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A TEACHERS'S GUIDE TO UNDERSTANDING
ATTENTION-DEFICIT/HYPERACTIVITY
DISORDER (ADHD)

by

Alaina L. Hollis

A Research Project Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Education

REGIS UNIVERSITY

April 24, 2006

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Chapter 1

INTRODUCTION

Over the past decade, cognitive and behavior problems, characterized by symptoms of inattention, impulsivity, and hyperactivity, have affected millions of children around the world. Collectively, these symptoms are referred to as Attention Deficit Hyperactivity Disorder (ADHD; [American Psychiatric Association, 1994), and it is the most commonly diagnosed psychiatric disorder (Barkley, 1990). The collective problems that define ADHD contribute to one of the most complex childhood disorders of this time (Goldstein & Goldstein, 1998). Typically, the symptoms of ADHD are exacerbated in school settings where high demands are placed on children. Because ADHD is so prevalent in academia, teachers need to fully understand the disorder (e.g., history, symptoms, diagnostic criteria, and treatment) in order to better serve the needs of their students in the classroom.

Statement of the Problem

Classroom teachers are one of the most valuable resources in regard to the diagnosis of ADHD because of their daily exposure to students where high demands are placed on students' regulatory skills and in an environment where the notable symptoms of the disorder are demonstrated. Also, teachers play an intricate role in the multidisciplinary team to treat ADHD (Sciutto et al., 2000, as cited in Barkley, 1990). Therefore, educators must avail themselves of the plethora of research information to

better understand the notable interactions of cognitive, psychological, and biological factors of AD(H)D to better assist parents and psychologists in the diagnosis and treatment of ADHD in the classroom setting.

Attention deficit hyperactivity disorder (ADHD) is one of the most widely researched psychiatric childhood disorders (APA, 1994). Attention deficit hyperactivity disorder affects the social, cognitive and emotional development of an estimated 5 million school aged children in the United States (Bowley, 1992; Walther, 1992). Attention deficit hyperactivity disorder (ADHD) and attention deficit disorder without hyperactivity (ADD) are biological disorders that affect the imbalance or deficiency of the neurotransmitters in the frontal lobe of the brain. Until recently, ADHD has gone unrecognized or misdiagnosed by public school educators. As a result, ADHD children were not treated in the primary grades and were more likely to suffer from the cumulative effects of: (a) low self-esteem, (b) inadequate social skills, (c) chronic school failure, (d) alcohol/drug abuse, and (e) suicide. Therefore, educators must take advantage of the plethora of research information with regard to ADHD as a disorder in order to understand the role that teachers can play in the identification, diagnosis and treatment of ADHD in the classroom.

Purpose of the Project

The purpose of this project will be to present educators with viable, usable, information with regard to the biological, cognitive, and psychological interactions of AD(H)D as well as the history, diagnosis, and treatment options available for educators to best serve the needs of their students. The information presented in this project will be distributed in the form of a PowerPoint to elementary school teachers.

Chapter Summary

In summary, ADHD is a biological disorder presumed to affect the imbalance or deficiency of the neurotransmitters in the frontal lobe of the brain (Bowley, 1992). Symptoms of ADHD affect the social, cognitive and emotional development of children and adolescents. Without diagnosis and or treatment of ADHD children are more likely to experience adverse outcomes such as: (a) low self-esteem, (b) inadequate social skills, (c) chronic school failure, and (d) substance abuse. For decades, ADHD has gone unrecognized and undiagnosed by public school educators. Because teachers play an intricate role in the diagnosis and treatment for children with ADHD, it is imperative that they avail themselves of the current scientific researched based information in regard to this popular and complex childhood psychiatric disorder.

In Chapter 2, the Review of Literature, the researcher will present background material to support these positions to make a case that teachers need to better educate themselves with regard to ADHD. Also, the history and background, causes, primary symptoms, diagnostic strategies, treatment, and the role of educators with regard to ADHD will be presented. In Chapter 3, Methods, the procedures to develop a PowerPoint presentation will be detailed in order to present the pertinent information to educators. Educators will attain a greater knowledge of the disorder in order to better serve the needs of their students.

Chapter 2

REVIEW OF LITERATURE

Imagine living in a world where sounds, images, and thoughts move at a perpetually shifting pace; where the mind is constantly on overload and distracted by unimportant sights and sounds that prevent a child from being able to focus on anything for an extended period of time (Neuwirth, n.d.). Imagine living in a world where it is difficult to: (a) follow through with tasks, (b) sit still, (c) socialize, or (d) be fully cognizant of the surrounding environment. For many children, this is what life is like if they have Attention Deficit Hyperactivity Disorder (ADHD). The problems and symptoms of ADHD are ever confusing and are exacerbated, typically, in the classroom setting where teachers play a vital role in the diagnosis and treatment process of their students with this disorder. Faced with the pressure from parents, schools and society, teachers struggle to find their appropriate role in the diagnosis and treatment of students with this complex disorder. The purpose of this project will be to present teachers with viable information in regard to the: (a) identification, (b) diagnosis, and (c) treatment of ADHD.

History and Background

According to the American Psychiatric Association (APA; 1994, as cited in Nicpon, & Kurpius, 2004), ADHD is the most commonly diagnosed, misunderstood, psychiatric disorder which affects approximately 3-7% of all children in the United

States. However, there is no clearly understood cause, definitive psychological deficit, and/or universal treatment for ADHD (Nicpon et al.). Barkley (1990), the most prominent researcher in the field of ADHD, noted that ADHD is the most recent diagnostic label for children who are characterized by significant impairments of attention, impulsivity, and over-activity. Barkley noted that, “Children with ADHD are a heterogeneous population who display considerable variation in the degree of their symptoms, the pervasiveness across situations of these problems, and the extent to which other disorders occur in association with it” (p. 3). Also, ADHD is one of the most prevalent childhood disorders in the U.S. The prevalence of this disorder results in one of the most common reasons why children are referred to mental health professionals. Grantham (1999) reported that approximately 30-50% of mental health referrals for children are for ADHD/ADD. The history of this disorder is prominent, and ADHD has received multiple labels throughout the years.

Origins of ADD/ADHD

1800-1960

According to Grantham (1999), the presence of ADHD can be traced back as early as the 1800s when the character, known as Fidgety Phil, was introduced in a series of popular stories by a German family doctor. However, Still and Myer are credited with the beginnings of diagnosis for ADHD in 1902. Still and Myer were the first to explore the concept of brain trauma and its correlations to unruly behavior. Yet, according to Barkley (1990), during 1900-1960, Still (1902, as cited in Barkley) and Tredgold (1902, as cited in Barkley) focused on the behavioral condition in children that is most closely

related to what is known as ADHD today. Still was the first person to note that the particular symptoms of the disorder were unnatural, relative to the behavior of normal children at a given age. Barkley stated that, “Still, following the theorizing of William James (1890), hypothesized that the deficits of inhibitory volition, moral control and sustained attention were causally related to each other and to the same underlying neurological deficiency” (p. 5).

The history of ADHD interest in North America began in 1917-1918 as a result of an encephalitis epidemic when clinicians treated a number of children who survived the brain infection caused by the epidemic and were left with notable behavioral and cognitive sequelae (Barkley, 1990). These sequelae incorporated many of the symptoms that are associated with ADHD today. Barkley noted, for example, that children were reported as impaired in attention, regulation of activity, and impulse control, the “holy trinity” (p. 6) of ADHD. Small (1982, as cited in Grantham, 1999) reported that it was in the 1940s when the term “Minimal Brain Damage” (MBD, p. 4) was coined as a way to distinguish the correlation between brain damage at birth with inattentive, hyperactive, and impulsive behavior. In the 1950s, Barkley noted that the new terminology was used to describe children with hyperactivity behavior problems. Several investigations into the neurological mechanisms responsible for impulse behaviors produced results that researchers coined as “hyperkinetic impulse disorder” (p. 8) or commonly known as hyperkinetic syndrome. It was claimed that the Central Nervous System (CNS) deficit occurred in the thalamic area of the brain. Despite the lack of evidence at the end of this era, writers and researchers accepted the notion that hyperactivity was a brain damage syndrome, and the prognosis was considered as fair to poor.

1960-1970

Barkley (1990) coined this era as the Golden Age of Hyperactivity. During these years, the term, hyperactivity, was highly emphasized. The previous term, Minimal Brain Damage (MBD), was discarded and eventually replaced by more specific learning disabilities and behavioral disorders such as: (a) dyslexia, (b) language disorders, and (c) hyperactivity. “These labels were based on the observable and verifiable deficits of the children they described, rather than some underlying unobservable etiological mechanism in the brain” (p. 10). However, recent studies still indicate possible neurological differences in individuals diagnosed with ADHD (Barkley).

According to Barkley (1990), clinicians had become increasingly dissatisfied with the term, MBD, as a description of the “hyperactive child syndrome” (p. 10). Therefore, in the second edition of the official catalogue of diagnostic nomenclature, the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-II; American Psychiatric Association, 1968, as cited in Barkley), the diagnosis of Hyperkinetic Reaction of Childhood Disorder was listed which briefly described the excessive activity level of a child with these behavioral disorders. Barkley noted that the DSM-III provided few useful and relevant details for a reliable clinical diagnosis. According to Ross and Ross (1976, as cited in Barkley), by 1969, the prevailing view was that hyperactivity remained classified as a brain dysfunction syndrome although of a milder magnitude than once believed.

1970-1990

According to Barkley (1990), during the 1970s, there was a period of notable research into ADHD; there were an estimated 2,000 published studies at the turn of the decade. “By the early 1970s, the defining features of the hyperactive or hyperkinetic child syndrome had been broadened to include what were previously felt to be only associated characteristics, including impulsivity, short attention span, low frustration tolerance, distractibility, and aggressiveness” (p. 12).

Grantham (1999) stated that, “During the years 1971-1980, the term hyperactivity was highly emphasized. Some researchers at the time felt that technology avenues such as brain scanning, did not definitively back up a link between brain damage and unruly behaviors” (p. 4). Therefore, more emphasis was placed on inattention and impulsivity in terms of a brain dysfunction rather than the emphasis on brain damage. Barkley (1990) referred to this time period as the Emergence of Attention Deficits. Douglas (1980, as cited in Barkley), a member of the Canadian Psychological Association and prominent researcher in the field of ADHD, argued that it was the deficits in sustained attention and impulse control which were more likely to account for the difficulties seen in these children rather than hyperactivity alone. Later, Douglas refined her theory of hyperactivity with regard to ADHD as a behavioral disorder. Douglas suggested that four major deficits account for the symptoms of ADHD: (a) inability to inhibit impulsive responding, (b) deficits in organization and maintenance of attention and effort, (c) inability to modulate arousal levels to meet situational demands, and (d) an unusually strong inclination to see immediate reinforcement. Barkley stated: “This theory initiated or guided a substantial amount of research over the next 15 years, including my own

(Barkley & Ullman, 1975, 1977a), constituting a model as close to a scientific paradigm as the field of hyperactivity is likely to have in its history to date” (p. 14). The year, 1980, was a notable one for ADHD. Study results began to emerge that were markedly at odds with either Douglas’ or Barkley’s theory. “Scientists began to seriously question the adequacy of an attentional model in accounting for the behavioral deficits seen in ADHD children, as well as for the effects of stimulant medications on them.”

(Barkley, p. 14)

As a result of Douglas’ (1980, as cited in Barkley, 1990) paper and the subsequent research published by a team of students and Douglas’ colleagues at McGill University, the authors of the *APA Diagnostic Statistical Manual* (DSM-III; 1980, as cited in Barkley) renamed Hyperkinetic Disorder to Attention Deficit Disorder. With these new diagnostic criteria, deficits in sustained attention and impulse control were now recognized as having greater importance in the overall diagnosis than hyperactivity. Thus began the paradigm shift from hyperactivity to attention deficits as the major difficulty for children who presented with ADHD symptoms.

Barkley (1990) noted that it was during the 1970s that the use of medication therapy was prescribed. “One of these developments was the rapidly increasing use of stimulant medication with school-age hyperactive children” (p. 15). During this era, there was a claim that hyperactivity was a *myth*, proposed by intolerant teachers and parents in an inadequate educational system, and was being advanced by the public. This claim was soon coupled with a “backlash against ‘drugging’ school children” (p. 15) for their behavioral problems. Another notable development that occurred in the 1970s was the theory that hyperactivity was due to environmental factors. Also, 1975 was when the

members of Congress passed Public Law 94-142 (1975, as cited in Barkley) which mandated the provision of special educational services for handicapping and behavioral disabilities of children in addition to the already existing mandates for mental retardation.

Barkley (1990) argued that the period 1980-1989 marked the age of diagnostic criteria and the waning of attention deficits. During this period, ADHD became the most studied childhood psychiatric disorders in history. More books, papers, and studies were published during this decade than in any previous historical period. Also, researchers began to “utilize technological tools to attempt to demonstrate that ADD/ADHD is neurologically based and is genetically and biologically transmitted (Grantham, 1999, p. 5). During the beginning of this decade, the DSM-III (APA, 1980, as cited in Barkley) and its characterization of childhood ADD was published (see Appendix A for the DSM-III Criteria). The criteria in the DSM-III were a radical reconceptualization of ADHD. In this publication, the DSM-III provided subtypes of ADD in an attempt to identify additional useful approaches, other than the criteria based on hyperactivity or aggression alone (Barkley). It was during the late 1980s that writers and clinicians attempted to distinguish between *pervasive* and *situational hyperactivity*. “It was shown that pervasively hyperactive children were likely to have more severe behavioral symptoms, greater aggression and peer relationship problems, and poorer academic achievement (p. 25).” In 1987, the APA further revised the criteria for identification and diagnosis of this disorder and changed the name from ADD to ADHD in the DSM-III-R. This revision was more important than a change in the acronym. According to Barkley, the changes made in the DSM-III-R included: (a) a single item list of symptoms and a single cutoff score which replaced the three previous lists (e.g., Inattention, Impulsivity, and

Hyperactivity); (b) the criteria were based on more empirically derived dimensions of child behavior from behavior rating scales; (c) an emphasis on the symptoms as being developmentally inappropriate for a child's mental age; (d) the removal of coexisting affective disorders with ADHD as a diagnosis of ADHD; and (e) the subtype of ADD/-H was deleted as a subtype and synchronized to the vaguely defined category, Undifferentiated ADD.

Barkley (1990) wrote about the notable developments in assessment, research methodology, and therapy for ADHD during this decade. At the end of the decade, most professionals viewed ADHD as a developmentally handicapping condition that, by nature, is usually chronic and has a strong hereditary or biological predisposition which, in turn, has notable negative impacts on the academic and social outcomes for children.

The historical development of the concept of ADHD has emerged in several different forms throughout history. The earliest view that emerged in the 1900's was based on the notion that ADHD was a biologically based disorder wherein behavior was controlled by morals and volitional inhibition, and it was perceived as a product of social circumstances. Barkley (1990) summarized the evolution of ADHD from the early 1900's when he wrote:

This world would evolve over 90 years to a view of ADHD as a biological, often hereditary, predisposition to defects in the regulation of behavior by rules and consequences-defects that could be significantly modulated by social circumstances. Throughout this evolution, the role of behavioral disinhibition/self-regulation has proven a central theme to which theorists of different eras have returned again and again. Along the way, labels changed from "brain damage syndrome" and "organic drivenness to "hyperkinetic impulse disorder" and then on to "ADD," culminating in "ADHD." (p. 37)

Originally, the prognosis for ADHD was viewed as chronic, but later it was believed that it could be outgrown at puberty. However, the perspective near the end of this decade reverted back to the previous notion that ADHD is a chronic disorder, and the resolution of this disorder would not prove to be an easy one.

1990-1999

According to Grantham (1999), Barkley, a proponent of the medical disease model for ADHD, has dominated the research field in the etiology of ADHD/ADD. Currently, Barkley views ADD/ADHD as a developmental failure in the “brain circuitry that underlies inhibition and self control which impairs other important brain functions crucial for maintaining attention, including immediate rewards for later, greater gain” (Grantham, p. 6).

According to Nicpon, Wodrich, and Kurpius, (2004), Barkley’s theory (1997, as cited in Nicpon et al.) offers two compelling neuroscience aspects. First, it defines ADHD as a neurological disorder attributed to impairments in frontal lobe of children. Second, Barkley’s theory provides descriptions of the psychological constructs believed to “mediate the array of failures experienced by the affected children” (p. 736). Utilization behavior was documented in Barkley’s theory as a cardinal feature of ADHD. Also, “Barkley’s theory affords a variety of explicit derivative predications suitable for empirical research from which findings could lead to theory building” (p. 736).

According to Grantham (1999, as cited in Zametkin et al., 1990), it was in 1990 when positron emission topography (PET) brain studies were conducted with children diagnosed with ADHD. The findings from these studies showed that three areas of the

left brain showed distinct patterns of brain failure to use glucose (e.g., brain sugar) fast enough to maintain normal muscle responses and thought patterns. This failure of the brain to use its glucose triggers a pattern described as ADHD. In the publication of the DSM-IV (APA, 1994), the authors indicated that no definitive laboratory tests were recognized for the diagnosis of ADD/ADHD. Despite this omission, Barkley (1995, as cited in Grantham, 1999), continued to emphasize that the possible etiologies for this syndrome include: (a) genetics, (b) brain injury, and/or (c) abnormal brain development. Barkley maintained that self-control and interest span vs. attention span are the mitigating factors of the disorder. Grantham noted that Barkley presented a new label, the Developmental Disorder of Self-Control, as a scientific neurological history to suggest the current usage of scientific technology to explore the neurological etiologies of ADHD.

1999- Present

Neuro-imaging technology. Today, there are many technological tools that can be used to explore the neurological etiology of ADHD. Grantham (1999) reported that neuro-imaging has become an important technological tool that is used to study brain functioning. With neuro-imaging, scientists and clinicians can study which regions of the brain malfunction in patients with ADD/ADHD. Grantham reported that the use of imaging studies have suggested that the prefrontal cortex, part of the cerebellum and at least two clusters of the basal ganglia (nerve cells deep in the brain) are involved in the production of ADD/ADHD symptoms (Barkley, Grodzinsky, & DuPaul, 1992; Castellanos et. al., 1997)” (p. 6).

