs.

Having two of the treatment categories only have one study in each category was another limitation. This causes each of those studies to have unequal weight when comparing categories. One category had two studies and the other had four studies. Therefore, each of the studies were not weighted equally. It would be useful to have more than one study in each category to prevent unequal weighting with the entire category being comprised of one study.

A final limitation was the unusual occurrence of two studies having identical outcome data on their measures. The studies were conducted by the same first author and utilized identical measures. The two studies were by Stevenson et al. (2002; 2003). The two studies utilizing the same measures is ideal, however the fact that the two studies had completely identical outcomes on these measures is at best unusual. Having similar outcome data would indicate that the treatments were equally effective. Having the same outcome data, including means and standard deviations, indicates that the treatments were equally effective, but raises concerns about the data itself. As these two studies

were separate publications in peer reviewed journals, it can only be assumed that the fact that the data is identical is by mere chance.

Implications for Future Research

The data obtained by this meta-analysis indicate promise for psychologically-based treatments of adult ADHD. The fact that there were only seven studies that focused on psychologically-based treatment of adult ADHD indicates the need for future research in this area. Additionally, the fact that there were only seven studies in the total base of literature shows that this has been a grossly neglected area of study. These seven studies comprise the entire literature base. Initially, it was thought that there would be 12 studies, but upon closer inspection, these studies were case-studies, not controlled studies, or focused on research that was not applicable. One of the four studies excluded was a controlled study, but it did not provide information on treatment gains and reduction of ADHD symptoms. The other controlled study did not utilize subjects diagnosed with adult ADHD. Therefore, studies were not excluded on any basis other than not being a controlled design focused on psychologically-based treatments of adult ADHD. More controlled studies on this topic of research are simply needed to increase the ability to state that this type of treatment truly is effective.

Additionally, future studies should have larger subject pools to increase the power of the studies. The largest N of the studies was 43. This is a relatively small subject pool. It would be ideal to have studies of 300 or larger to have sufficient power to infer causality of the experimental treatment. If enough studies of this magnitude are conducted, then another meta-analytic study of this type should be completed to summarize the findings of all of the research to date on this subject.

The future research needs to focus on controlled studies of the effectiveness of psychologically-based treatments of adult ADHD. This should be done through the use of non-medicated control and non-medicated experimental treatment subjects. This would allow for direct comparison of these two groups without any confounding effects of medications. This may be difficult to accomplish, however, the benefits obtained from this type of research would be worth the difficulty of completing such a study. Additionally, a comparison of the various categories of psychologically-based treatments identified in this meta-analysis could be conducted.

Another direction future research could take is a direct comparison of psychologically-based treatment to medication alone. Also, a comparison of the additive properties of medication with the psychologically-based treatment to medication alone. These types of comparisons would yield information as to the effectiveness of the psychologically-based treatments compared to the effectiveness of medication based treatments and the additive properties of medication. This type of research would allow some inferences as to whether psychologically-based treatment alone is as effective or more effective than medication, or if medication plus psychologically-based treatments is the ideal. There could be a comparison of all the three groups (medication alone, psychologically-based treatment, and medication added to psychologically-based treatment) to see which type of treatment is most effective. The research could also compare the psychologically-based treatments to the various classes of medication treatment such as stimulants or antidepressants.

Research that focuses on the psychologically-based treatments of childhood ADHD is another recommended area. This meta-analysis has indicated promise in the

treatment of adults with these practices; therefore, modifying this line of research to be used with children would be useful. As ADHD research has historically focused on children, then translated to adults, careful consideration will need to be paid to not simply utilizing treatments that may be effective with adults on children. The use of effective psychologically-based treatments of ADHD with children could lead to a reduction in the amount of children currently receiving medication as treatment for ADHD.

Another area of future research is to be inclusive of lowered IQ ranges for adults. Five of the seven studies in the meta-analysis excluded subjects on the basis of lowered IQ, four of five specifically excluded on the basis of mental retardation. Some of the insight-oriented treatments may be difficult to utilize for mentally retarded populations, however, all psychologically-based treatments should not be ruled out. The treatments could potentially be modified for mentally retarded populations. Additionally, one of the studies excluded subjects with an IQ lower than 90. As an IQ of 90 is still in the average range of 85 to 115 of which 68% of the population IQ scores fall (Feldman, 2005), future research should not exclude subjects with IQ scores in the low average range as that excludes a large proportion of the population.

Conclusions and Implications

Is adult ADHD a real disorder? That is a question that many researchers have been trying to answer definitively for a long time. As previously stated, some researchers state that adult ADHD is not a valid diagnosis where others state that it is (Faraone, 2004). It appears that ADHD is a real disorder by the volume of research that has been conducted and had concluded as such. Further, ADHD is a real disorder for adults. The arguments over whether or not it is a real disorder in childhood seem to be fewer and

further between. This is not always the case for adulthood ADHD. There is much research that documents the validity of the disorder and that it simply does not end after adolescence (Faraone; Jadad et al., 1999; Spencer et al., 2002; Zametkin & Borcherding, 1989). This past research, as well as the results of the meta-analysis completed here, all indicate that this is a real disorder. The results from the individual studies reported positive treatment gains overall, which is indicative of adult ADHD being a real disorder that responded positively to psychologically-based treatment.

The research summarized by this meta-analysis indicates that psychologically-based treatments of adult ADHD are potentially effective. This is quite promising in terms of the overall picture in the treatment of adult ADHD. As most ADHD adults who receive treatment for the disorder generally receive some type of medication based treatment for the disorder, this could provide another modality of treatment. This could mean a reduction in the number of individuals receiving medication for this disorder. If these types of treatments are eventually found to be effective enough, it could lead to a paradigm shift in the treatment of ADHD in adults as well as children.

The overall large effect size of the meta-analysis indicates that there is promise in future research on this type of treatment. It should not be mistaken that the large effect size on the meta-analysis of seven studies is fact that psychologically-based treatments are superior to medication. However, it should be taken seriously enough to stimulate further research on this topic. The fact that all seven studies had medium to large effect sizes indicates promise for each type of psychologically-based treatment and that the mental health field should not ignore the potential benefits of these treatments. Additionally, each category of psychologically-based treatment had medium to large

effect sizes. This indicates that each overall type of psychologically-based treatment should not be ignored by the mental health field.

Overall, this analysis has provided evidence that there is more than one potentially effective form of treatment for adult ADHD. This analysis has shown that psychologically-based treatments have the potential to be an effective form of treatment. Although this type of analysis puts medication and psychologically-based treatments in apparent competition with each other to show which is more effective, that should not be the message taken from this analysis. What may be found with future research is that a combination of the two types of treatment is the most effective, as with Safren et al. (2005). This study demonstrated, for instance, that CBT plus continued psychopharmacology was superior to psychopharmacology alone. This may become the standard of treatment. However, for those individuals wishing to not take medication, the psychologically-based treatments appear to offer a viable alternative to the traditional form of medical treatment of this disorder. Hopefully, the results of this meta-analysis demonstrate the overall usefulness of an analysis of this nature. An integration of the research findings to date such as this could lead to further research and discussion on this particular topic. As this topic has received much attention through popular media as well as scientific literature, this study demonstrates that there is potential utility in psychologically-based treatments of ADHD. It also demonstrates the need to further this line of research to have more confidence in the findings of psychologically-based treatments of adult ADHD being useful alternatives to medication.

Although this meta-analysis indicates promise in the use of psychologically-based treatments for adult ADHD, it is still early to make gross generalizations that these types

of treatments are superior to medication based treatments. Also, it is early to identify which category of psychologically-based treatment is superior. When comparing the categories one could make the mistake of assuming that psychosocial treatment and psychoeducational treatment are better treatments than cognitive treatment or neurofeedback treatment based on the larger effect sizes. One has to keep in mind that psychosocial treatment and psychoeducational treatment only had one study in each of the categories whereas cognitive treatment had four studies (neurofeedback treatment had only one study). After replication of the studies in this meta-analysis has been completed and additional controlled studies of psychologically-based treatments have been conducted and published, we may then be in a better place to ascertain the true effectiveness of psychologically-based treatments.