Also, magnetic resonance imaging (MRI) is a frequently used scan for ADHD (Grantham, 1999). The results from a study of 576 ADHD boys showed a smaller right prefrontal cortex and the two smaller basal ganglia (e.g., the caudate nucleus and the globus pallidus) in children diagnosed with ADHD. “This is significant because these are the areas thought to be involved with regulating attention” (p. 7). According to Grantham, it is the prefrontal cortex that edits behavior and resists distractions. Barkley (1998, as cited in Grantham) described the prefrontal cortex as the *steering wheel*, the caudate as the *accelerator*, and the globus as the *brakes* of a car. It is the braking (i.e., globus) or inhibitory function that is likely to be impaired in children with ADHD that causes ADHD symptoms.

The theory of neuro-transmitter dysfunction. Gross (1997, as cited in Grantham, 1999), an internal medicine physician and endocrinologist, shifted his clinical practice to a focus on the diagnosis and treatment of ADHD. Gross, like Barkley, viewed ADHD as a neurological problem. Gross defined ADHD as a “complex of clinical dysfunctions, which at the neuroscience level are associated with reduced effectiveness of neurotransmitter hormone action and/or synaptic abnormality in various centers of the brain” (p. 8). Also, Gross purported that the symptoms of ADHD outlined in the DSM-IV (APA, 1994) are not the only problems associated with ADHD. Gross attempted to link neurotransmitter and synaptic abnormalities in the brain to a multitude of problems: (a) academic underachievement, (b) sleep problems, (c) irritability, (d) negative feelings and attitudes, and (e) dyslexia problems. The medical data supported the notion that ADHD is caused by chemical imbalances in the brain. If, in the neurotransmitter/synaptic on/off communication processes that take place in the brain,

there is an interruption or problem with these neurotransmitters, problems result with thought processes, feelings, and body movements (Grantham). Researchers continue to explore the possible neurological etiology for ADHD.

Another popular area of study for ADHD is genetic predispositions. According to Grantham (1999), “researchers concerned with the etiology of ADD/ADHD must consider the issue of genetics vs. environment” (p. 9). The research methodologies used to support a genetic etiology over environment consist primarily of family studies. According to Grantham, there is a connection between the thyroid hormone receptor and ADD/ADHD characteristics. Further research, in regard to this hormone receptor as an indicator of the possible genetic influence on the etiology of ADHD, needs to be conducted.

Another genetic discovery that involves ADHD is that of the dopamine transporter gene (Grantham, 1999). According to Grantham, “the tracer fluro-dopa was used to determine if there were differences in dopaminergic uptake in the brains of adults and adolescents with ADHD. Differences were noted when compared to normal brains” (p. 12). Cook (1995, as cited in Grantham) reported that children with ADHD had responded positively to medications that inhibit this dopamine transporter, which suggests that the dopamine transporter is a primary candidate gene for ADHD. In several studies, Zametkin et al. (1998, as cited in Grantham) explored the relationship between the dopamine transporter gene and symptoms of ADHD which suggested that genes encode or serve as the blueprint for dopamine receptors and are highly active in the

prefrontal cortex and basal ganglia. Grantham argued that the controversy about genetic predispositions will continue to be examined as researchers explore the etiology of ADHD.

Causes of ADHD

According to Flower (1991), a former teacher, founder of an ADHD parent support group, and author, scientists and medical experts do not know the cause of ADHD and suggest that the disorder is acquired in many ways. In many cases, ADHD has shown to be genetically transmitted and may be caused by a chemical imbalance or deficiency in neurotransmitters in the brain. Neuwirth (n.d), an education writer, noted that, over the last decades, researchers and clinicians have developed many theories about the causes of ADHD.

According to Neuwirth (n.d), it is evident that many theories have led to dead ends while others lead to avenues of new investigation. The minimal brain damage or minimal brain dysfunction theory from the 1940s, in which it was purported that attention disorders were caused by minor head injuries or damage to the brain, has been rejected. The theory itself was rejected because it could explain only a very small number of brain injury cases which were directly correlated to attention disorders. Not everyone with ADHD has a history of head trauma or a birth complication. Another popular theory was that refined sugar and food additives (i.e., poor diet and or parenting) caused children to be hyperactive and inattentive. Clinicians encouraged parents to discontinue serving food that contained artificial flavorings, sugars, and preservatives to their children. The staff of the National Institutes of Health (NIH; 1982, as cited in Neuwirth), the Federal agency responsible for biomedical research, held a scientific conference to discuss the correlation

between diet and ADHD. They examined the data and concluded that a restricted diet helped approximately 5% of children with ADHD, mostly young children or children with food allergies. Also, they provided a list of the theorized causes of ADHD which, in fact, are not valid. These included: (a) too much television watching, (b) food allergies, (c) excess sugar, (d) poor home life, and (e) poor schools. Aust (1994), a school social worker and author, argued that:

Despite popular opinion, the consumption of sugar, food additives and dyes, vitamin deficiencies, lead poisoning, perinatal influences, birth complications, brain damage, and inappropriate parenting are no longer considered significant causes of AD(H)D, although in some case they may exacerbate existing AD(H)D or cause AD(H)D-like symptoms. (p. 1)

According to Neuwirth (n.d.), recently advanced tools and technology have been used to study the brain, and scientists have been able to test more theories in regard to the causes of ADHD. Several recent studies produced a variety of theories. Aust (1994) cited Amay-Jackson et al. (1992), Anastopoulos et al. (1991), and Barkley (1990), who supported the current consensus that ADHD has many causes and is mostly likely a direct result of an inherited tendency toward the depletion of dopamine, or underactivity in the frontal cortex of the brain which in turn affects: (a) attention; (b) response inhibition (i.e., impulsivity); and (c) behavior problems. Also, there was an indication that there is an “inefficiency or imbalance of several neurotransmitters and lowered glucose metabolism in the brain of those affected with ADHD (Zemetkin et al., 1990, as cited in Aust). In addition, Aust cited Lou et al. (1984) who noted a possible correlation between hyperactivity and a “generalized resistance to thyroid hormone” (p. 2) in close to 10% of persons diagnosed with ADHD as well as decreased blood flow to the striatum and prefrontal regions of the brain. Zemetkin et al. noted that there are findings which

support neurological bases for both conditions. The next step for scientists and clinicians is to determine why there is less activity in certain areas of the brain in order to find a more definitive cause of ADHD and better treatment options.

Diagnosis of ADHD

There has been a tremendous amount of research published on the symptoms of ADHD in children. According to Barkley (1990), by the year 1979, over 2,000 studies existed. According to Goldstein and Goldstein (1998), perception of the disorder continues to change over time; therefore, researchers and clinicians struggle to find a working definition of ADHD. Researchers and clinicians have shifted focus from the 1970s to: (a) definition, (b) assessment, (c) life course, and (d) etiology. Before a set of definitions can be provided for the primary symptoms of ADHD, a brief presentation of the cause of ADHD and critically related issues is relevant.

Primary Symptoms

The various types of ADHD can be difficult to diagnosis, and many manifest themselves as other symptoms (D'Alonzo, 1996). According to Barkley (1990, as cited in D'Alonzo), frequently, children with ADHD are described as having chronic difficulties in three distinct areas: (a) inattention, (b) impulsivity, and (c) overactivity (i.e., the holy trinity of ADHD). D'Alonzo cited the APA (1994) who specified that inattention, hyperactivity, or impulsivity are symptoms that may exist not only in ADHD but may be present in: (a) mental retardation; (b) oppositional behavior; (c) mood, anxiety, or dissociative disorder; (d) substance related disorder; (e) pervasive developmental disorder; or (f) a psychotic disorder. Therefore, D'Alonzo argued that the

best way to diagnosis persons with ADHD is to observe the person's behavior in at least two settings.

Barkley (1990) reported that the holy trinity of ADHD (e.g., inattention, impulsivity, and overactivity) are characteristics that are believed to be displayed at an early age and to a degree that is inappropriate for the child's age or developmental level. In order to fully define the symptoms of ADHD, it is imperative to explicitly define each prominent characteristic of the disorder.

Inattention

Goldstein and Goldstein (1998) described the brain as an instrument with limited capacity for simultaneous information processing and stated, "It relies on a complex process to narrow the scope and focus of information to be processed and assimilated" (p. 29). Goldstein and Goldstein cited Mesulam (1985), who defined attention as a generic term used to differentiate a group of hypothetical mechanisms that "collectively serve an important function for the organism" (p. 29). Goldstein and Goldstein noted that attention is a multidimensional concept, which is most likely affected by: (a) cognitive, (b) emotional, (c) behavioral, and (d) physiological variables. In terms of ADHD, children with the disorder display inattention, compared to normal children of the same age and sex (Barkley). Amen, an M.D. and author, argued that inattention is the hallmark symptom of ADHD, and it is difficult for these children to sustain attention and effort over prolonged periods of time. Barkley noted that the term, hyperactivity, is more than difficulty sustaining attention. Barkley referred to inattention as an multidimensional construct that can affect: (a) alertness, (b) arousal, (c) selectivity, (d) sustained attention,

(e) distractibility, or (f) span of apprehension to name a few. Goldstein and Goldstein (1998) cited their 1990 work, in which they hypothesized that inattention may result from a disorder of “faulty selective attention” (p. 57). That is, it is difficult for children with ADHD to differentiate between what is most important to pay attention to and what is not important. Children with ADHD tend to be over stimulated. Barkley eloquently supported this assertion when he stated:

The problem is not so much one of heightened distractibility, or the ease with which children are drawn off task by extraneous stimulation, although many parents and teachers will describe these children in such terms. Research on the distractibility of ADHD children has been somewhat contradictory on this issue, but in general finds these children to be no more distractible than normal children by extra task stimulation (Barkely, 1997, p. 41 as cited in Campbell, Douglas, & Morgenstern, 1971; Cohen, Weiss, & Minde, 1972; Rosenthal & Allen, 1980; Steinkamp, 1980). (p. 41)

According to Barkley (1990), educators and parents tend to describe the attentional problems or “off task” (p. 41) behaviors associated with ADHD as: (a) does not listen; (b) fails to finish assigned tasks; (c) daydreams; (d) loses things, (e) cannot concentrate, (f) easily distracted, (g) cannot do work independently of supervision, (h) often requires redirection, (i) shifts from one task to another without following through on each task, and (j) often confused. According to Barkley, “what is not so clear in these studies is whether this deficit in paying attention reflects a primary deficit in sustained attention or impulsivity is secondary to the problem of behavioral disinhibition described below” (p. 41).

Impulsivity

Coupled with difficulties in sustained attention, children with ADHD experience inhibiting behavior in response to high situational demands (e.g., school) relative to

children of the same mental age and sex (Barkley, 1990). Similar to inattention, hyperactivity is multidimensional and ambiguous in nature. Researchers still do not know the definitive aspects of impulsivity that are problematic for children with ADHD. According to Selikowitz (2004), it is difficult for ADHD children to stop to think before they say or act and, often, they do or say the first thing that comes into their heads (e.g., blurt out answers in class, say tactless things, or take unnecessary risks). Typically, children with ADHD respond quickly to situations, do not wait for instructions, and it is difficult to wait their turn. “They are the sort of children who may run out in front of a car without looking first” (p. 9). Barkley noted that, generally, children with ADHD fail to consider the consequences of their actions and may carelessly damage or destroy property or endanger their own lives without thought of the adverse effects. Barkley cited Brown and Quay (1977), who described the problem of impulsivity as a pattern of rapid, inaccurate response to tasks. Selikowitz (2004), described this behavior as overactivity. He described children with ADHD to be constantly “on the go” (p. 9). For example, it may be difficult for the teacher to keep the child in his or her seat. Barkley described behavioral disinhibition, or poor regulation and inhibition of behavior as the hallmark of ADHD. Barkley proposed a novel concept, “several studies have typically shown that it is not inattention that distinguishes ADHD children from children with other clinical disorders or from normal children as much as it is their hyperactive, impulsive, and disinhibited behavior” (p. 43).

Hyperactivity

The third primary characteristic of ADHD children is hyperactivity, the excessive or developmentally inappropriate level of activity (i.e., motor or vocal; Barkley 1990). Barkley explicitly defined the characteristics of hyperactivity as fidgeting, restlessness, and generally unnecessary gross bodily movements irrelevant to the task or situation. According to Ingersoll and Goldstein (1993), often, hyperactivity is but not always demonstrated by children with ADHD. Literally, it is described as in constant motion, perpetually on the go, and bouncing off the walls. Barkley noted that observations of this type of behavior are most prevalent at school and while the child works independently. Also, he noted direct observations of hyperactivity in children with ADHD in their social interactions with others. Children with ADHD tend to display excessive speech and commentary that lack general rapport. Goldstein and Goldstein (1998) referred to hyperactivity as “overarousal” (p. 62), and they defined overarousal as the inability to modulate the body and emotion in time and space that is appropriate to the situation. Barkley cited Barkley and Cunningham (1997b) and Porrino, Rapoport, Behar, Scerry, Ismond, and Bunney (1983) and stated that, “Numerous scientific studies attest to these complaints that ADHD children are more active, restless, and fidgety than normal children throughout the day and even during sleep” (p. 44). However, Ingersoll and Goldstein (1993) argued that the changes in terminology in regard to hyperactivity have caused confusion about this component of ADHD in children. Goldstein and Goldstein (1998) maintained that hyperactivity is one symptom of ADHD that appears to improve drastically as the child gets older.

Difficulty with Gratification

Children with ADHD tend to express the need for immediate, frequent, predictable, and salient reinforcers (Goldstein & Goldstein, 1998). They have an inability to benefit efficiently from the consequences of their actions, and they show a repeated need to try things more than once. These behaviors are a direct result of motivation. Goldstein and Goldstein stated that, “Again, although it is increasingly recognized that this pattern of difficulty, ostensibly the need for more immediate gratification, likely results from limited capacity for self-control” (p. 60). Also, Goldstein and Goldstein cited Solanto (1990) who maintained that inattentive, hyperactive, and impulsive characteristics are the cumulative results of the consequences of reduced sensitivity to reinforcement. In addition, Goldstein and Goldstein cited Pffiffer and O’Leary (1987), Rosen and Sanderson (1985), and Rosen, O’Leary, Joyce, Conway, and Pffiffer (1984) and stated that the “response cost-- the opportunity to lose what has been earned--has been found to be particularly effective in managing and modifying the behavior of children with ADHD” (p. 60).

Diagnostic Strategy for Children with ADHD

According to Goldstein and Goldstein (1998), the past 20 years have proved to be a time period in which a number of practitioners (Barkley, 19981a, 1990a; Cantwell & Clarson, 1978; Goldstein & Goldstein, 1990; all cited in Goldstein & Goldstein), and even a pharmaceutical company (CIBA, 1974) have recommended a multidisciplinary approach to the diagnosis, identification, evaluations, and treatment of children with ADHD. Goldstein and Goldstein stated that, “Although, at one time, limited evaluative components such as obtaining a history and teacher rating as the primary means of

making a diagnosis were suggested (Sleator, 1982), the multicomponent assessment process has been embraced by the clinical community” (p. 64). Goldstein and Goldstein developed a strategy for practitioners to diagnosis ADHD with a high degree of confidence. The following criteria should be considered in the diagnosis of ADHD:

1. DSM-IV *Diagnostic Criteria* (see Appendix B),
2. Elevated Rating Scales,
3. Objective Measures,
4. Situational Problems, and
5. Differential Diagnosis. (p. 65)

According to Goldstein and Goldstein (1998), the first criteria that should be considered in the diagnosis of ADHD is the DSM-IV (APA, 1994, as cited in Goldstein and Goldstein). The DSM-IV provides the most utilized and researched definition and diagnostic criteria for ADHD. Three criteria are presented in regard to ADHD, and it is imperative that the child meet at least one of these three criteria: (a) primarily inattentive type, (b) primarily hyperactive-impulsive type, or (c) combined. The second criteria that practitioners should consider in the diagnosis of ADHD, is the concept of elevated rating scales. Elevated rating scales do not diagnose; but they can be used to describe behaviors in a statistical, organized manner. Goldstein and Goldstein reported that the most popular rating scales used to diagnose ADHD behaviors are the Conner Parents’ and Teachers’ Questionnaires (Conners, 1969, as cited in Goldstein & Goldstein). The Conners questionnaires provide a thorough behavioral profile and contain well structured, attention symptom scales. Goldstein and Goldstein described the working definition of these scales: “the child must be at or beyond a minimum of one and a half standard deviations difference in a negative direction on at least one of these questionnaires in comparison to children of the same chronological age and gender” (p. 65). These

questionnaires should be administered by “two independent raters” (p. 65) (e. g., parent and teacher). The third diagnostic criteria Goldstein and Goldstein recommended are *objective measures*. As Ostrom and Jenson (1998, as cited in Goldstein & Goldstein) noted, the assessment of ADHD has rarely involved direct measures of attention. There are a variety of norm-referenced measures that range from paper-and-pencil assessment tests to computer-based instructional tools used to diagnose children with ADHD. The purpose of these assessments is to rate the performance rather than process. For example, tasks that measure metabolites or brain waves are not considered objective measures of ADHD because of their limited supported scientific research. Goldstein and Goldstein noted, “In the working definition, children with ADHD may but do not have to demonstrate problems on the measures of impulsiveness” (p. 66). The fourth diagnostic criteria Goldstein and Goldstein identified, is situational problems. Children affected with ADHD have been found to have situational problems in school and at home. Goldstein and Goldstein cited Zentall (1995) who purported that children exhibit their greatest behavioral problems in the classroom. Goldstein and Goldstein stated that, “Gordon, Mammen, DiNiro, and Mettelman (1998) found that 72% of a population of children referred for problems of attention and impulsivity presented with a consensus between parents and teachers concerning the severity of these problems” (p. 66). Also, Goldstein and Goldstein noted that the inclusion of situational data as diagnostic criteria for ADHD allows the evaluator to assess the impact of daily living as a symptom of the disorder. The final criterion is differential diagnosis. Differential diagnosis is the collection of sufficient history, behavior, and assessment data to understand and rule out other medical problems.

DSM-IV Guidelines for ADHD

Despite the fact that definitions of ADHD have evolved through time, members of the American Academy of Pediatrics and the American Academy of Child and Adolescent Psychiatry have developed a set of specific elements and guidelines to follow in the diagnosis of ADHD (Goldstein & Goldstein, 1998). Current guidelines are found in the DSM-IV (APA, 1994). The definition of ADHD has changed notably since its explicit definition in the DSM-III. The criteria outlined in the DSM-IV for the diagnosis of ADHD should not be taken lightly. According to Vickers (2002), up to 19% of school age children display the severe behavioral problems listed in the DSM-IV which have adverse effects on school, home, and social situations. Vickers stated that, “Any successful effort to treat a child is a cooperative one” (p. 20), and in the DSM-IV, numerous guidelines are provided to finalize the diagnosis and treatment for the child with ADHD.

Treatment for ADHD

According to Kollins, Barkley, and DuPaul (2001), children diagnosed with ADHD are at higher risk of having severe behavioral and emotional problems throughout childhood. Typically, children with ADHD: (a) attain fewer formal years of school, (b) are limited to a lower occupational status, and (c) are more likely to have psychiatric problems and participate in substance abuse. Also, persons with ADHD display poor social skills with peers, family members, and in the work place. Therefore, given the potential for adverse outcomes associated with this disorder, effective treatment of ADHD is imperative. Kollins, Barkley, and DuPaul (2001) identified the three general

approaches used to treat ADHD that have received the most attention in current research: (a) pharmacological approaches, (b) behavioral/psychosocial approaches, and (c) a combination of behavioral and psychosocial approaches. Kollins et al. stated that, “The vast majority of the scientific evidence suggests that effective treatment for children with ADHD consists of low-to-moderate doses of stimulant medication, such as methylphenidate (Ritalin) or d-amphetamine (Dexedrine)” (p. 2). The most recent study, the Multimodal Treatment of ADHD (MTA) study, sponsored by the NIH demonstrated that, “compared to standard community-based care and a structured behavioral intervention, a carefully managed protocol of stimulant medication or a combination of medication and behavioral intervention to the greatest reductions in ADHD symptoms” (p. 2).

Central Nervous Stimulants

According to Vickers (2002), the use of central nervous stimulants to treat ADHD has been widely studied, and this use has generated substantial controversy. Vickers noted that the media is very involved on both sides of the debate. The largest area of interest is the long-term safety and efficacy of the use of these drugs. Another controversial issue is associated with the growing frequency with which stimulants or other classes of drugs are prescribed. According to DuPaul and Barkley (1991, as cited in Vickers), psychostimulant medications have the ability to increase the arousal or alertness of the central nervous system (CNS). Psychostimulants are sympathomimetic compounds (Donnelly, & Rapoport, 1985, as cited in Vickers) and have a similar structure to the neurotransmitters in the brain (e.g., dopamine). DuPaul and Barkley

stated that, “The most commonly employed CNS stimulants are methylphenidate (Ritalin) dextroamphetamine (Dexedrine) and pemoline (Cylert)” (p. 2). These CNS stimulants are dispersed in tablets based on a fixed dosage. Generally, methylphenidate (Ritalin) and dextroamphetamine (Dexedrine) are prescribed twice per day (e.g., breakfast and lunch), while pemoline is prescribed only once per day. The reason for the schedule is that methylphenidate and dextroamphetamine peak between 1-2 hours after they are taken and will dissipate within 4-6 hours. Also, methylphenidate (Ritalin) and dextroamphetamine (Dexedrine) are available in short acting as well as sustained released dosages.

Methylphenidate (Ritalin)

According to Kollins et al. (2001), methylphenidate (Ritalin) is the most commonly prescribed drug for ADHD. It has been demonstrated to be effective for a variety of behavioral problems that are associated with the disorder. The use of ritalin has been demonstrated to improve emotional and academic areas. Kollins et al. cited the Physician’s Desk Reference (PDR; 2000) for children in which the typical dose of Ritalin is 5mg twice a day and is adjusted upward as needed. Kollins et al. stated that “Ritalin exerts its peak effects 1-2 hours after administration and has a half-life of 2-3 hours” (p. 7). The beneficial effects of Ritalin have been observed to be approximately 3-4 hours at regular doses, and it is administered in both short acting and sustained released doses. The adverse effects or the most common side effects associated with Ritalin include: (a) insomnia, (b) decreased appetite, (c) stomachaches, (d) headaches, and (e) dizziness.

Dextroamphetamine (Dexedrine)

Dextroamphetamine (Dexedrine) is another stimulant shown to be effective in the treatment of ADHD symptoms (Kollins et al., 2001). Dextroamphetamine (Dexedrine) is equally as effective as Ritalin; however, it is not prescribed as frequently. Kollins et al. noted that “This is likely because of the greater potency and longer duration of action of the drug relative to Ritalin, which may lead to more pronounced side effects with Dexedrine” (p. 7). Like Ritalin, the use of dexedrine has been shown to improve school performance. The recommended dosage as cited in the Physician’s Desk Reference (PDR; 2000, as cited in Kollins et al.) is 2.50 mg doses or twice per day. Also, the dosages can be adjusted upward as needed. Dexedrine can be administered to younger children than Ritalin (e.g., as young as 3 years of age). The peak of Dexedrine is 2-3 hours after ingestion, and the half life of the drug is 6-7 hours. Also, Dexedrine is available in short acting and sustained formulations. Kollins et al. stated that “Dexedrine is contraindicated, or at least should be used more cautiously, if the child experiences tics or has a history of Tourette’s disorder, hypertension, hyperthyroidism, glaucoma, or cardiovascular abnormalities” (p. 8). The side effects of Dexedrine include: (a) insomnia and appetite suppression in comparison to Ritalin; and (b) increased levels of irritability, crying, anxiousness, sadness/unhappiness, and nightmares.

Pemoline (Cylert)

According to Kollins et al. (2001), generally, pemoline (Cylert) is used when children either do not respond to Ritalin or Dexedrine or when multiple daily dosages are not an option for the child. Cylert is administered once daily (e.g., in the morning) at a

starting dose of 37.5 mg. “It is generally not considered a ‘frontline’ treatment for ADHD because of its potentially severe side effects” (p. 8). Like Ritalin or Dexedrine, Cylert has shown to be effective in the improvement of academic performance. The peak performance of Cylert is 6 hours after the drug has been administered. According to Kollins et al., “The most salient side effect of Cylert is its association with potentially fatal liver failure” (p. 8).

Mixed Amphetamine Salts (Adderall)

According to Kollins et al. (2001), Adderall is the generic/trade name for a compound mix of amphetamine salts (i.e., 3 forms of d-amphetamine & 1-amphetamine). Recently, Adderall has become available as a treatment for ADHD in comparison to other stimulants, and it is equally effective as Ritalin in the reduction of problem behaviors for children with ADHD. The starting dose for Adderall is 2.5 mg once or twice per day for children between ages 3- 6 and 5 mg per day for children older than 6. Adderall has shown to be more potent than Ritalin and can result in more side effects. Kollins et al. stated, “Because Adderall is composed primarily of amphetamine salts, the contraindications are similar to those for Dexedrine: a history of hypertension, hyperthyroidism, or cardiovascular problems” (p. 8). Kollins et al. noted that 80% of all children with ADHD are treated with a stimulant drug.

Antidepressant Drugs

According to Kollins et al. (2001), antidepressant drugs are rarely used to treat ADHD. In a survey conducted by Zito et al. (1999, as cited in Kollins et al.), 17.2% of children with ADHD were treated with a medication other than a stimulant. Kollins et al.

stated that, “Typically, antidepressants or anti-hypertensive agents are used either when children do not respond to stimulant treatment or when co-occurring psychological, emotional or behavioral problems are present” (p. 9). Primarily, antidepressants are used to treat depressive disorders; however, because of the neurotransmitters in the brain which the drugs target, sometimes, they are helpful in the treatment of ADHD. The types of antidepressants used to treat ADHD include:

1. Tricyclic antidepressants (desipramine, imipramine)
2. Selective serotonin-reuptake inhibitors (SSRIs), and
3. Other antidepressants (e.g. Wellbutrin). (p. 9)

According to Kollins et al. (2001), the use of these medications raises many confusing questions. It is through a basic understanding of these drugs by the parents and teachers involved in the care of the child with ADHD that will determine whether pharmacological medication is the right form of treatment for a specific child with ADHD.

ADHD and Alternative Therapies

If drugs are not the solution, there are still other options for the treatment of ADHD. According to Vickers (2002), other forms of alternative therapies include: (a) EEG Biofeedback, (b) diet modification and herbal supplements, (c) acupuncture, and (d) straightforward behavior modification therapy. The problem with the use of alternative therapies is that they infer that ADHD is a physical or mental problem and, in turn, may mask a real physical disorder which produces the ADHD symptoms. According to Vickers, reported that Stein, Professor of Pediatrics at the University of California San Diego School of Medicine, recommended that an incorporation of treatments should be used to enhance the child’s self- autonomy and overall quality of life.

ADHD and Educators

So what does all this mean for educators? According to Vickers (2002), educators are pressured by society, the media, parents, and colleagues in a variety of directions in regard to the diagnosis and treatment of ADHD. Vickers noted,

Educators, while valuable members of a community, are not medical professionals and while their extended contact with a child may allow them insights others often miss, this in no way should give them the right to dictate to parents the appropriate course of actions concerning a child's mental health. (p. 35)

Instead, teachers should answer questionnaires and complete behavior profiles concurrent with ADHD to better assist parents and clinicians so that a more definitive diagnose might be achieved.

Chapter Summary

Provided in this chapter was an overview of the historical background of the development of ADHD from the 1900s to the present. The view that emerged in the 1900s was that of a biologically based disorder as a result of controlled behavior through moral and volitional inhibition (Barkley, 1999). It evolved into a disorder that was seen as biological in nature, often hereditary, and with symptoms in behavior ruled by consequences and exacerbated by social circumstances. Labels for ADHD have changed throughout the course of history. What was once thought of as Minimal Brain Damage, then organic drivenness, followed by Hyperkinetic Impulse Disorder, was changed to *ADD* is now culminated into ADHD. Also, the primary symptoms of ADHD were described, and Barkley (1990) determined that the working definition of ADHD is the inability to adequately regulate behavior by rules and consequences (e.g. behavioral disinhibition).

Finally, this author reviewed the treatment used for ADHD (i.e., most commonly, the use of stimulants) as well as the role of educators in the diagnosis and treatment of children with ADHD. Teachers must take advantage of the plethora of researched information in regard to ADHD to better understand the disorder that affects so many school aged children. In Chapter 3, this author will detail the development of an in-service to provide teachers with the most pertinent information about ADHD.

Chapter 3

METHOD

The purpose of this project was to provide teachers with pertinent information in regard to the history, diagnosis, primary symptoms, and treatment options for children diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). Relevant information about this disorder was gathered to provide concise information to teachers so that they may understand the disorder in order to better serve the needs of students in the classroom. The information was presented in the form of a PowerPoint presentation.

Target Audience

The groups or individuals that will be interested in this project will include: (a) elementary school teachers, (b) counselors, (c) principals, and (d) their pupils. The teachers will use the information in this project to expand their knowledge of ADHD to better distinguish their role in the diagnosis and treatment of students with this disorder.

Goals of the Applied Project

The goals of this project were twofold. The first goal was to provide the most current researched based information in regard to the etiology of ADHD to teachers to enhance their knowledge of the disorder. Also, this presentation provided information about the symptoms and treatment options available for children affected by ADHD in order to: (a) enhance their academic performance, (b) curb problems associated with behavioral inhibition, and (c) improve overall autonomy and self-efficacy.

The second goal of this project was to provide teachers with the criteria for the identification of symptoms for this disorder so they may take the appropriate steps in order to help students receive a medical diagnosis and treatment.

Procedures and Assessments

The researcher asked three certified professional teachers to review the presentation and provide informal feedback. The researcher used the informal feedback to determine the quality and effectiveness of the presentation and to identify areas for future study.

Chapter Summary

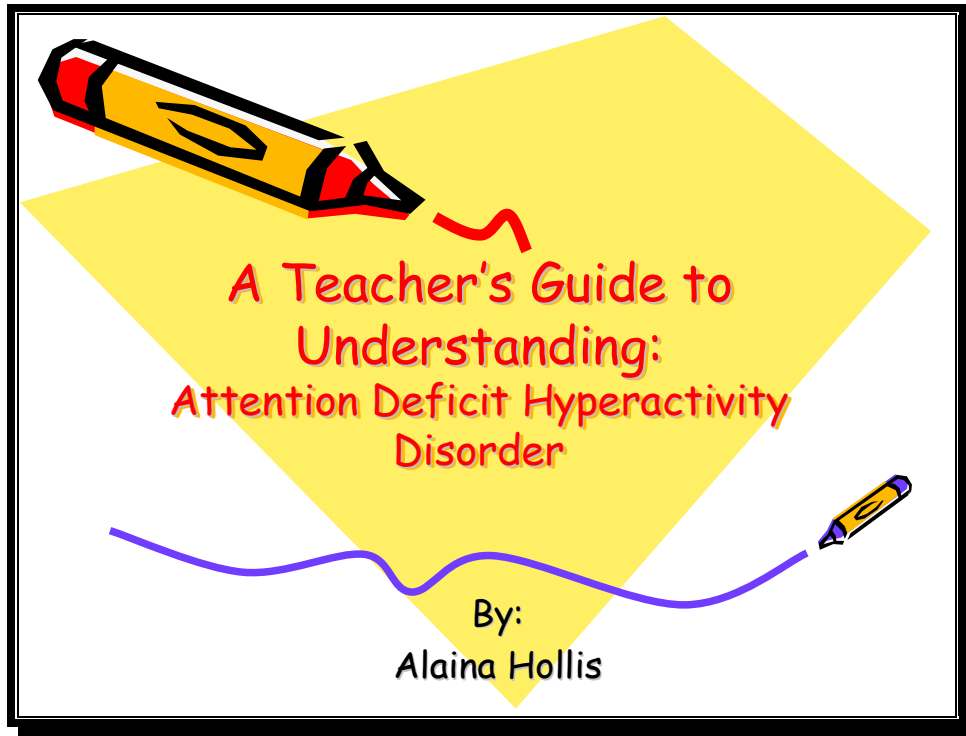
Results from informal feedback provided by teachers in the profession were applied to the presentation in Chapter 4. Discussion of the results as well as recommendations for future research was presented in Chapter 5.

Chapter 4

RESULTS

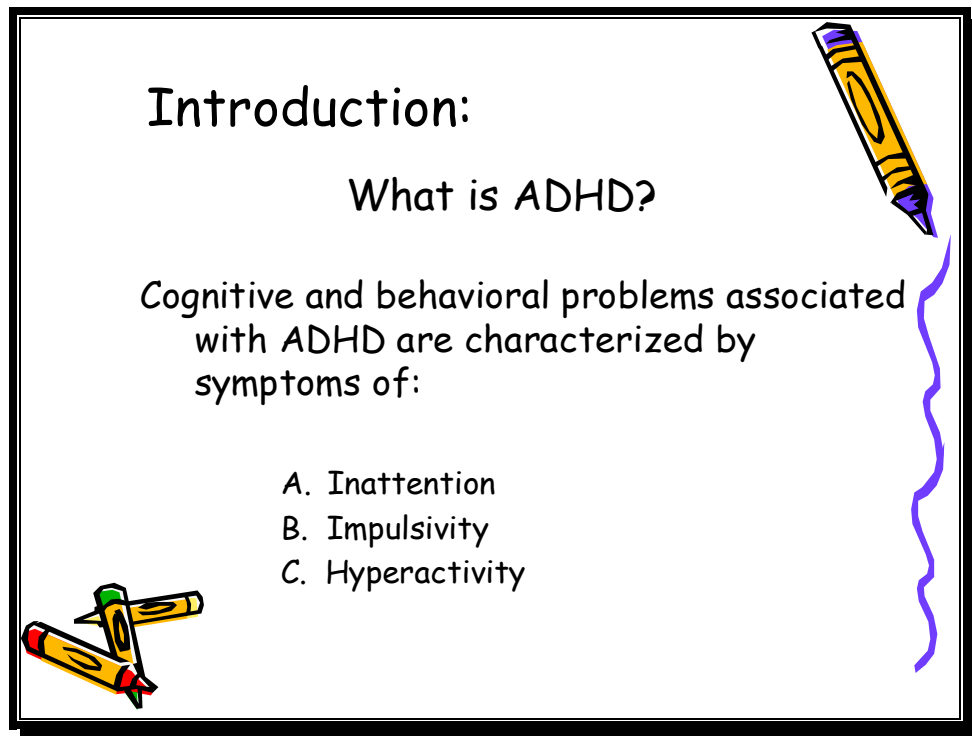
Attention deficit hyperactivity disorder is one of the most widely researched psychiatric childhood disorders (American Psychiatric Association, 1994). Over the past decade, problems characterized by symptoms of impulsivity, inattention and hyperactivity have affected the academic performance of millions of children around the world. Collectively, these symptoms are referred to as Attention Deficit Hyperactivity Disorder (ADHD). Symptoms of ADHD are most commonly exacerbated in academic settings where high demands are placed on children. As a result of the increased prevalence of ADHD in school settings, teachers need to fully understand the disorder (e.g., history, symptoms, diagnostic criteria, and treatment) in order to better serve the needs of individual students in the classroom setting. In turn, the goal of this inservice was to inform educators about ADHD with regard to the: (a) history and origin background, (b) diagnosis, (c) treatment, and (d) the role of educators. This author is hopeful that educators who are exposed to this inservice will gain a greater appreciation of ADHD as a biological disorder and consider the history, diagnosis, and treatment options presented in order to understand their role as an educator, and thus better serve the needs of their students.

Prior to the presentation, this author asked those in attendance to complete a short survey. A copy of that survey is in the Appendix.



A Teacher's Guide to Understanding Attention Deficit Hyperactivity Disorder.

This research project was presented in partial fulfillment of the requirements for the degree of Masters of Education at Regis University.