The results of this meta-analysis, again, can be misleading as there are medium to large effect sizes reported. It must be kept in mind that there were only seven studies included in the meta-analysis. However, these seven studies represent the literature base of psychologically-based treatments of adult ADHD. There may be critics of reporting the results of such a small number of studies in this type of meta-analysis, however, there is no set criteria for number of studies to be included in a meta-analysis, just that it be exhaustive of the literature base. This study is exhaustive of the current literature base. Additionally, there have been other studies with less than what might be considered "optimal" numbers of studies for inclusion. As previously discussed, de Rossi et al. (2001) had seven studies in their meta-analysis; Perskalla et al. (2004) had nine studies; and others had fewer than 15 (see Chapter 2 for further review of this). This is discussed again to demonstrate that although there are relatively few studies published on this topic

that could be synthesized for this meta-analysis, it is still information that should be taken into consideration and not discarded due to the relatively small number of studies.

REFERENCES

Adler, L. A., & Chua, H. C. (2002). Management of ADHD in adults. *Journal of Clinical Psychiatry, 63(supplement 12),* 29-35.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.

American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.

American Psychiatric Association. (1968). *Diagnostic and statistical manual of mental disorders* (2nd ed.). Washington, DC: Author.

Barabasz, A. & Barabasz, M. (1995). Attention deficit hyperactivity disorder: neurological basis and treatment alternatives. *Journal of Neurotherapy, 1(1),* 1-10.

Barkley, R. A. (1998). *Attention-deficit hyperactivity disorder a handbook for diagnosis and treatment* (2nd ed.). New York: Guilford Press.

Barkley, R. A. (2002). Major life activity and health outcomes associated with attention-deficit/hyperactivity disorder. *Journal of Clinical Psychiatry, 63(supp 12),* 10-15.

Biederman, J. (2005). Attention-deficit/hyperactivity disorder: a selective overview. *Biological Psychiatry, 57(11),* 1215-1220.

Bowman, J. C. (2003). Non-traditional modes of treatment for attention deficit/hyperactivity disorder: A critical review. *ProQuest Disserations and Theses* (AAT No. 3078512).

Butnik, S. M. (2005). Neurofeedback in adolescents and adults with attention deficit hyperactivity disorder. *Journal of Clinical Psychology, 61(5),* 621-625.

Chambless, D. L., & Ollendick, T. H. (2001). Empirically supported psychological interventions: controversies and evidence. *Annual Review of Psychology, 52,* 685-716.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* (2nd ed.). New York: Academic Press.

Crenshaw, T. M. (1997). Attention deficit hyperactivity disorder and the efficacy of stimulant medication: A meta-analysis. *ProQuest Disserations and Theses* (AAT No. 9724663).

de Rossi, M., Donda, P., & Bellantuono, C. (2001). Efficacy and safety of olanzapine: A critical review of the international literature. *Rivista di Psichiatria, 36(4),* 183-203.

DuPaul, G. J., Barkley, R. A., & Connor, D. F. (1998). Stimulants. In R. A. Barkley (Ed.), *Attention-deficit hyperactivity disorder a handbook for diagnosis and treatment* (2nd ed.) (pp. 510-551). New York: Guilford Press.

Epstein, L. H., & Wing, R. R. (1980). Aerobic exercise and weight. *Addictive Behaviors, 5,* 371-388.

Erk, R. R. (1997). Multidimensional treatment of attention deficit disorder: a family oriented approach. *Journal of Mental Health Counseling, 19(1),* 3-22.

Faraone, S. V. (2004). Special issue: Adult Attention-Deficit/Hyperactivity Disorder. *Primary Psychiatry, 11(7),* 28-34.

Feldman, R. S. (2005). *Understanding psychology.* (7th ed.) New York: McGraw Hill.

Glass, G. V. (1976). Primary, secondary, and meta-analysis of research. *Educational Researcher, 5,* 3-8.

Glass, G. V. (1977). Integrating findings. In L. Shulman (Ed.), *Review of Research in Education* (pp. 351-379).

Glass, G. V., McGaw, B., & Smith, M. L. (1981). *Meta-analysis in social research.* California: Sage.

Goode, V. (2001). A meta-analysis of the relationship between parenting attributes and disruptive behavior in children with ADHD. *ProQuest Disserations and Theses* (AAT No. 3040651).