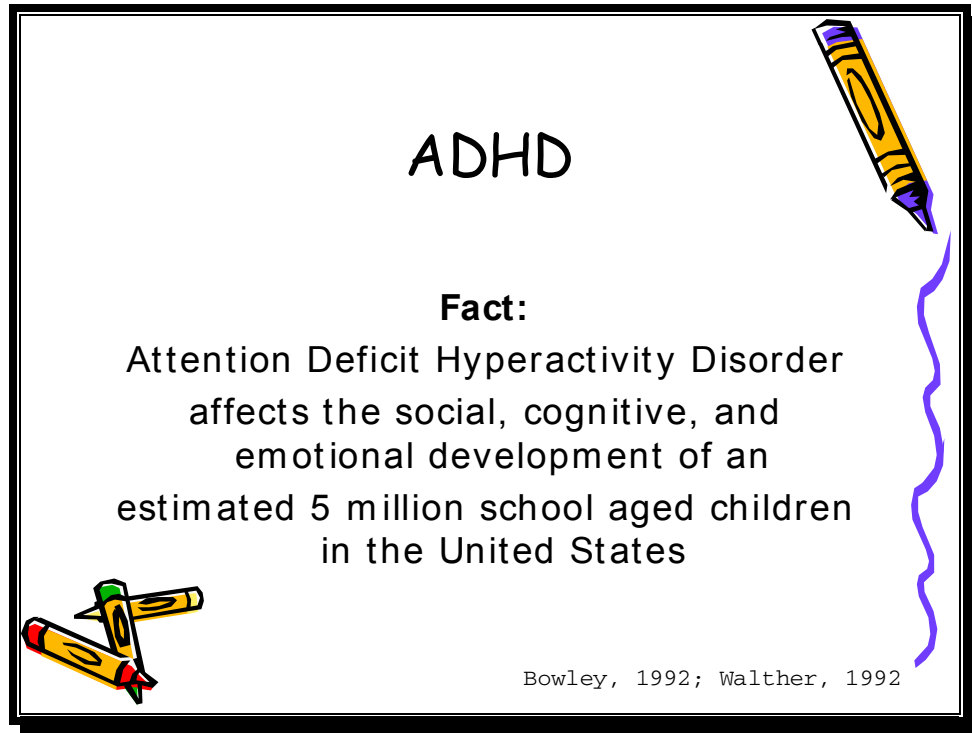
Introduction:

What is ADHD?

Cognitive and behavioral problems associated with ADHD are characterized by symptoms of:

- A. Inattention
- B. Impulsivity
- C. Hyperactivity

Attention Deficit Hyperactivity disorder (ADHD) is a huge problem facing classroom teachers today! It is the most commonly diagnosed psychiatric disorders among children. Attention Deficit Hyperactivity Disorder (ADHD) and Attention Deficit Disorder without hyperactivity (ADD) are biological disorders that in turn affect the imbalance or deficiency of the neurotransmitters in the front lobe of the brain. As a result, children with ADHD suffer from cognitive and behavioral problems characterized by three main symptoms, inattention, impulsivity, and hyperactivity. These three characteristics are considered the hallmark symptoms of ADHD.

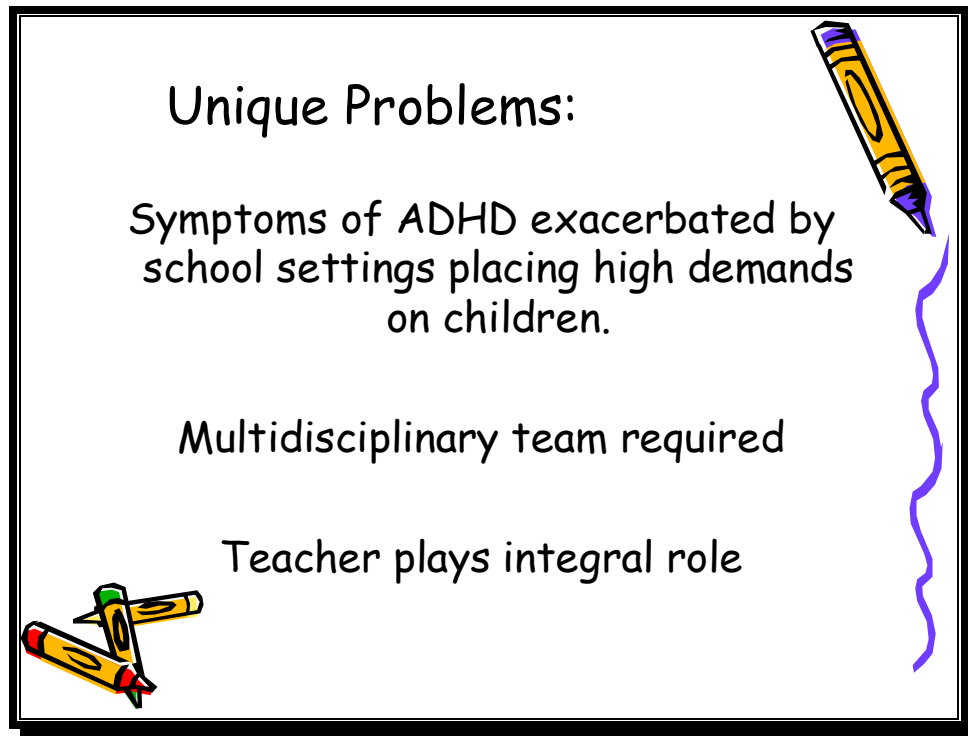


ADHD

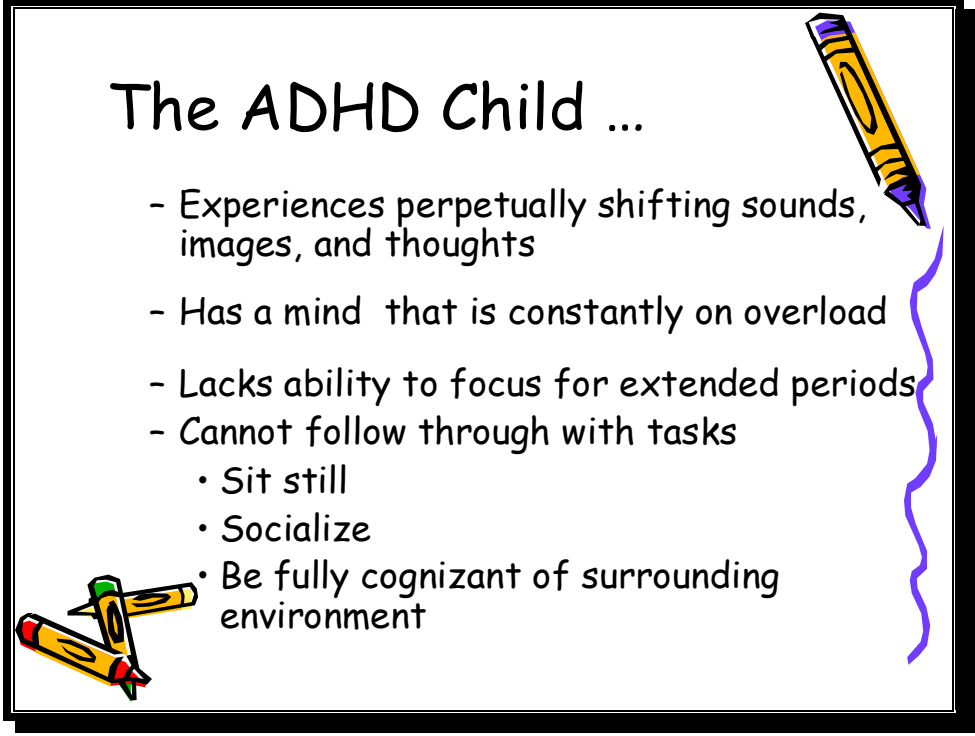
Fact:
Attention Deficit Hyperactivity Disorder
affects the social, cognitive, and
emotional development of an
estimated 5 million school aged children
in the United States

Bowley, 1992; Walther, 1992

The fact is, Attention Deficit Hyperactivity disorder affects the social, cognitive and emotional development of an estimated 5 million school aged children in the United States alone!



According to Russell Barkley, history's most prominent researcher in the field of attention deficit hyperactivity disorder, ADHD is the most commonly diagnosed psychiatric disorder among children. Think back to elementary school. How hard was it to sit still and stay silent all day long? Children with ADHD exhibit exacerbated symptoms of inattention, impulsivity and hyperactivity in the school settings where high demands are placed on them. Classroom teachers are one of the most valuable resources when it comes to diagnosing ADHD due to their daily exposure to students in a setting where symptoms characterized by the disorder are intensified. Teachers also play an intricate role in the multidisciplinary team to treat ADHD. Therefore, educators must avail themselves of the plethora of research information to better understand the notable interactions of cognitive, psychological, and biological factors of ADHD to better assist parents and psychologists in the diagnosis and treatment of ADHD in the classroom.





The ADHD Child ...

- Experiences perpetually shifting sounds, images, and thoughts
- Has a mind that is constantly on overload
- Lacks ability to focus for extended periods
- Cannot follow through with tasks
 - Sit still
 - Socialize
 - Be fully cognizant of surrounding environment

Can you imagine what it must feel like to live in a world where sounds, images, and thoughts move at a perpetually shifting pace? Where your mind is constantly on overload and you are easily distracted by unimportant sights and sounds? Can you imagine living in a world where you are in a continuous state of motion and it is nearly impossible for you to focus on anything for an extended period of time? Can you imagine finding it unbelievably difficult to follow through with tasks, sit still, socialize with others, or be fully cognizant of your surrounding environment? This is what it is like every day for children suffering from Attention Deficit Hyperactivity Disorder. These problems and symptoms are ever confusing and are exacerbated in the classroom setting.

Teacher Responsibilities

1. Understand history and causes of ADHD
2. Recognize primary symptoms
3. Use appropriate diagnostic criteria
4. Be familiar with various treatment options



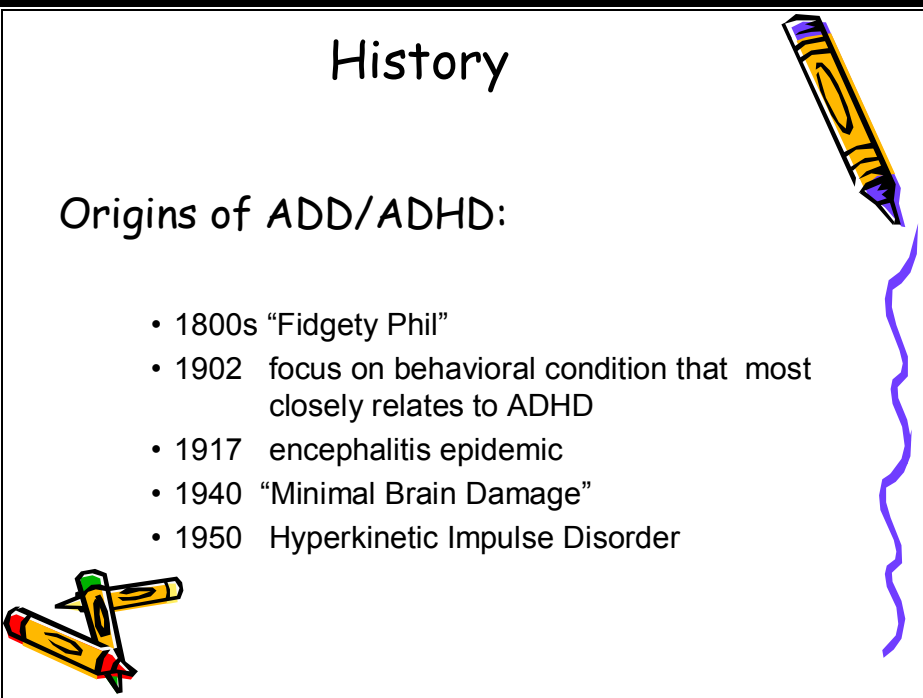
There is a plethora of research information about ADHD. Until recently, ADHD has gone unrecognized or misdiagnosed by public school educators. As a result of this misdiagnosis or lack thereof, children with ADHD were not properly treated in the primary grades and were more likely to suffer from low self esteem, inadequate social skills, chronic school failure, alcohol and or drug abuse, and finally suicide.

Educators have not taken advantage of this surplus of research information with regard to this disorder. The purpose of this inservice is to present you with viable, valuable, information with regard to the biological, cognitive, and psychological interactions of ADHD as well as the history and causes of ADHD, primary symptoms, diagnostic criteria, treatment options, and the role of educators in the classroom.

History

Origins of ADD/ADHD:

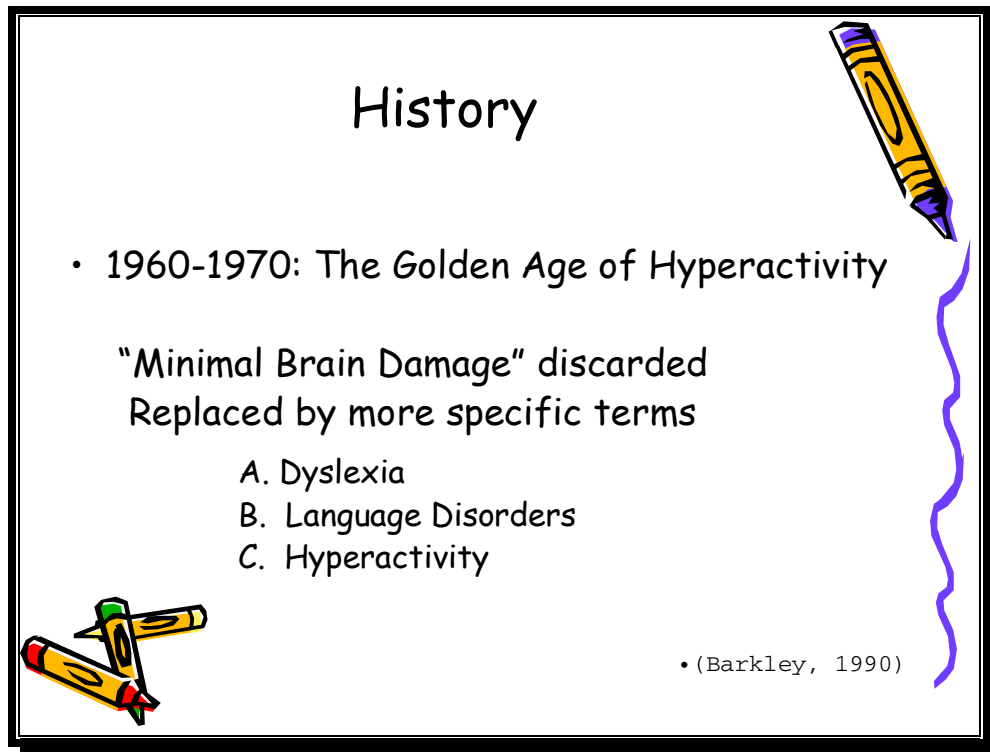
- 1800s “Fidgety Phil”
- 1902 focus on behavioral condition that most closely relates to ADHD
- 1917 encephalitis epidemic
- 1940 “Minimal Brain Damage”
- 1950 Hyperkinetic Impulse Disorder



According to the American Psychiatric Association (1994), ADHD is the most commonly diagnosed, misunderstood, psychiatric disorder that affects approximately 3-7% of all children in the United States. Barkley provided a history and background of ADHD which dates back to the 1800s with a character known as “Fidgety Phil”. Still and Myer were the first men to explore the concept of brain trauma and its correlation to unruly behavior in the early 1900s. During 1900-1960, Still and Myer focused on a behavioral condition that mostly closely relates to today’s current definition of ADHD. Still was the first person to note that the particular symptoms of ADHD were unnatural.

The history of ADHD interest in North America began in 1916 as a result of an encephalitis epidemic when clinicians treated a number of children who survived the brain infection caused by this epidemic. These children were left with notable behavior and cognitive problems that incorporated many of the symptoms that are associated with

ADHD today. In the 1940's, the term "Minimal Brain Damage" was coined as a way to distinguish the correlation between brain damage at birth and inattention, hyperactivity and impulsive behavior. It was in the 50's when new terminology was used to describe children with hyperactivity problems. Many investigations into the neurological mechanisms responsible for this impulsive behavior produced results that researchers coined as "hyperkinetic impulse disorder" also commonly known as hyperkinetic syndrome. It was claimed that a Central Nervous System deficit occurred in the thalamic area of the brain. Despite the lack of evidence at the end of this era, writers and researchers accepted the notion that hyperactivity was a brain damage syndrome, and the prognosis was considered as fair to poor.



History

- 1960-1970: The Golden Age of Hyperactivity

"Minimal Brain Damage" discarded
Replaced by more specific terms

- A. Dyslexia
- B. Language Disorders
- C. Hyperactivity

• (Barkley, 1990)



The decade between the 60's and 70's was known as The Golden Age of Hyperactivity. It was during this decade that the term minimal brain damage was discarded and replaced with the terms we know today as dyslexia, language disorders and hyperactivity.

History

The decade 1970-1980

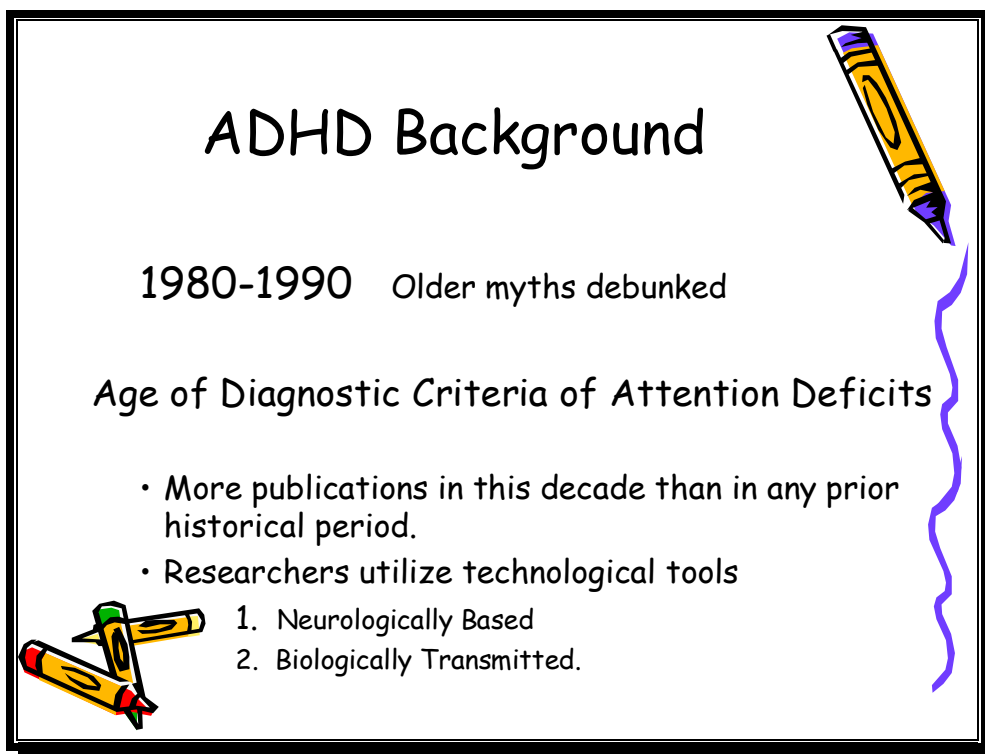
- Renewed interest in ADHD research.
- 2,000 new published reports
- New emphasis placed on inattention and impulsivity
- Douglas* defines tetrad of deficits
 1. impulsive behavior
 2. lack of organization
 3. inability to modulate arousal levels
 4. unusually strong inclination to seek immediate reinforcement.