Hedges, L. V. (1987). Issues in meta-analysis. *Review of Research in Education, 13,* 353-398.

Hesslinger, B., Tebartz van Elst, L., Mochan, F., & Ebert D. (2003). A psychopathological study into the relationship between attention deficit hyperactivity disorder in adult patients and recurrent brief depression. *Acta Psychiatrica Scandinavica, 107(5),* 385-389.

*Hesslinger, B., Tebartz van Elst, L., Nyberg, E., Dykierek, P., Richter, H., Berner, M.,

& Ebert D. (2002). Psychotherapy of attention deficit hyperactivity disorder in adults. A pilot study using a structured skills training program. *European Archives of Psychiatry and Clinical Neuroscience, 252(4),* 177-184.

Higgins, E. S. (1999). A comparative analysis of antidepressants and stimulants for the treatment of adults with attention-deficit hyperactivity disorder. *The Journal of Family Practice, 48(1),* 15-20.

Hill, J. C., & Schoener, E. P. (1996). Age-dependent decline of attention-deficit hyperactivity disorder. *American Journal of Psychiatry, 153(9),* 1143-1146.

Jadad, A. R., Booker, L., Gauld, M., Kakuma, R., Boyle, M., Cunningham, C. E., et al. (1999). The treatment of attention-deficit hyperactivity disorder: an annotated bibliography and critical appraisal of published systematic reviews and metaanalyses. *Canadian Journal of Psychiatry, 44(10),* 1025-1035.

Javorsky, J., & Gussin, B. (1994). College students with attention deficit hyperactivity disorder: an overview and description of services. *Journal of College and Student Development, 35,* 170-177.

Johnston, C. (2002). The impact of attention deficit hyperactivity disorder on social and vocational functioning in adults. In Jensen, P.S., & Cooper, J. R. (Eds.), *Attention Deficit Hyperactivity Disorder State of the Science Best Practices* (pp. 6-1 to 6-21), Kingston: Civic Research Institute, Inc.

Kaiser, D. A. (1997). Efficacy of Neurofeedback on adults with attentional deficit and related disorders. *EEG Spectrum, Inc., (December),* 1-3.

Kavale, K. A., & Glass, G. V. (1981). Meta-analysis and the integration of research in special education. *Journal of Learning Disabilities, 14(9),* 531-538.

Keller, I. (2001). Neurofeedback therapy of attention deficits in patients with traumatic brain injury. *Journal of Neurotherapy, 5(1-2),* 19-32.

Locke, S. L., Eiden, T., Ray, K. P., & Boswell, D. L. (unpublished manuscript). Meta-analysis of ADHD treatment. Cognitive/behavioral, behavioral, family intervention, multimodal. *Oklahoma State University.*

Lubar, J. F. (1991). Discourse on the development of EEG diagnostics and biofeedback for attention-deficit/hyperactivity disorders. *Biofeedback and Self-Regulation, 16(3),* 201-225.

Mannuzza, S., Klein, R. G., Bessler, A., Malloy, P., & LaPadula, M. (1998). Adult psychiatric status of hyperactive boys grown up. *American Journal of Psychiatry, 155(4),* 493-498.

Mannuzza, S., & Klein, R. G. (2000). Long-term prognosis in attention-deficit/hyperactivity disorder. *Child and Adolescent Psychiatric Clinics of North America, 9(3),* 711-726.

Miller, B., & Cafasso, L. (1992). Gender differences in caregiving: Fact or artifact? *Gerontologist, 32(4),* 498-507.

Murphy, K. R. (1998). Psychological counseling of adults with ADHD. In R. A. Barkley (Ed.), *Attention-deficit hyperactivity disorder a handbook for diagnosis and treatment* (2nd ed.) (pp. 582-591). New York: Guilford Press.

Newbern, D., Dansereau, D. F., Czuchry, M., & Simpson, D. (2005). Node-link mapping in individual counseling: treatment impact on clients with ADHD-related behaviors. *Journal of Psychoactive Drugs, 37(1),* 93-103.

Perskalla, C. D., Lee, M. E., Stein, T. V., Anderson, D. H., & Nickerson, R. (2004).

Understanding relationships among recreation opportunities: A meta-analysis of nine studies. *Leisure Sciences, 26(2),* 163-180.

Preece, P. F. W. (1987). Class size and learning: A theoretical model. *Journal of Educational Research, 80(6),* 377-379.

Ramsay, J. R. (2002). A cognitive therapy approach for treating chronic procrastination and avoidance: behavioral activation interventions. *Journal of Group Psychotherapy, Psychodrama, & Sociometry, SummerFall,* 79-92.

Rasey, H. W., Lubar, J. F., McIntyre, A., Zoffuto, A. C., & Abbott, P. L. (1996). EEG biofeedback for the enhancement of attentional processing in normal college students. *Journal of Neurotherapy, 3(Winter),* 1-7.

Reisner, A. D. (2005). The common factors, empirically validated treatments, and recovery models of therapeutic change. *The Psychological Record, 55,* 377-399.

Resnick, R. J. (2005). Attention deficit hyperactivity disorder in teens and adults: they don't all outgrow it. *Journal of Clinical Psychology, 61(5),* 529-533.

*Safren, S. A., Otto, M. W., Sprich, S., Winett, C. L., Wilens, T. E., & Biederman, J. (2005). Cognitive-behavioral therapy for ADHD in medication-treated adults with continued symptoms. *Behaviour Research and Therapy, 43,* 831-842.

Sanchez Meca, J., Olivares Rodriguez, J., & Alcazar, A. I. R. (1998). Meta-analysis of behavioral interventions in the treatment of diabetes in spain. *Revista de Psicologia General y Aplicada, 51(3-4),* 501-516.

Schwiebert, V. L., Sealander, K. A., & Dennison, J. L. (2002). Strategies for counselors working with high school students with attention-deficit/hyperactivity disorder. *Journal of Counseling and Development, 80(winter),* 3-10.

Sneed, M. M. (1995). A meta-analytic study of the effectiveness of treating ADHD children with medication. *Unpublished Dissertation, Oklahoma State University.*

Spencer, T. J. (2002). Attention-Deficit/Hyperactivity Disorder. *Archives of Neurology, 59(2),* 314-316.

Spencer, T. J., Biederman, J., Wilens, T. E., & Faraone, S. V. (2002). Overview and neurobiology of attention-deficit/hyperactivity disorder. *Journal of Clinical Psychiatry, 63(supp 12),* 3-9.

*Stevenson, C. S., Stevenson, R. J., & Whitmont, S. (2003). A self-directed psychosocial intervention with minimal therapist contact for adults with attention deficit hyperactivity disorder. *Clinical Psychology and Psychotherapy, 10,* 93-101.

*Stevenson, C. S., Whitmont, S., Bornholt, L., Livesey, D., & Stevenson, R. J. (2002). A cognitive remediation programme for adults with attention deficit hyperactivity disorder. *Australian and New Zealand Journal of Psychiatry, 36,* 610-616.

Swanson, J., Castellanos, F. X., Murias, M., LaHoste, G., Kennedy, J. (1998). Cognitive neuroscience of attention deficit hyperactivity disorder and hyperkinetic disorder. *Current Opinion in Neurobiology, 8(2),* 263-271.

*Tinius, T. P., & Tinius, K. A. (2000). Changes after EEG biofeedback and cognitive retraining in adults with mild traumatic brain injury and attention deficit hyperactivity disorder. *Journal of Neurotherapy, 4(2),* 27-44.

Vanvoorhis, R. W. (2003). Job satisfaction among school psychologists: A meta-analysis. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 64(6-A),* AAI No. 3094888.

Weiss, G. (1979). Hyperactives as young adults: a controlled prospective ten-year follow-

up of 75 children. *Archives of General Psychiatry, 36(6),* 675-681.

Weiss, G., & Hechtman, L. T. (1993). *Hyperactive Children Grown Up* (2nd ed.). New York: Guilford Press.

Weiss, M., & Murray, C. (2003). Assessment and management of attention-deficit hyperactivity disorder in adults. *Canadian Medical Association Journal, 168(6),* 715-722.

*Wiggins, D., Singh, K., Getz, H. G., & Hutchins, D. E. (1999). Effects of brief group intervention for adults with attention deficit/hyperactivity disorder. *Journal of Mental Health Counseling, 21(1),* 82-92.