*Canadian Psychological Association



The 1970s marked a period of notable research into the field of research for ADHD. There were an estimated 2,000 studies published with regard to ADHD at the turn of the decade. It was during this decade that more emphasis was placed on inattention and impulsivity in terms of a brain dysfunction rather than brain damage. Douglas, a member of the Canadian Psychological Association and prominent researcher in the field of ADHD, argued that it was the deficits in sustained attention and impulse control which were more likely to account for the difficulties seen in these children rather than hyperactivity alone. Later, she refined her theory of hyperactivity in regard to ADHD as a behavioral disorder. She suggested that four major deficits account for the symptoms of ADHD, inability to inhibit impulsive responding, deficits in organization and maintenance of attention and effort, inability to modulate arousal levels to meet

situational demands, and an unusually strong inclination to see immediate reinforcement. Douglas' theory initiated a substantial amount of research over the next 15 years.



ADHD Background

1980-1990 Older myths debunked

Age of Diagnostic Criteria of Attention Deficits

- More publications in this decade than in any prior historical period.
- Researchers utilize technological tools
 1. Neurologically Based
 2. Biologically Transmitted.

Also during the 70's era it was thought that ADHD was thought of as a “myth” proposed by intolerant teachers and parents in an inadequate educational system that was being advanced by the public. The claim was soon coupled with a backlash against drugging school children for their behavioral problems and was theorized that ADHD was the cause of environmental factors.

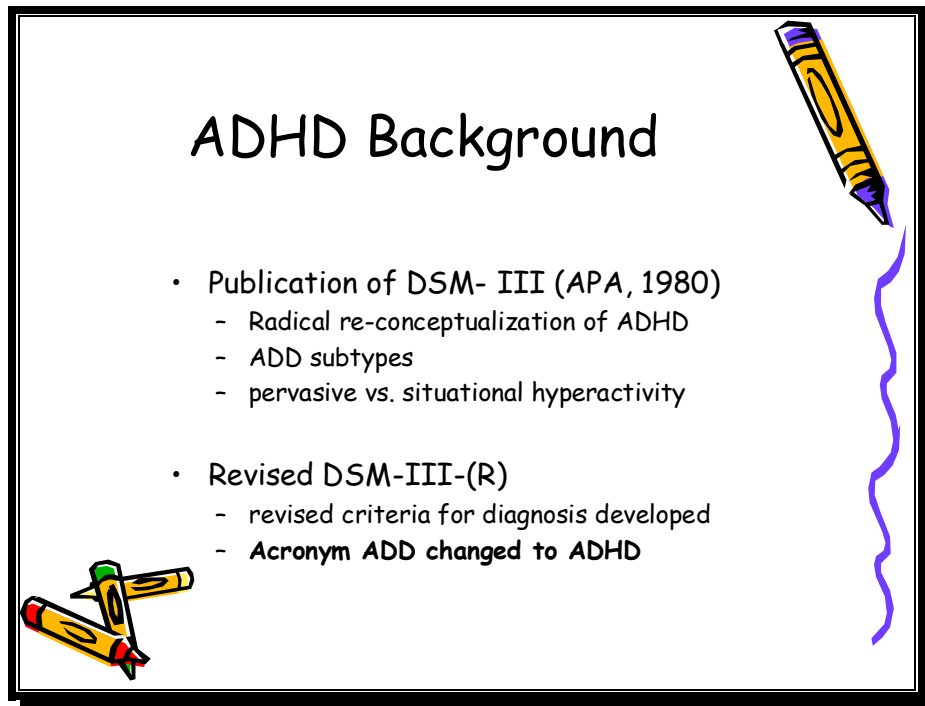
The 1980s marked the age of diagnostic criteria of attention deficits. It was during this era that ADHD became the most studied childhood psychiatric disorder in history. More books, papers, and studies were published during this decade than in any previous historical period. Older myths and theories were rebuked. Researchers began to “utilize technological tools to attempt to demonstrate that ADD/ADHD is neurologically based and is genetically and biologically transmitted.

ADHD Background

- 1990-1999
 - Positron Emission Topography (PET)
 - Findings Concluded:
 - » 3 areas in left brain with distinct patterns of impaired glucose utilization
 - » Resultant abnormal responses and thought patterns.
 - » This failure triggers a pattern described as ADHD
 - Publication of DSM-IV (APA, 1994)



It was in the 1990s when positron emission topography (PET) brain studies were conducted with children diagnosed with ADHD. The findings from these studies showed that three areas of the left brain showed distinct patterns of brain failure to use glucose (e.g., brain sugar) fast enough to maintain normal muscle responses and thought patterns. This failure of the brain to use its glucose triggers a pattern described as ADHD. The 90's marked the decade for the newest publication of the DSM-IV in 1994. The authors indicated that no definitive laboratory tests were recognized for the diagnosis of ADD/ADHD.



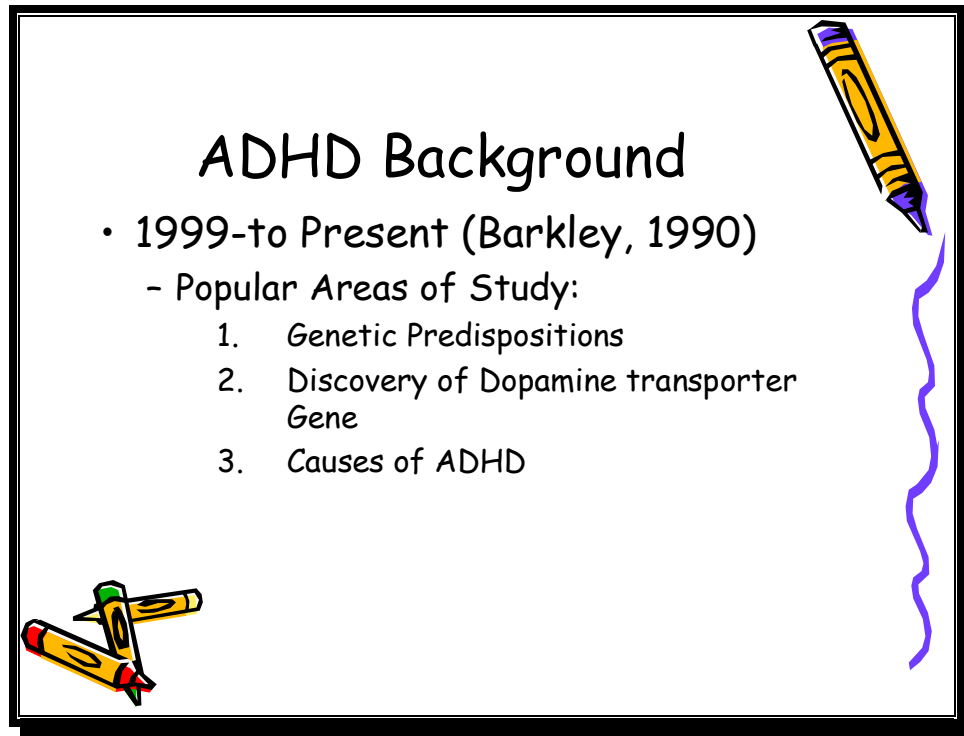
ADHD Background

- Publication of DSM- III (APA, 1980)
 - Radical re-conceptualization of ADHD
 - ADD subtypes
 - pervasive vs. situational hyperactivity
- Revised DSM-III-(R)
 - revised criteria for diagnosis developed
 - **Acronym ADD changed to ADHD**

During the beginning of the 80's, the DSM-III d was published. The DSM-III criteria are attached in Appendix A. The criterion in the DSM-III was a radical reconceptualization of ADHD. In this publication, the DSM-III provided subtypes of ADD in an attempt to identify additional useful approaches, other than the criteria based on hyperactivity or aggression alone. It was during the late 1980s that writers and clinicians attempted to distinguish between *pervasive* and *situational hyperactivity*. Studies showed that pervasively hyperactive children were more likely to have severe behavioral symptoms, greater aggression and peer relationship problems, and poorer academic achievement than children with situational hyperactivity. In 1987, the APA further revised the criteria for identification and diagnosis of this disorder and changed the name from ADD to ADHD in the DSM-III– revised edition.

This revision was more important than a change in the acronym. The changes made in the DSM-III-R included a single item list of symptoms and a single cutoff score.

This revision replaced the three previous lists inattention, impulsivity, and hyperactivity as well as a established criteria based on more empirically derived dimensions of child behavior from behavior rating scales. There was an emphasis on the symptoms of ADHD as being developmentally inappropriate for a child's mental age, and there was a removal of coexisting affective disorders. Also, the subtype of ADD/-H was deleted as a subtype and defined as undifferentiated ADD.



In the past fifteen years, one of the more popular areas of study for ADHD is genetic predispositions versus environment factors. Most of the previous research methodologies used to support a genetic etiology over environment consist primarily of family studies. It has been shown in research that there is a connection between the thyroid hormone receptor and ADD/ADHD characteristics. However, further research, in regard to this hormone receptor as an indicator of the possible genetic influence on the etiology of ADHD, needs to be conducted.



Another genetic discovery that has been emphasized in the past decade is the dopamine transporter gene. It has been reported that children with ADHD responded positively to medications that inhibit this dopamine transporter, which in turn, suggests that the dopamine transporter is a primary candidate gene for ADHD. This leads us into the last popular area of research with regard to ADHD: the causes.

Evolution of the term ADHD

Almost a century in evolution

- ADHD often hereditary, significantly modulated by social circumstances.
- Central Theme
 - behavioral disinhibition /self-regulation
 - “brain damage syndrome”
 - “organic drivenness”
 - “hyperkinetic impulse disorder”
 - “ADD”

culminating in the modern term “ADHD.”

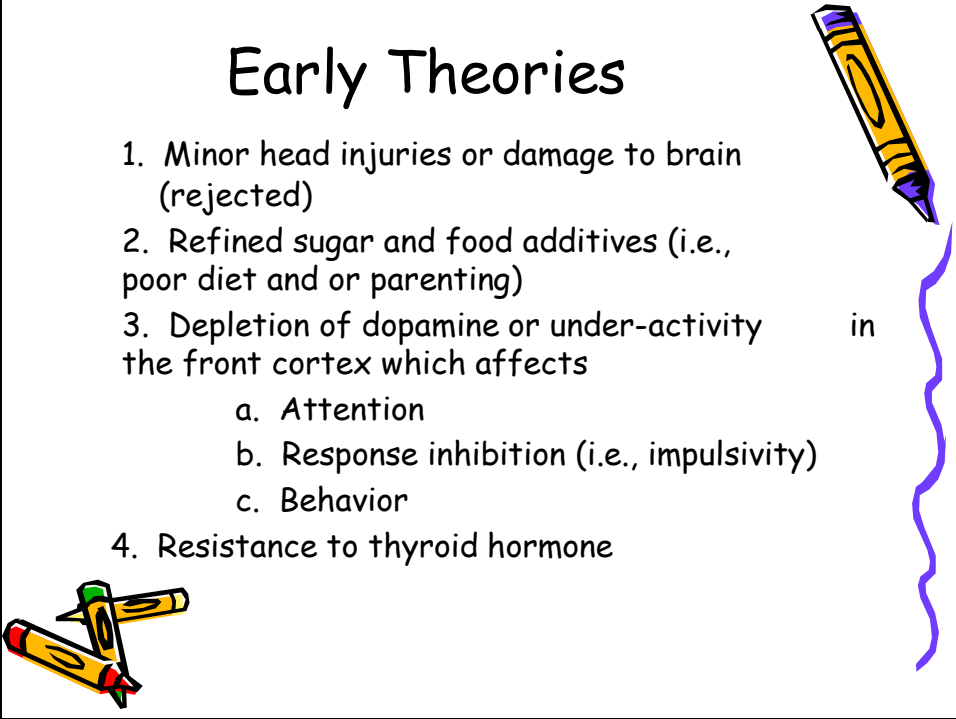
Barkley wrote about the notable developments in assessment, research methodology, and therapy for ADHD during this decade. At the end of the decade, most professionals viewed ADHD as a developmentally handicapping condition that, by nature, is usually chronic and has a strong hereditary or biological predisposition which, in turn, has notable negative impacts on the academic and social outcomes for children.

Barkley summarized the evolution of ADHD from the early 1900s when he wrote:

This world would evolve over 90 years to a view of ADHD as a biological, often hereditary, predisposition to defects in the regulation of behavior by rules and consequences-defects that could be significantly modulated by social circumstances. Throughout this evolution, the role of behavioral disinhibition/self-regulation has proven a central theme to which theorists of different eras have returned again and again. Along the way, labels changed from “brain damage syndrome” and “organic drivenness” to “hyperkinetic impulse disorder” and then on to “ADD,” culminating in “ADHD.” (p. 37)

Early Theories

1. Minor head injuries or damage to brain (rejected)
2. Refined sugar and food additives (i.e., poor diet and or parenting)
3. Depletion of dopamine or under-activity in the front cortex which affects
 - a. Attention
 - b. Response inhibition (i.e., impulsivity)
 - c. Behavior
4. Resistance to thyroid hormone



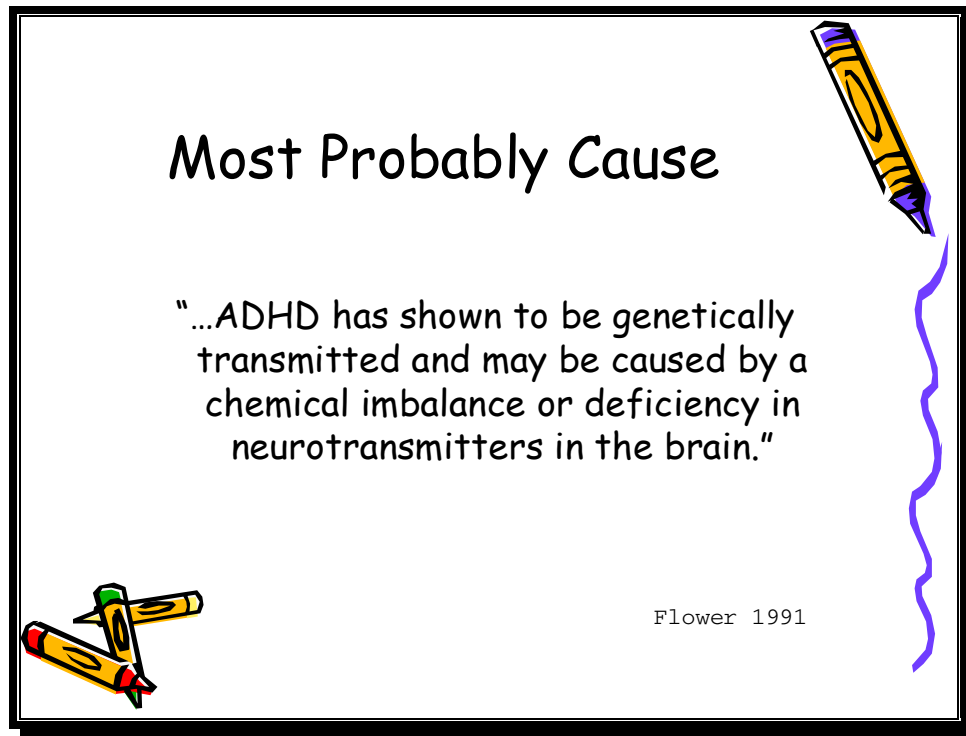
Scientists and medical experts do not know the cause of ADHD and suggest that the disorder is acquired in many ways. There are four major theories of the cause of ADHD: The first theory which was later rejected was that of minimal brain damage or minimal brain dysfunction. This theory was popular in the 1940s, in which it was purported that attention disorders were caused by minor head injuries or damage to the brain, has been rejected. The theory itself was rejected because it could explain only a very small number of brain injury cases which were directly correlated to attention disorders. Not everyone with ADHD has a history of head trauma or a birth complication.

The second popular theory was that refined sugar and food additives, in other words, a poor diet, or poor parenting, caused children to be hyperactive and inattentive. Clinicians encouraged parents to discontinue serving food that contained artificial

flavorings, sugars, and preservatives to their children. The staff of the National Institutes of Health concluded that a restricted diet helped approximately 5% of children with ADHD, mostly young children or children with food allergies. Also, they provided a list of the theorized causes of ADHD which, in fact, are not valid. These included too much television watching, food allergies, excess sugar, poor home life, and poor schools. Some researchers argue that despite popular opinion the consumption of certain foods additives, sugar, prenatal influences, birth complications or brain damage, are no longer considered a notable cause of ADHD. However, in some cases they may exacerbate the existing ADHD symptoms.

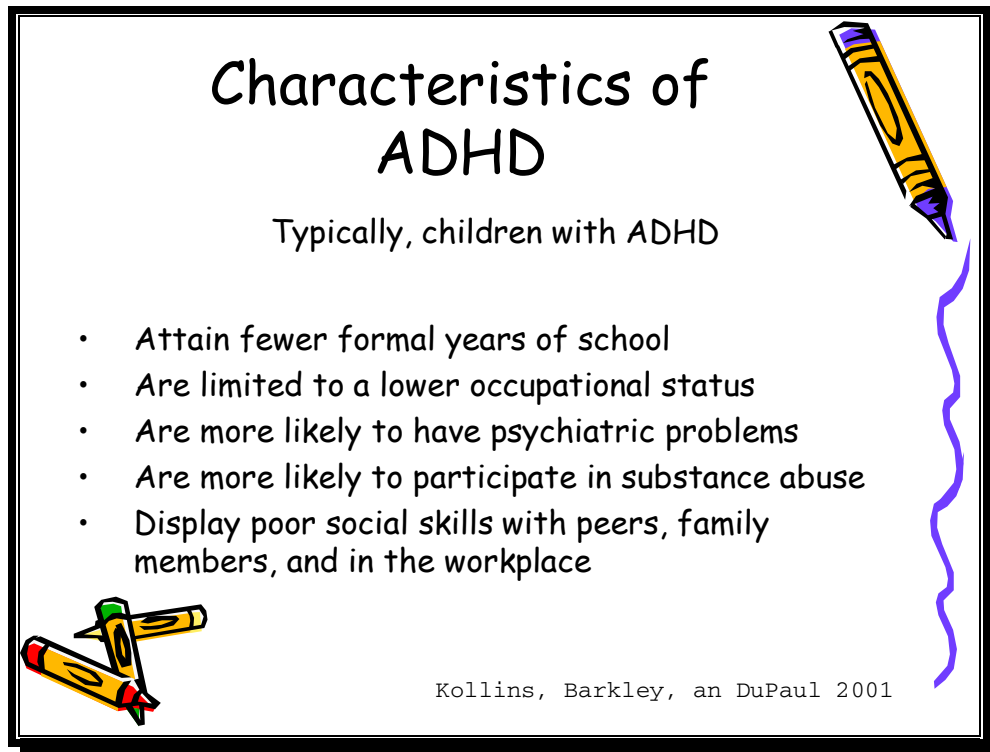
The third major theory of the cause of ADHD is the notion that ADHD is mostly likely a direct result of an inherited tendency toward the depletion of dopamine, or underactivity in the frontal cortex of the brain. Also, there was an indication that there is an “inefficiency or imbalance of several neurotransmitters and lowered glucose metabolism in the brain of those affected with ADHD.

The fourth popular theory about ADHD involves a possible correlation between hyperactivity and a generalized resistance to thyroid hormone. Studies have shown that close to 10% of persons diagnosed with ADHD show a decreased blood flow to the striatum and prefrontal regions of the brain.



Although there are data that suggest validity in these theories, scientists can agree on the most probably cause of ADHD. Flower, a former teacher and founder of an ADHD parent support group, suggested that in many cases, ADHD has shown to be genetically transmitted and may be caused by a chemical imbalance or deficiency in neurotransmitters in the brain. Over the last decades, researchers and clinicians have developed many theories about the causes of ADHD.

Although there is no known cause of ADHD scientists continue to study the possible theories. The next step for scientists and clinicians is to determine why there is less activity in certain areas of the brain in order to find a more definitive cause of ADHD and better treatment options.



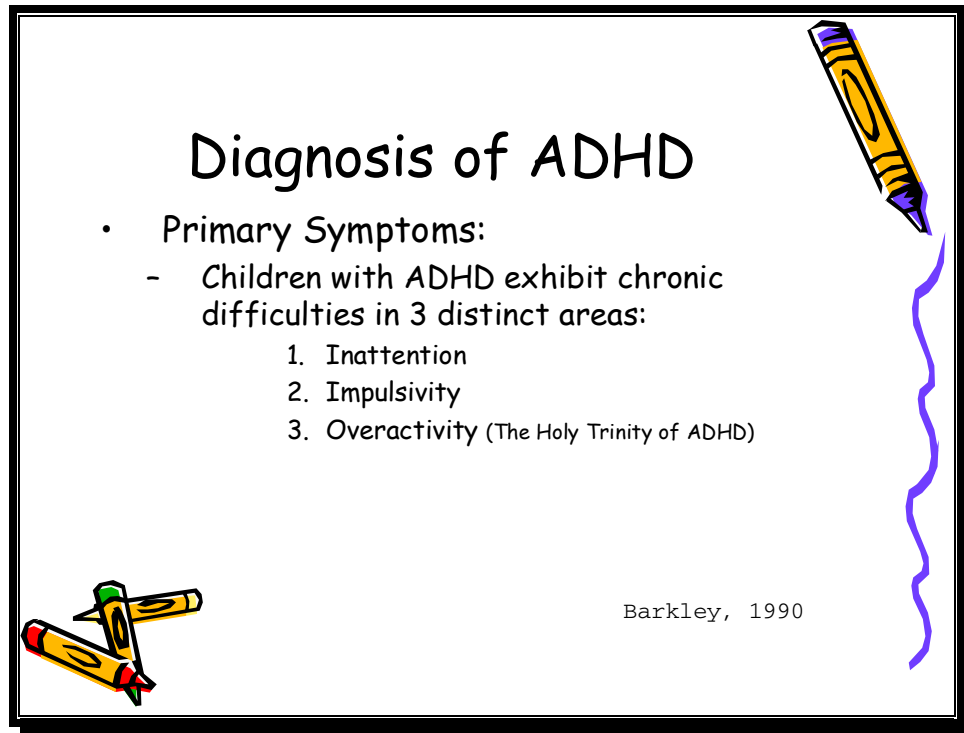
Characteristics of ADHD

Typically, children with ADHD

- Attain fewer formal years of school
- Are limited to a lower occupational status
- Are more likely to have psychiatric problems
- Are more likely to participate in substance abuse
- Display poor social skills with peers, family members, and in the workplace

Kollins, Barkley, and DuPaul 2001

Children diagnosed with ADHD are at higher risk of having severe behavioral and emotional problems throughout childhood. Typically, children with ADHD attain fewer formal years of school, are limited to a lower occupational status, and are more likely to have psychiatric problems and participate in substance abuse. Also, they display poor social skills with peers, family members, and in the work place. Given the potential for adverse outcomes associated with ADHD, it is imperative that teachers, parents and clinicians seek effective treatment for these children as soon as possible.

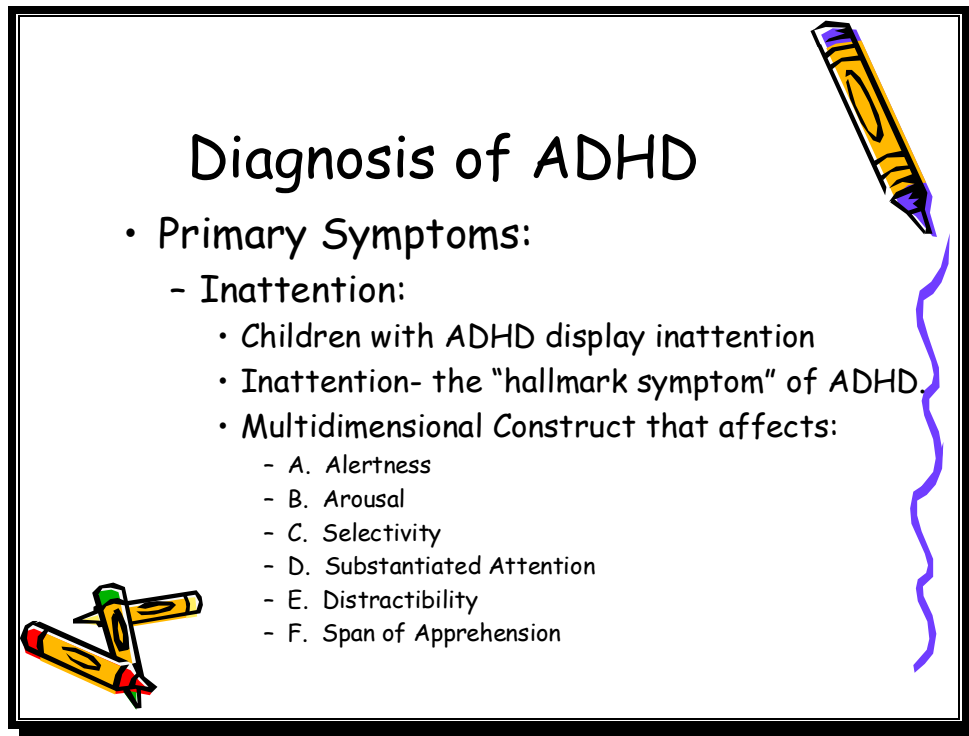


Diagnosis of ADHD

- Primary Symptoms:
 - Children with ADHD exhibit chronic difficulties in 3 distinct areas:
 1. Inattention
 2. Impulsivity
 3. Overactivity (The Holy Trinity of ADHD)

Barkley, 1990

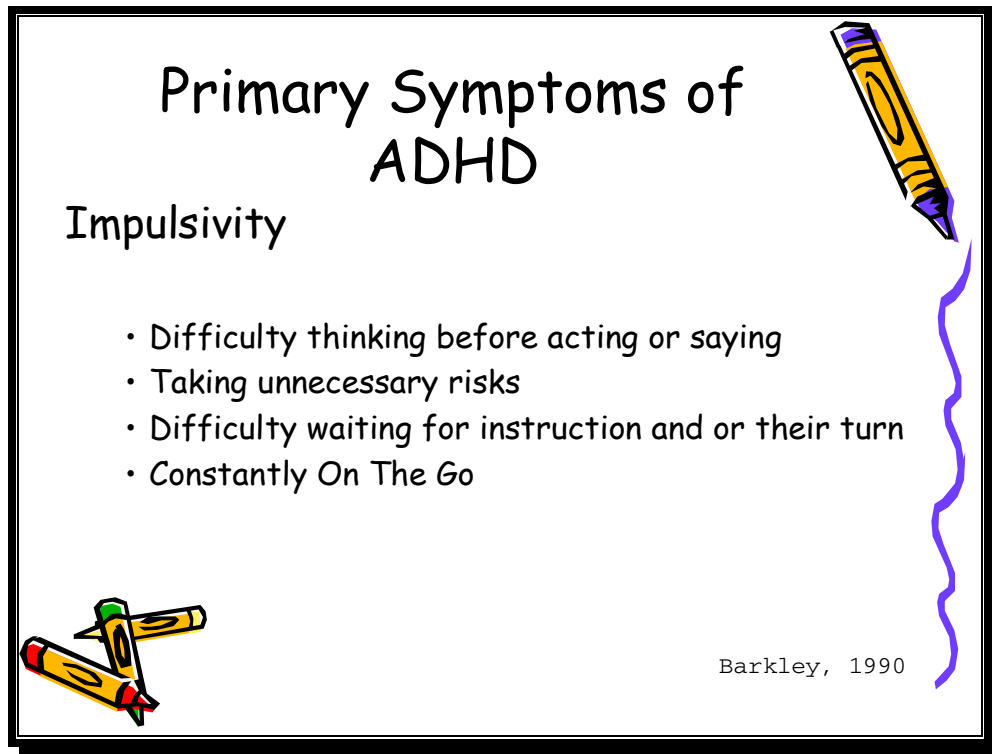
There are various types of ADHD and some authors argue that ADHD can be subtyped into 6 different groups. Therefore, it can be difficult to diagnosis ADHD because many of the symptoms can manifest themselves as other symptoms. Children with ADHD are described as having chronic difficulties in three distinct areas: inattention, impulsivity, and overactivity. Barkley refers to these symptoms as the holy trinity of ADHD.



Diagnosis of ADHD

- Primary Symptoms:
 - Inattention:
 - Children with ADHD display inattention
 - Inattention- the "hallmark symptom" of ADHD.
 - Multidimensional Construct that affects:
 - A. Alertness
 - B. Arousal
 - C. Selectivity
 - D. Substantiated Attention
 - E. Distractibility
 - F. Span of Apprehension

The first primary symptom of ADHD is inattention. Children with ADHD display inattention compared to normal children of the same age and sex. Society tends to view children with ADD or ADHD as incapable of sustaining attention. Inattention has been marked as the hallmark symptom of ADHD. In terms of ADHD, children with the disorder display inattention and effort over prolonged periods of time, compared to normal children of the same age and sex. Inattention is a multidimensional construct that can affect alertness, arousal, selectivity, sustained attention, distractibility, or span of apprehension just to name a few.



Primary Symptoms of ADHD

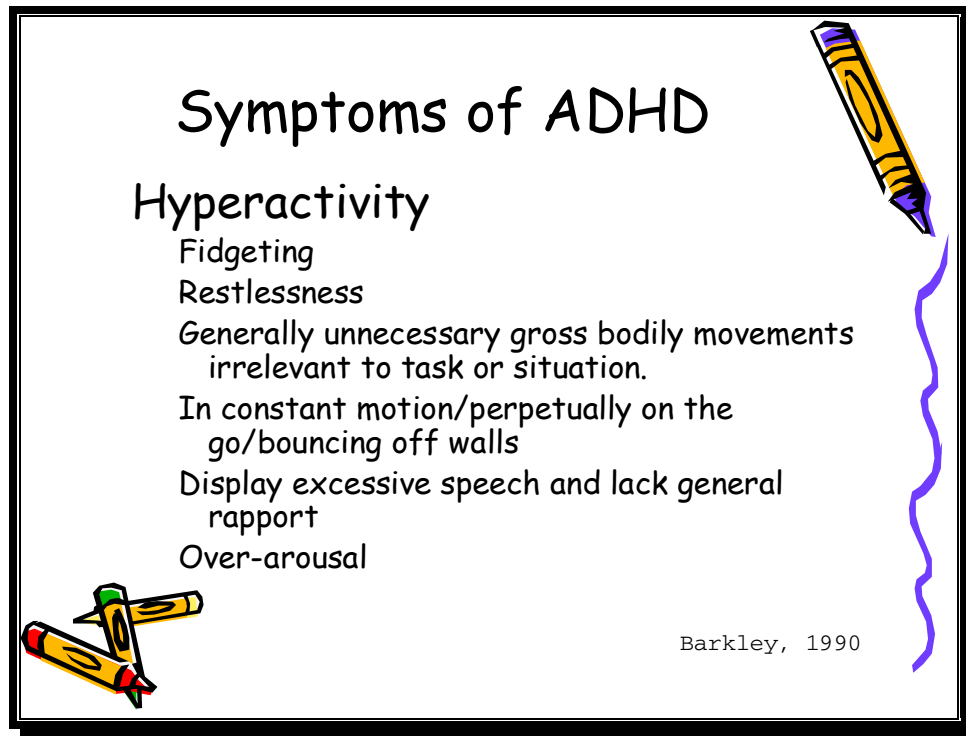
Impulsivity

- Difficulty thinking before acting or saying
- Taking unnecessary risks
- Difficulty waiting for instruction and or their turn
- Constantly On The Go

Barkley, 1990

Another primary symptom of ADHD is impulsivity. Similar to inattention, children with ADHD experience impulsive behavior or hyperactive in response to high situational demands. Impulsivity or hyperactivity is multidimensional and ambiguous in nature. Researchers still do not know the definitive aspects of impulsivity that are problematic for children with ADHD. It is difficult for ADHD children to stop to think before they say or act and, often, they do or say the first thing that comes into their heads. For example, children with ADHD may blurt out answers in class, say tactless things. They often also take unnecessary risks and tend to respond quickly to situations without waiting for directions or instructions. In class, ADHD children find it extremely difficult to wait their turn or realize that they are not the only student in the classroom. They are the type of children who may run out in front of a car without looking first.

These children fail to consider the consequences of their actions and may carelessly damage or destroy property or endanger their own lives without thought of the adverse effects. Impulsivity is a pattern of rapid, inaccurate responses to tasks. Children with ADHD are constantly “on the go” and for some teachers it is draining to keep the student in his or her seat. It is not inattention that distinguishes ADHD children from children with other clinical disorders or from normal children as much as it is their hyperactivity.



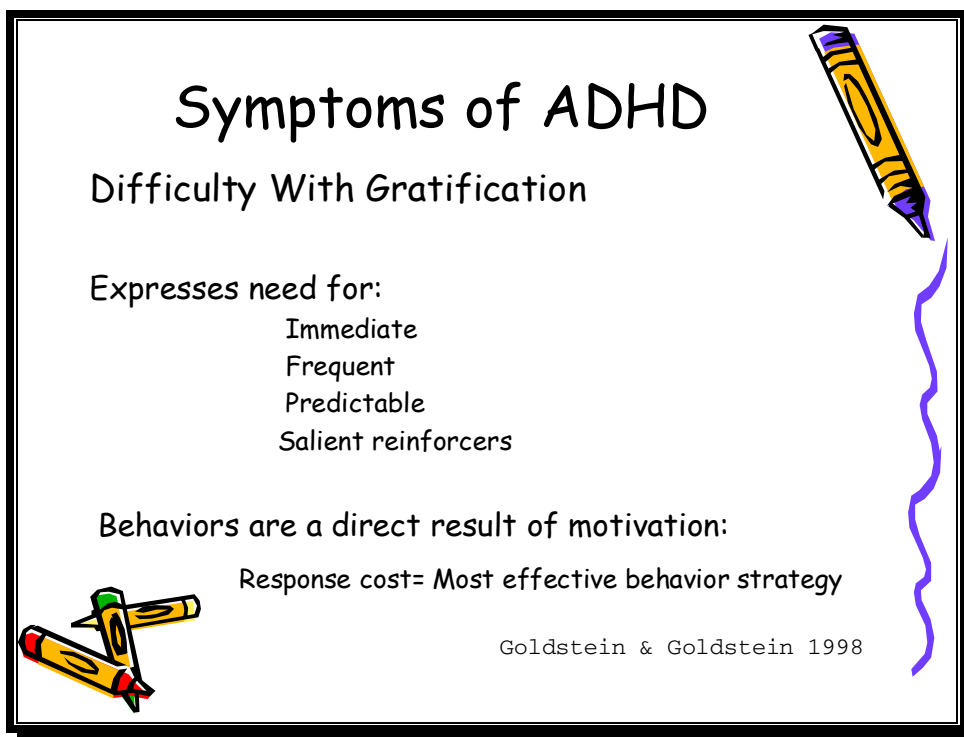
Symptoms of ADHD

Hyperactivity

- Fidgeting
- Restlessness
- Generally unnecessary gross bodily movements irrelevant to task or situation.
- In constant motion/perpetually on the go/bouncing off walls
- Display excessive speech and lack general rapport
- Over-arousal

Barkley, 1990

The third primary symptom of ADHD children is hyperactivity. Characteristics of hyperactivity include fidgeting, restlessness, and generally unnecessary gross bodily movements irrelevant to the task or situation. Hyperactivity is described as a constant state of motion. This type of behavior is most prevalent at school and while the child works independently. Hyperactivity in children with ADHD is extremely evident in their social interactions with others. Children with ADHD tend to display excessive speech and commentary that lack general rapport. Researchers tend to refer to hyperactivity as overarousal, and define overarousal as the inability to modulate the body and emotion in time and space that is appropriate to the situation.



Symptoms of ADHD

Difficulty With Gratification

Expresses need for:

- Immediate
- Frequent
- Predictable
- Salient reinforcers

Behaviors are a direct result of motivation:

Response cost= Most effective behavior strategy

Goldstein & Goldstein 1998

Children with ADHD tend to express the need for immediate gratification. They have an inability to benefit efficiently from the consequences of their actions, and they show a repeated need to try things more than once. These behaviors are a direct result of motivation. Goldstein and Goldstein stated that, “Again, although it is increasingly recognized that this pattern of difficulty, ostensibly the need for more immediate gratification, likely results from limited capacity for self-control”. The most effective behavior modification strategy for children with ADHD is the idea that the student may lose what has been earned.

Understanding ADHD

"The problem is not so much one of heightened distractibility, or the ease with which children are drawn off task by extraneous stimulation, although many parents and teachers will describe these children in such terms.