Wilens, T. E., Biederman, J., Spencer, T. J. (2002). Attention deficit/hyperactivity disorder across the lifespan. *Annual Review of Medicine, 53,* 113-131.

*Wilens, T. E., McDermott, S. P., Biederman, J., Abrantes, A., Hahesy, A., & Spencer, T. J. (1999). Cognitive Therapy in the treatment of adults with ADHD: a systematic chart review of 26 cases. *Journal of Cognitive Psychotherapy: An International Quarterly, 13(3),* 215-226.

Wood, D. R., Reimherr, F. W., Wender, P. H., & Johnson, G. E. (1976). Diagnosis and treatment of minimal brain dysfunction in adults: A preliminary report. *Archives of General Psychiatry, 33(12),* 1453-1460.

Yahr, G. W. (2001). Attention deficit hyperactivity disorder and couples treatment: An intervention program for couples when one of the partners has been diagnosed with attention deficit hyperactivity disorder. *ProQuest Disserations and Theses* (AAT No. 3022992).

Young, S. (2000). ADHD children grown up: an empirical review. *Counselling*

Psychology Quarterly, 13(2), 191-200.

Zametkin, A. J., & Borcherding, B. G. (1989). The neuropharmacology of attention-deficit hyperactivity disorder. *Annual Review of Medicine 40,* 447-451.

Zimbardo, P. G., Weber, A. L., & Johnson, R. L. (2003). *Psychology core concepts.* (4th ed.) New York: Allyn and Bacon.

*Note: Asterisk indicates the studies that were used in the meta-analysis.

APPENDICES

APPENDIX A

APPENDIX A

COMPLETE CITATION FOR EACH STUDY INCLUDED IN THE META-ANALYSIS

Hesslinger, B., Tebartz van Elst, L., Nyberg, E., Dykierek, P., Richter, H., Berner, M., & Ebert D. (2002). Psychotherapy of attention deficit hyperactivity disorder in adults. A pilot study using a structured skills training program. *European Archives of Psychiatry and Clinical Neuroscience, 252(4),* 177-184.

Safren, S. A., Otto, M. W., Sprich, S., Winett, C. L., Wilens, T. E., & Biederman, J. (2005). Cognitive-behavioral therapy for ADHD in medication-treated adults with continued symptoms. *Behaviour Research and Therapy, 43,* 831-842.

Stevenson, C. S., Stevenson, R. J., & Whitmont, S. (2003). A self-directed psychosocial intervention with minimal therapist contact for adults with attention deficit hyperactivity disorder. *Clinical Psychology and Psychotherapy, 10,* 93-101.

Stevenson, C. S., Whitmont, S., Bornholt, L., Livesey, D., & Stevenson, R. J. (2002). A cognitive remediation programme for adults with attention deficit hyperactivity disorder. *Australian and New Zealand Journal of Psychiatry, 36,* 610-616.

Tinius, T. P., & Tinius, K. A. (2000). Changes after EEG biofeedback and cognitive retraining in adults with mild traumatic brain injury and attention deficit hyperactivity disorder. *Journal of Neurotherapy, 4(2),* 27-44.

Wiggins, D., Singh, K., Getz, H. G., & Hutchins, D. E. (1999). Effects of brief group intervention for adults with attention deficit/hyperactivity disorder. *Journal of Mental Health Counseling, 21(1),* 82-92.

Wilens, T. E., McDermott, S. P., Biederman, J., Abrantes, A., Hahesy, A., & Spencer,

T. J. (1999). Cognitive Therapy in the treatment of adults with ADHD: a systematic chart review of 26 cases. *Journal of Cognitive Psychotherapy: An International Quarterly, 13(3),* 215-226.

APPENDIX B

APPENDIX B

CODING SHEET

Study ID #:_____ Publication Date:_____

Sample Size:_____ Length of Treatment (in weeks):_____

Mean Age of Treatment Subjects:_____ Gender of Subjects:____Male _____Female

Co-morbid Disorders:_____Yes _____No Co-morbid Disorders Treated:_____

_____

Type of Treatment:

	Cognitive	Cognitive-Behavioral	Psycho-social	Psycho educa-tional	Peer-Mediated	Neurofeedback/ Biofeedback
N						
Race						
Gender						
Ethnicity						
Sexual Orientation						
Diagnoses						
Length of Treatment						
Type of Control Group (Medica-tion or Waiting List)						
Taking Medication						
Type of Medication						

Mean Score Experi-mental Group on Outcome Measure						
Mean Score Control Group on Outcome Measure						
SD of Control Group						
Effect Size						

APPENDIX C

APPENDIX C

EFFECT SIZES FOR EACH MEASURE PRESENTED IN EACH STUDY

	Safren et al., 2005	Hesslinger et al., 2002	Wilens et al., 1999	Stevenson et al., 2002; 2003
ADHD symptom severity	.52			
ADHD current symptoms scale	.92			
Clinical Global Impression	.73			
Hamilton Depression	.71			
Hamilton Anxiety	.78			
Beck Depression	.62	.41	.69	
Beck Anxiety	.72			
ADHD-CL (checklist)		.90		
SCL (Symptom Checklist-16)		.46		
VAS (Visual Analogue Scale)		.58		
CGIS-ADHD (Clinical Global Impression of Severity)			.83	
CGII-ADHD (Clinical Global Impression of Improvement)			1.11	
CGIS-Depression (Clinical Global Impression of Severity)			.87	
CGIS-Anxiety (Clinical Global Impression of Severity)			.77	

GAF-Global Assessment of Functioning			1.26	
ADHD Symptom Checklist			.80	
ADHD Symptoms (DSM-3R ADHD Checklist				2.18
Organizational Skills (Adult Org. Scale)				1.11
Self-Esteem (Davidson & Lang SE Measure				.90
State Anger (STAXI)				.62
Trait Anger (STAXI)				.54
	Wiggins et al., 1999	Tinius & Tinius, 2000		
Self-Confidence/ Self-Esteem	1.23			
Hyperactivity	.67			
Interpersonal Difficulties	.93			
Disorganiza-tion	1.38			
Impulsivity	.78			
Emotional Lability	1.83			
Inattention	1.94			
Full Scale Attention Quotient		.83		
Auditory Attention Quotient		1.07		
Visual Attention Quotient		.42		

General Measure of Impairment		1.40		
Attention		1.0		
WCST # of Trials		0		
WCTS Perseverative Errors		.52		

APPENDIX D

APPENDIX D

EFFECT SIZES BY STUDY, CATEGORY OF TREATMENT, SIMILAR MEASURES WITHIN EACH CATEGORY OF TREATMENT, SIMILAR MEASURES ACROSS ALL STUDIES (AVERAGED BY STUDY AND INDIVIDUALLY ACROSS STUDIES), AND GLOBAL EFFECT SIZES AVERAGED BY STUDY AND INDIVIDUALLY ACROSS STUDIES

	Safren et al., 2005	Hesslinger et al., 2002	Wilens et al., 1999	Stevenson et al., 2002
Total average of individual ES	.91	.91	.91	.91
Total average of each study's overall ES	.91	.91	.91	.91
Total average. of each category overall ES	.97	.97	.97	.97
CT ES	.71	.59	.90	1.07
Psychosocial ES				
Psychoeduca-tional ES				
NFT ES				
ADHD measures	.72	.90	.91	1.65
ADHD measures CT	1.05	1.05	1.05	1.05
ADHD measures Psychosocial				
ADHD measures Psychoeduca-tional				
ADHD measures NFT				

ADHD measures across all studies average by study	1.12	1.12	1.12	1.12
ADHD measures across all studies avg. by individual measure	1.10	1.10	1.10	1.10
Depressive measures	.67	.41	.78	.90
Depressive measures CT	.69	.69	.69	.69
Depressive measures Psychosocial				
Depressive measures Psychoeduca-tional				
Depressive measures NFT				
Depressive measures across all studies avg. by study	.83	.83	.83	.83
Depressive measures across all studies avg. by individual measure	.90	.90	.90	.90
General Impairment measures	.73	.52	1.26	N/A
General Impairment measures CT	.84	.84	.84	N/A
General Impairment measures Psychosocial				