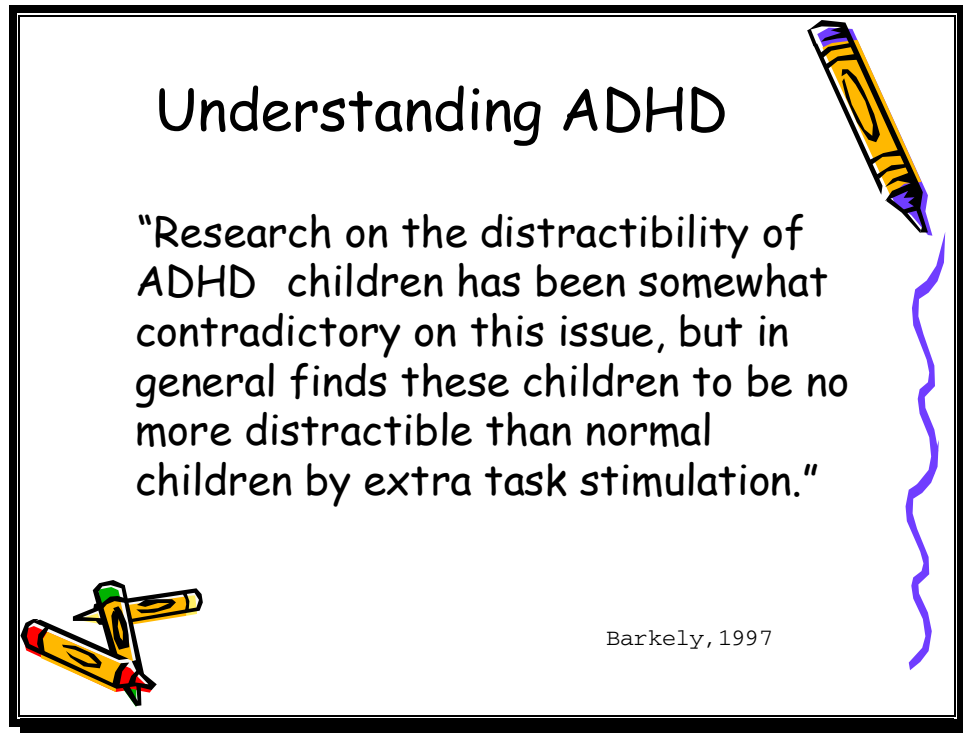
Barkely, 1997

Barkley noted that the problem is not the heightened distractibility, or the ease in which children are drawn off task by extraneous stimulation it is the notion that children with ADHD are over stimulated and focus on everything. It is a common myth to think that children with ADHD cannot focus. They can! In fact they focus on everything and cannot differentiation between what is important to focus on and what is not!

Understanding ADHD

"Research on the distractibility of ADHD children has been somewhat contradictory on this issue, but in general finds these children to be no more distractible than normal children by extra task stimulation."

Barkely, 1997

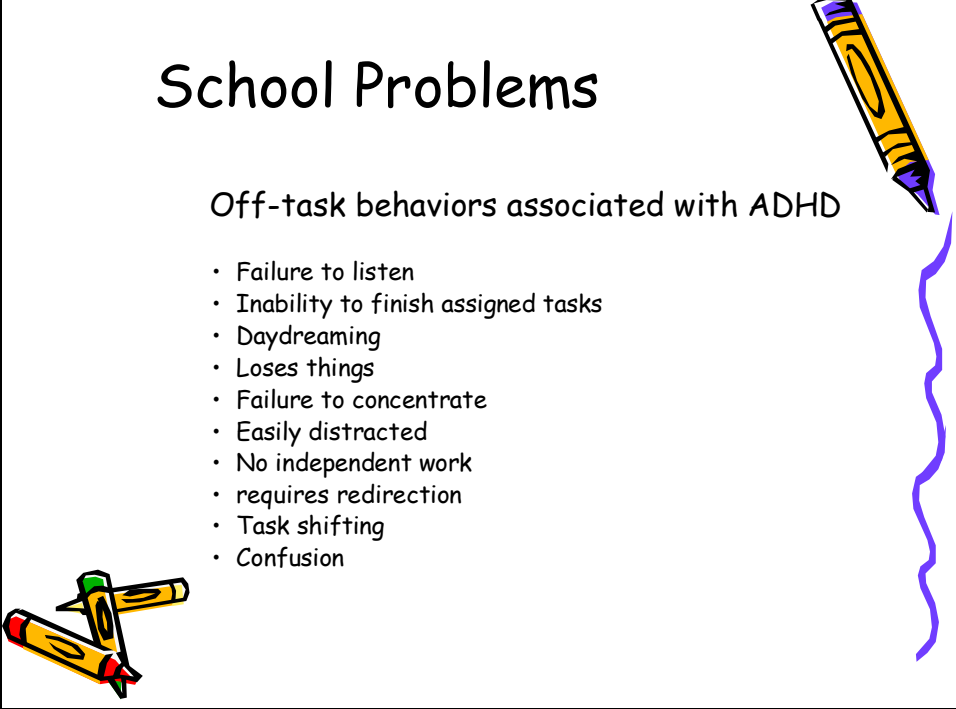


Research on the distractibility of ADHD children has been somewhat controversial. The fact is children with ADHD tend to be no more distractible than normal children by extra task stimulation.

School Problems

Off-task behaviors associated with ADHD

- Failure to listen
- Inability to finish assigned tasks
- Daydreaming
- Loses things
- Failure to concentrate
- Easily distracted
- No independent work
- requires redirection
- Task shifting
- Confusion



What are the types of problems that teachers may find with ADHD children? The off task behaviors that a teacher may see in the classroom range from a student failing to listen to directions and following through with tasks, to daydreaming and loses things on a consistent basis. These students tend to focus on countless external stimuli which can inhibit them work independently and require constant redirection. ADHD students will most likely shift tasks constantly which often disrupt whole class instruction and individual work time. The teacher must be cognizant of the learning dynamic in the classroom because children with ADHD may disrupt other students' ability to learn. It is also evident that children with ADHD often display a state of confusion.



Diagnostic Strategy for Children with ADHD

Multidisciplinary Approach

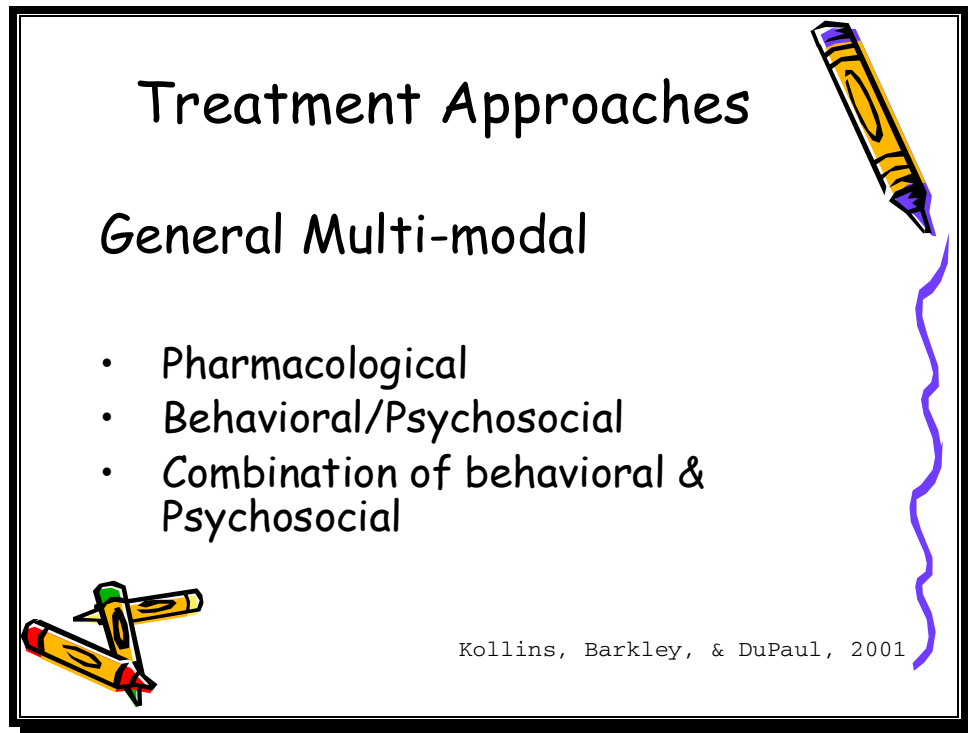
The following Criteria should be considering in the diagnosis of ADHD

1. DSM-IV Diagnostic Criteria
2. Elevated Rating Scales
3. Objective Measures
4. Situational Problems
5. Differential Diagnosis

Goldstein & Goldstein, 1998

Goldstein and Goldstein developed a strategy for practitioners to diagnosis ADHD with a high degree of confidence. These criteria are shown here. The first criteria that should be considered in the diagnosis of ADHD is the DSM-IV. The DSM-IV provides the most utilized and researched definition and diagnostic criteria for ADHD. Three criteria are presented in regard to ADHD, and it is imperative that the child meet at least one of these three criteria: primarily inattentive type, primarily hyperactive-impulsive type, combined type. The second criteria to consider are the idea of elevated rating scales. Elevated rating scales do not diagnose; but they can be used to describe behaviors in a statistical, organized manner. See Appendix C for an example of an elevated rating scale. The most popular rating scales used to diagnose ADHD behaviors are the Conner Parents' and Teachers' Questionnaires. These questionnaires provide a thorough behavioral profile and contain well structured, attention symptom scales.

Questionnaires should be administered by two independent raters. The parent and the teacher would serve as two independent raters. The third recommend criteria to consider are *objective measures*. There are a variety of norm-referenced measures that range from paper-and-pencil assessment tests to computer-based instructional tools used to diagnose children with ADHD. The purpose of these assessments is to rate the performance rather than process. For example, tasks that measure metabolites or brain waves are not considered objective measures of ADHD because of their limited supported scientific research. The fourth diagnostic criteria to consider are situational problems. Children affected with ADHD have been found to have situational problems in school and at home. They tend to exhibit their greatest behavioral problems in the classroom. Close to 72% of children referred for problems of attention and impulsivity presented with a consensus between parents and teachers concerning the severity of these problems. Including situational data as diagnostic criteria for ADHD allows the evaluator to assess the impact of daily living as a symptom of the disorder. The final criteria to consider are differential diagnoses. Differential diagnosis is the collection of sufficient history, behavior, and assessment data to understand and rule out other medical problems.



Treatment Approaches

General Multi-modal

- Pharmacological
- Behavioral/Psychosocial
- Combination of behavioral & Psychosocial

Kollins, Barkley, & DuPaul, 2001



Kollins, Barkley, and DuPaul identified the three general approaches used to treat ADHD that have received the most attention in current research. The first approach described is the pharmacological approach which would be the use of medication. The second approach is the behavioral/psychosocial approach which involves behavioral therapy. The third general approach used to treat ADHD is a combination of behavioral and psychosocial approaches. This tends to be the most effective treatment. Students who are medicated with a stimulant of some kind and receive some form of behavioral modification therapy tend to show a significant decrease in symptoms and problem behaviors. The most effective treatment with regard to ADHD is the use of central nervous system stimulants. The use of central nervous system stimulants to treat ADHD has been widely studied, and generated substantial controversy. The largest area of interest is the long-term safety and efficacy of the use of these drugs.

Pharmacologic Treatment

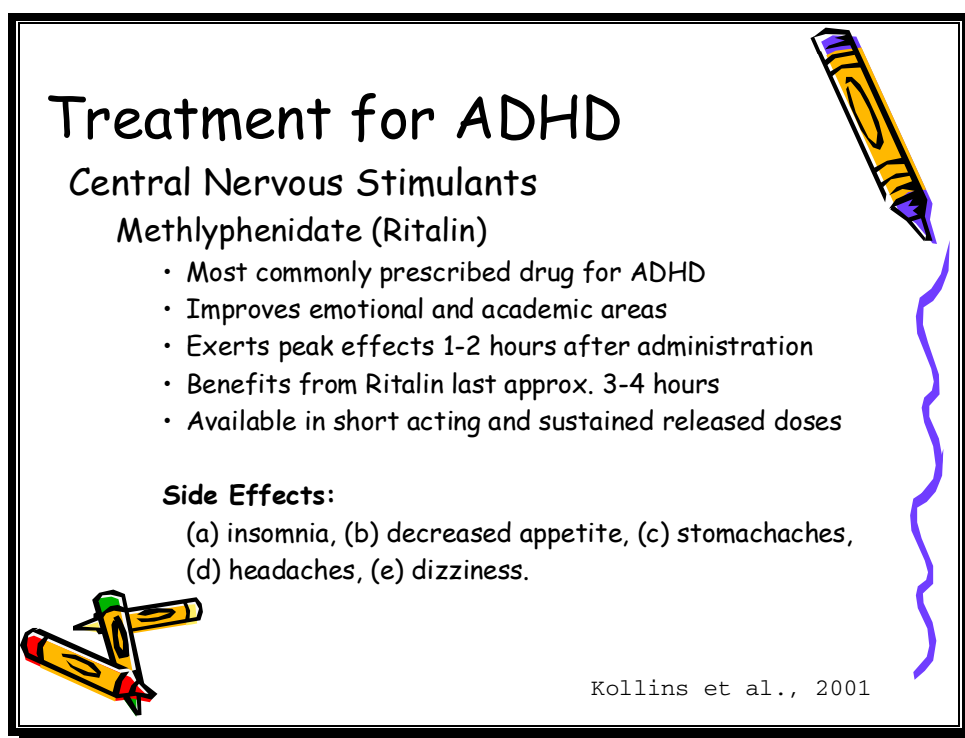
Stimulants

- To increase the arousal or alertness of the central nervous system (CNS).
- Structure: Sympathomimetic compounds with similar structure to the neurotransmitters (e.g., dopamine) in the brain.
- Most common CNS stimulants:
 - Methylphenidate (Ritalin)
 - Dextroamphetamine (Dexedrine)
 - Pemoline (Cylert)

Vickers, 2002



Stimulant medications have the ability to increase the arousal or alertness of the central nervous system (CNS). Stimulants are sympathomimetic compounds that have a similar structure to the neurotransmitters in the brain. One particular neurotransmitter affected by central nervous system stimulants is dopamine. The use of stimulants increases the alertness of the central nervous system. There are three commonly employed CNS stimulants, methylphenidate (Ritalin), dextroamphetamine (Dexedrine), and pemoline (Cylert). These central nervous system stimulants are dispersed in tablets based on a fixed dosage.



Treatment for ADHD

Central Nervous Stimulants

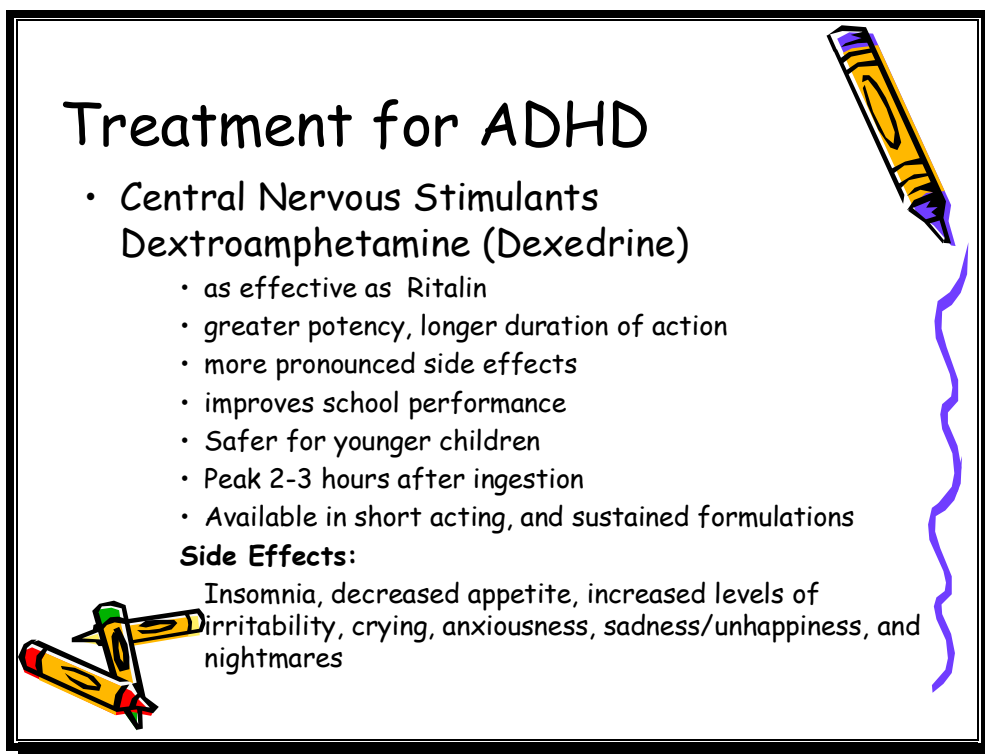
Methlyphenidate (Ritalin)

- Most commonly prescribed drug for ADHD
- Improves emotional and academic areas
- Exerts peak effects 1-2 hours after administration
- Benefits from Ritalin last approx. 3-4 hours
- Available in short acting and sustained released doses

Side Effects:
(a) insomnia, (b) decreased appetite, (c) stomachaches,
(d) headaches, (e) dizziness.

Kollins et al., 2001

Generally, methylphenidate, also known as Ritalin, is the most commonly prescribed drug for ADHD. It has been demonstrated to be effective for a variety of behavioral problems that are associated with the disorder. The use of Ritalin has been demonstrated to improve emotional and academic areas. Ritalin exerts peak effects 1-2 hours after administration and will last for approximately 3 to 4 hours. Ritalin is available in short acting and sustained released doses. There are side effects to taking Ritalin. These include: insomnia, decreased appetite, stomachaches, headaches and dizziness.