General Impairment measures Psychoeduca-tional				
General Impairment measures NFT				
General Impairment measures across all studies average by study	.98	.98	.98	N/A
General Impairment measures across all studies average by individual measure	.89	.89	.89	N/A
Anxiety measures	.75		.77	
Anger measures				.58
WCST measures				
	Stevenson et al., 2003	Wiggins et al., 1999	Tinius & Tinius, 2000	
Total average of individual ES	.91	.91	.91	
Total average of each study's overall ES	.91	.91	.91	
Total average of each category overall ES	.97	.97	.97	
CT ES				
Psychosocial ES	1.07			

Psychoeduca-tional ES		1.25		
NFT ES			.75	
ADHD measures	1.07	1.25	.75	
ADHD measures CT				
ADHD measures Psychosocial	1.65			
ADHD measures Psychoeduca-tional		1.19		
ADHD measures NFT			.83	
ADHD measures across all studies average by study	1.12	1.12	1.12	
ADHD measures across all studies average by individual measure	1.10	1.10	1.10	
Depressive measures	.90	1.33	N/A	
Depressive measures CT				
Depressive measures Psychosocial	.90			
Depressive measures Psychoeduca-tional		1.33		
Depressive measures NFT			N/A	
Depressive measures across all studies average by study	.83	.83	N/A	

Depressive measures across all studies average by individual measure	.90	.90	N/A	
General Impairment measures	N/A	N/A	1.40	
General Impairment measures CT				
General Impairment measures Psychosocial	N/A			
General Impairment measures Psychoeduca-tional		N/A		
General Impairment measures NFT			1.40	
General Impairment measures across all studies average by study	N/A	N/A	.98	
General Impairment measures across all studies average by individual measure	N/A	N/A	.89	
Anxiety measures				
Anger measures	.58			
WCST measures			.26	

VITA

Lee Allen Thrash

Candidate for the Degree of

Doctor of Philosophy

Thesis: A META-ANALYSIS OF PSYCHOLOGICALLY-BASED TREATMENTS OF ADULT ATTENTION-DEFICIT HYPERACTIVITY DISORDER

Major Field: Educational Psychology

Biographical:

Personal Data: Born in Knoxville, Tennessee, on May 17, 1972, the son of Jimmie and Suzy Thrash.

Education: Graduated from Edmond Memorial High School, Edmond, Oklahoma in May, 1990; received Bachelor of Arts degree in Psychology from the University of Oklahoma, Norman, Oklahoma in December, 1994; received Master of Education degree in Community Counseling from the University of Central Oklahoma, Edmond, Oklahoma in July, 1996. Completed the requirements for the Doctor of Philosophy degree with a major in Educational Psychology at Oklahoma State University in December, 2006.

Experience: Employed by various mental health agencies, 1996 to 1998; private practice counselor, 1998 to 2004; employed by the University of Oklahoma, Health Sciences Center as a counselor and intern from 2004 to present.

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Name: Lee Allen Thrash Date of Degree: December, 2006

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: A META-ANALYSIS OF PSYCHOLOGICALLY-BASED TREATMENTS OF ADULT ATTENTION-DEFICIT HYPERACTIVITY DISORDER

Pages in Study: 121 Candidate for the Degree of Doctor of Philosophy

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Scope and Method of Study: The purpose of this study was to ascertain if psychologically-based treatments of adult Attention-Deficit Hyperactivity Disorder (ADHD) were a potentially viable form of treatment for the disorder. This study was a meta-analysis of all the available empirical studies to date on this subject. Effect sizes were calculated to determine if this type of treatment is viable.

Findings and Conclusions: Four categories of psychologically-based treatment of adult ADHD were identified. These categories were: Cognitive Treatment, Psychosocial Treatment, Psychoeducational Treatment, and Neurofeedback Treatment. It was found that each overall category was potentially effective in the treatment of adult ADHD as three categories had large effect sizes and one category had a medium effect size (Cohen, 1988). The overall effect size of psychologically-based treatments was also large. The results must be interpreted cautiously as there were only seven studies that met inclusion criteria for the meta-analysis.

ADVISER'S APPROVAL: Donald L. Boswell, Ph.D.