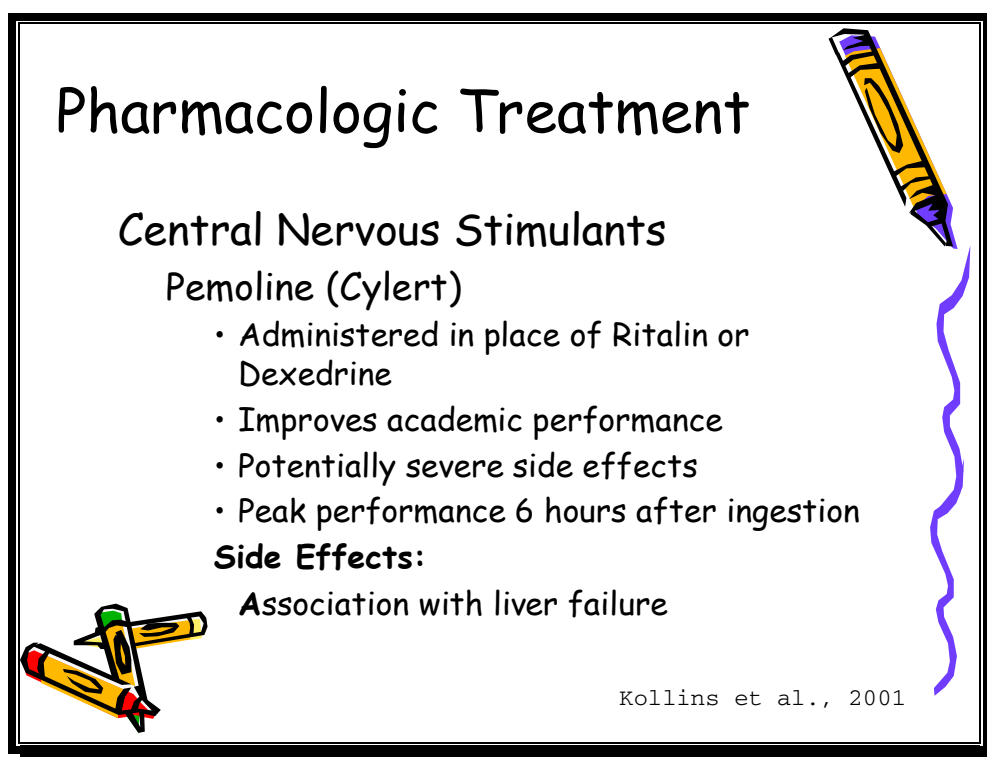


Treatment for ADHD

- Central Nervous Stimulants
Dextroamphetamine (Dexedrine)
 - as effective as Ritalin
 - greater potency, longer duration of action
 - more pronounced side effects
 - improves school performance
 - Safer for younger children
 - Peak 2-3 hours after ingestion
 - Available in short acting, and sustained formulations

Side Effects:
Insomnia, decreased appetite, increased levels of irritability, crying, anxiousness, sadness/unhappiness, and nightmares

Dexedrine is the next most commonly employed stimulant shown to be effective in the treatment of ADHD symptoms. Dexedrine is equally as effective as Ritalin; however, it is not prescribed as frequently. It has a greater potency and longer duration of action relative to Ritalin, which may lead to more pronounced side effects. Like Ritalin, the use of it has been shown to improve school performance and can be administered to children as young as 3 years old. The peak of Dexedrine is 2-3 hours after ingestion and it is also available in short acting and sustained formulations. Dexedrine should be used more cautiously, if the child experiences tics or has a history of Tourette's disorder, hypertension, hyperthyroidism, glaucoma, or cardiovascular abnormalities this stimulant may not be the best choice of treatment. Side effects include: insomnia and appetite suppression in comparison to Ritalin; and increased levels of irritability, crying, anxiousness, sadness/unhappiness, and nightmares.



Pharmacologic Treatment

Central Nervous Stimulants

Pemoline (Cylert)

- Administered in place of Ritalin or Dexedrine
- Improves academic performance
- Potentially severe side effects
- Peak performance 6 hours after ingestion

Side Effects:

- Association with liver failure

Kollins et al., 2001

The third stimulant commonly used to treat ADHD is pemoline also known as Cylert. Cylert is used when children either do not respond to Ritalin or Dexedrine or when multiple daily dosages are not an option for the child. Cylert is not typically seen as a frontline treatment for ADHD because it has several potentially severe side effects. Like Ritalin or Dexedrine, Cylert has shown to be effective in the improvement of academic performance. The peak performance of Cylert is 6 hours after the drug has been administered. The most prominent side effect of Cylert is its association with liver failure.



Pharmacologic Treatment

Mixed Amphetamine Salts


Adderall

- Compound mix of amphetamine salts
- Equally effective as Ritalin
- More potent than Ritalin
- Can result in more side effects

Kollins et al., 2001




Adderall is also a common treatment for ADHD. Adderall is a mixture of amphetamine salts. It is equally effective as Ritalin in the reduction of problem behaviors for children with ADHD. Adderall has shown to be more potent than Ritalin and can result in more side effects. Because Adderall is composed primarily of amphetamine salts, the side effects are very similar to those for Dexedrine. Clinicians consider the history of hypertension, hyperthyroidism, or cardiovascular problem before prescribing this medication.



Pharmacologic Treatment

Antidepressants

- Antidepressant drugs are rarely used to treat ADHD and are used when children do not respond to stimulant treatment.
- 3 types of Antidepressants:
 - Tricyclic antidepressants (desipramine, imipramine)
 - Selective serotonin-reuptake inhibitors (SSRIs)
 - Other antidepressants (e.g. Wellbutrin)





Kollins et al., 2001

Antidepressants have also been used for the treatment of ADHD. Antidepressants are only used when children do not respond to stimulant treatment or when coexisting psychological or emotional problems are present. Normally, antidepressants are used to treat depressive disorders but because of the neurotransmitters in the brain, they are sometimes helpful in the treatment of ADHD. There are three types of antidepressants, tricyclic antidepressants, selective serotonin-reuptake inhibitors, and other forms of antidepressants like Wellbutrin.

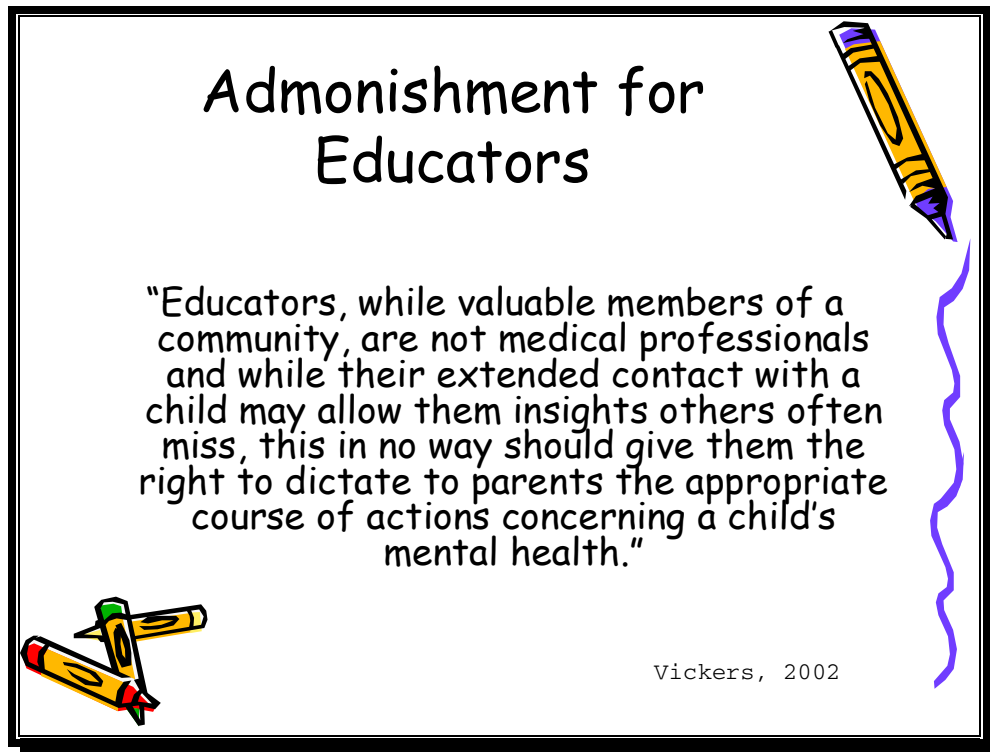
Alternative Therapies

- EEG (electroencephalogram) Biofeedback
- Diet Modification and Herbal Supplements
- Acupuncture
- Behavior Modification Therapy

Kollins et al., 2001



There are many other forms of treatment used with ADHD other than medication. Sometimes drugs may not be the best option for a child with ADHD. Other forms of alternative therapies include: EEG Biofeedback, diet modification and herbal supplements, acupuncture, and straightforward behavior modification therapy. Many experts argue that an incorporation of treatments should be used to enhance the child's self- autonomy and overall quality of life. Treatment should be assessed based on the individual child.



Admonishment for Educators

"Educators, while valuable members of a community, are not medical professionals and while their extended contact with a child may allow them insights others often miss, this in no way should give them the right to dictate to parents the appropriate course of actions concerning a child's mental health."



Vickers, 2002

The graphic features a black border. At the top center is the title 'Admonishment for Educators'. Below it is a quote in a smaller font. In the bottom right corner of the graphic is the citation 'Vickers, 2002'. There are illustrations of crayons: one yellow crayon with a purple tip pointing downwards on the right side, and a cluster of three crayons (yellow, green, and red) in the bottom left corner. A wavy purple line extends from the tip of the yellow crayon on the right side.

So what does all this mean for educators? Educators are pressured by society, the media, parents, and colleagues in a variety of directions with regard to the diagnosis and treatment of ADHD. Teachers do possess valuable insight with regard to student behavior. However, teachers are not medical doctors or experts in the field of ADHD and they should not dictate to parents the course of actions to take with regard to their children who may have ADHD. Teachers instead should use their multidisciplinary resource team at their school to learn the appropriate actions to take.

Highlights

- The term ADHD evolved over time as knowledge of the disability increased
- Biologically based disorder (1900s)
- Symptoms ruled by consequences and exacerbated by social circumstances
- Most common pharmacologic treatment is CNS stimulation with amphetamines or derivatives thereof
- Educators should use caution when interacting with parents of the ADHD child



In this presentation you learned a brief history and background with regard to ADHD as a disorder and how the term ADHD evolved over time. ADHD was presented as a biologically based disorder where symptoms are exacerbated in social settings and ruled by consequences. This presentation offered treatment options and suggestions for teachers to broach the possibility of this disorder with parents. Thank you for your attention!

Chapter Summary

Provided in this chapter was an overview of the historical background of the development of ADHD from the 1900s to the present. The view that emerged in the 1900s was that of a biologically based disorder as a result of controlled behavior through moral and volitional inhibition. It evolved into a disorder that was seen as biological in nature, often hereditary, and with symptoms in behavior ruled by consequences and exacerbated by social circumstances. Labels for ADHD have changed throughout the course of history. What was once thought of as Minimal Brain Damage, then organic drivenness, followed by Hyperkinetic Impulse Disorder, was changed to ADD is now culminated into ADHD. Also, the primary symptoms of ADHD were described, and Barkley determined that the working definition of ADHD is the inability to adequately regulate behavior by rules and consequences. Finally, it was the purpose of this author to bring light to the treatment used for ADHD, most commonly, the use of stimulants as well as the role of educators in the diagnosis and treatment of children with ADHD. This information was presented to educators in the form of an in-service so that teachers could learn from the information presented to better understand ADHD as a disorder.

Chapter 5

DISCUSSION

Attention Deficit Hyperactivity Disorder is one of the most commonly diagnosed psychiatric disorders among school aged children. Until recently this disorder has gone unrecognized or misdiagnosed by parents and educators. Classroom teachers are valuable resources with regard to the diagnosis and treatment of ADHD due to their daily exposure to students in an environment that exacerbates symptoms of the disorder. The abundance of research with regard to Attention Deficit Hyperactivity Disorder can be overwhelming for educators to decipher. Therefore, this research project presents educators with viable, usable, information with regard to the biological, cognitive and psychological interactions of ADHD as well as the history, diagnosis and treatment options available. The information presented in this research project will encourage educators to avail themselves of the plethora of research information with regard to ADHD as a biological disorder in order to better understand their role as educators in the diagnosis and treatment of this disorder.

Objectives Achieved

It is believed that the information presented in this research project will serve educators by presenting viable information with regard to the diagnosis and treatment of Attention Deficit Hyperactivity Disorder in a succinct, informative manner. This author had the opportunity to work with children with this disorder in the educational system

and included information that was pertinent to teachers. Attention Deficit Hyperactivity Disorder is a perplexing disorder. Often teachers do not know their role as educators with regard to the diagnosis and treatment of their students with ADHD. This research project explores the most crucial information applicable to teachers so that they may understand the disorder and their role as educators with regard to the diagnosis and treatment of their students with ADHD.

Limitations to the Project

Like most research, the information with regard to attention deficit hyperactivity will one day become obsolete. The DSM-IV will publish a DSM-V and criteria for the diagnosis and treatment of ADHD will change. Scientists and clinicians are continuing to research the disorder and may produce findings that could contradict previous findings. New treatment options will be developed in years to come and clinicians might soon be able to better define the cause of the disorder. There are still many aspects of ADHD that are unknown and there are many areas in which future studies could produce more viable information.

Recommendations for Future Research

The diagnosis of attention deficit hyperactivity disorder is more complex than first imagined. Scientists and researchers have yet to discover the cause of attention deficit hyperactivity as well as a way to biologically test for the disorder. There are many aspects surrounding the cause and definition for this disorder that would benefit future research.

Treatment for ADHD is another aspect that would benefit from future research.

The current research suggests that physicians do not always follow the criteria outlined in the DSM-IV strictly. Instead they move quickly to a diagnosis and the immediate fix-drug therapy. This author would like to see continued research with regard to the pharmacological treatment options used to treat this disease. Suggestions were provided with regard to alternative forms of treatment that could be utilized in the classroom.

This author would like to see more information presented for educators with regard to classroom management strategies and suggestions for classroom modifications for teachers who have children with ADHD in their classes. This author suggests that more emphasis be placed developing individual treatment plans for children with ADHD where several intervention modalities are addressed including: a) psychosocial, b) behavioral, c) educational, and 4) pharmacological.

This presentation would be more useful for educators if suggestions for how to broach ADHD with a parent of a suspected student with the disorder were included in the PowerPoint. Also, it would be useful for teachers to have access to a step by step approach with appropriate actions to take when they suspect their student is suffering with the disorder. Teachers would also benefit from information with regard to the legality and confidentiality requirements that they are expected to adhere to.

Project Summary

The purpose of this project was to present educators with viable, usable, information with regard to the biological, cognitive, and psychological interactions of ADHD as well as the history, diagnosis, and treatment options available in order to

educate teachers so that they can better serve the needs of their students. The information presented in this project was distributed in the form of a PowerPoint presentation to elementary school teachers. The expectations of this author were rewarded by suggestions from professional teachers that were creative, thought provoking and encouraging to future research.

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APPENDIX A
DSM-III Criteria

**DSM III Criteria for Attention Deficit Disorder with and without Hyperactivity
(American Psychiatric Association, 1980).**

The child displays, for his or her mental and chronological age, signs of developmentally inappropriate inattention, impulsivity, and hyperactivity. The signs must be reported by adults in the child's environment, such as parents and teachers. Because the symptoms are typically variable, they may not be observed directly by the clinician (Barkley, 1990).

The number of symptoms specified is for children between the ages of eight and ten, the peak age range for referral. In younger children, more severe forms of the symptoms and a greater number of symptoms are usually present. The opposite is true of older children.

- A. Inattention. At least three of the following:
 - (1) often fails to finish things he or she starts
 - (2) often doesn't seem to listen
 - (3) easily distracted
 - (4) has difficulty concentrating on schoolwork or other tasks requiring sustained attention
 - (5) has difficulty stick to play activity
- B. *Impulsivity*. At least three of the following:
 - (1) often acts before thinking
 - (2) shifts excessively from one activity to another
 - (3) has difficulty organizing work (this not being due to cognitive impairments)
 - (4) needs a lot of supervision
 - (5) frequently calls out in class
 - (6) has difficulty awaiting turn in games or group situation
- C. *Hyperactivity*. At least two of the following
 - (1) runs about to climbs on things excessively
 - (2) has difficulty sitting still or fidgets excessively
 - (3) has difficulty staying seated
 - (4) moves about excessively during sleep
 - (5) is always "on the go" or acts as if "driven by a motor"
- D. Onset before the age of seven.
- E. Duration of at least six months.
- F. Not due to Schizophrenia, Affective Disorder, or Severe or Profound Mental Retardation

APPENDIX B

DSM-IV Criteria

DSM IV Criteria for Attention Deficit Hyperactivity Disorder (American Psychiatric Association, 1994).

A. Either (1) or (2)

(1). 6 (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

- (a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
- (b) often has difficulty sustaining attention in tasks or play activities
- (c) often does not seem to listen when spoken to directly
- (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)
- (e) often has difficulty organizing tasks and activities
- (f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework).
- (g) often loses things necessary for tasks or activities (e.g. toys, school assignments, pencils, books, or tools)
- (h) is often easily distracted by extraneous stimuli
- (i) is often forgetful in daily activities

(2) 6 (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level

Hyperactivity

- (a) often fidgets with hands or feet or squirms in seat
- (b) often leaves seat in classroom or in other situations in which remaining seated is expected
- (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)
- (d) often has difficulty playing or engaging in leisure activities quietly
- (e) is often "on the go" or often acts as if "driven by a motor"
- (f) often talks excessively

Impulsivity

- (g) often blurts out answers before questions have been completed
- (h) often has difficulty awaiting turn
- (i) often interrupts or intrudes on others (e.g. butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

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

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

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

314.01 ADHD, Combined Type - if both A1 and A2 for at least 6 months

314.00 ADHD, Predominantly Inattentive Type

314.01 ADHD, Predominantly Hyperactive-Impulsive Type

APPENDIX C

ADHD Teacher Rating Scale

ADHD Teacher Rating Scale:
(Goldstein and Goldstein, 1998 as cited in DuPual, 1991, p. 276)

Child's Name _____ Age _____ Grade _____

Completed by _____

Circle the number in the column which best describes the child

	Not at All	Just a Little	Pretty Much	Very Much
1. Often fidgets or squirms in seat.	0	1	2	3
2. Has difficulty remaining in seat.	0	1	2	3
3. Is easily distracted.	0	1	2	3
4. Has difficulty awaiting turn in groups.	0	1	2	3
5. Often blurts out answers to questions.	0	1	2	3
6. Has difficulty following instructions.	0	1	2	3
7. Has difficulty sustaining attention to tasks.	0	1	2	3
8. Often shifts from one uncompleted activity to another.	0	1	2	3
9. Has difficulty playing quietly.	0	1	2	3
10. Often talks excessively.	0	1	2	3
11. Often interrupts or intrudes others.	0	1	2	3
12. Often does not seem to listen.	0	1	2	3
13. Often loses things necessary for tasks.	0	1	2	3
14. Often engages in physically dangerous activities without considering consequences.	0	1	2	3