A Nonpharmaceutical Approach to Support Children with ADHD

HANDBOOK FOR TEACHERS

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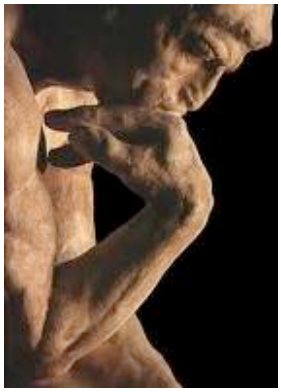
ABOUT THE AUTHOR



I have completed my Bachelor of Education at McGill University focusing on teaching at the Kindergarten and Elementary level and am graduating with my Master in Education in Educational Psychology in May 2013. My path through education was driven by my passion for learning. After studying Commerce at Marianopolis College, I began my studies at McGill University in the field of Education pursuing my intrinsic desire to learn and share knowledge with others.

My passion for teaching and learning has helped me progress quickly in my desired area of study. My intention as a teacher is to make sure that each student understands the importance of education. I firmly believe education is a mean for students to become **critical thinkers** and **problem solvers**, all while, engaging in quality academic work. I believe the learning process encompasses the students, teachers and the educational institution all working in conjunction to transform a child into a **life-long learner**. In our ever-changing society it is crucial that future educators learn to be innovative in the techniques they use to meet the ever-evolving educational needs of their students. Collectively, we can build a classroom of learners with a **multifaceted plan** using technology, multi-media, music, multicultural texts and a multi-disciplinary approach.

I firmly believe that a **connection** should always exist between the student and teacher, amongst the students themselves, and between the students and the material. This being said, I believe the student is not the only one learning in the classroom; the teacher is also developing new skills to add to his or her teaching approach. I discovered many new educational practices while researching Attention Deficit Hyperactivity Disorder and I offer this knowledge in this handbook for fellow teachers.

"The object of education is to prepare the young to educate themselves throughout their lives."

- Robert M. Hutchins

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MISSION STATEMENT

This handbook will . . .

- Create awareness of ADHD
- Educate school personnel on concepts, tools and strategies to support individuals with ADHD
- Encourage individuals with ADHD and empower them towards a healthy, positive, and satisfying educational experience

REVIEW OF THE LITERATURE

Understanding Attention Deficit Hyperactivity Disorder (ADHD)

Special Activity Project
Completed in partial fulfillment of the requirements of the
Master of Education in Educational Psychology

ABSTRACT

Challenges are omnipresent, thus, resilience is essential for success in school and life. Given the ever increasing number of research articles, it is clear that Attention Deficit Hyperactivity Disorder (ADHD) is a challenging disability that affects the general population and is of great significance to school personnel, parents, specialists, mental health researchers, and clinical practitioners. ADHD is a developmental disability defined as a disruptive behavior disorder characterized by levels of inattention, impulsivity, or over activity (DuPaul & White, 2005). ADHD has increased in prevalence over the years and is more often diagnosed in males than females. ADHD can be diagnosed as early as preschool; therefore, early interventional treatments for individuals with ADHD are of great significance.

The goal of this handbook is to focus on early intervention and non pharmaceutical approaches to support individuals in elementary and high school with ADHD. To better position teachers, I will provide a brief background and overview of the disability, which includes the history of the disability, contributing factors, and extended information on this developmental disability relevant to the student and the school environment. Finally, I will by providing a practical manual with non pharmaceutical interventions, strategic activities, and tools that will allow teachers and professionals to foster resilience in their classroom.

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Understanding Attention Deficit Hyperactivity Disorder (ADHD)

ADHD has been in medical literature for more than 100 years (Silver, 2004). Over the past 50 years, our understanding of ADHD has expanded. This growth has allowed for increased awareness, the development of new diagnostic concepts, and an increase in treatment possibilities. With a high prevalence rate, teachers are presented with classroom challenges of teaching students with ADHD. For this reason, it is important that teachers understand the disability so that they can help accommodate and foster learning for all students in the classroom. Silver (2004) and Chandler (2010) are authors who are frequently referred to throughout this literature review because they established a forum among researchers who study ADHD. Silver (2004) presented general research advice through the means of a clinical guide, to diagnose, and treat ADHD for mental health professionals. He provided a research-based overview of ADHD and day-to-day management faced by physicians and mental health professionals. Chandler (2010) focused on a factual scientific account of ADHD in the form of a guide for parents and professionals.

Historical Overview

This section will reveal important discoveries in the history of ADHD. Silver (2004) stated, "before the 1940s (in the United States), if a child had difficulty with their learning, the child was considered to have a mental retardation" (p. 18). Today, inclusive education refers to a child with a learning disability being mainstreamed in the regular classroom and given accommodations and support in their learning. It is important for teachers and professionals to have a basic understanding of ADHD and to understand changes that have occurred in medical research and teaching practices overtime.

Historically, Dr. George Still first recognized the modern symptoms of ADHD in 1902 (Frick & Lahey, 1991). He presented a series of papers to The Royal College of Physicians, in which clinicians and researchers declared that these symptoms were linked to brain damage (Frick & Lahey, 1991). Frick and Lahey's brief review (1991) stated, "early studies failed to document consistent neurological dysfunction in hyperactive children" (p. 163). Throughout the 1940s and 1950s, Minimal Brain Dysfunction (MBD) was the term used to address these children. As history evolved, so did the diagnostic criteria and terminology of this disorder. Further research by Weyandt (2001) summarized literature on ADHD and was presented as an ADHD Primer for students and professionals. According to Weyandt (2001), in 1968, *The Diagnostic and Statistical Manual* (DSM-II) was published and included another new term for these children–Hyperkinetic Reaction Disorder of Childhood (Weyandt, 2001). With this came the description of over activity, distractibility, and short attention span. In 1980 the term transformed to Attention Deficit Disorder (ADD) with two subtypes–ADD with hyperactivity and ADD without hyperactivity (Weyandt, 2001). Since 1994, the term ADD changed to what is currently known as ADHD (Weyandt, 2001). The DSM-III was the first medical manual to distinguish between children who have attention deficit with hyperactivity and those with attention deficit without hyperactivity (Frick & Lahey, 1991). The evolution of terminology and the historical roots of this disorder are important to keep in mind when examining this learning disability especially since educators have had to face the challenges of accommodating the needs of students with ADHD for many years now.

The Disability Movement is also of great significance to professionals as it allows them to become aware of the important legislation related to disability rights. Historically, individuals with any type of learning disability were considered as having "communication problems (vision,

hearing, or speech impairment) that impeded learning or mobility to perform and were stigmatized" (Pfeiffer, 1993, p. 724). Pfeiffer (1993) wrote a qualitative overview of the disability movement and insists that in the 1990s professionals were not able to care for disadvantaged members of society. Furthermore, in the 19th century, individuals with disabilities were viewed as "the feebleminded" and their disadvantages devalued them (Pfeiffer, 1993, p. 724). In the mid 19th century, during the Industrial Revolution, Samuel Howe sparked the relief for those with disabilities by creating awareness; he claimed that, "even they had rights that would be violated by a policy of institutionalization and segregation" (Pfeiffer, 1993, p. 725).

Individuals with disabilities have suffered a great amount under public policies that were meant to assist them. Gradually, this population and their advocates began calling for their rightful place in society (Pfeiffer, 1993). Education is one example of this steady progress. Lusthaus, Gazith, and Lusthaus (1992) provided a rationale for full inclusion in a qualitative overview and stated, "the issue of special education versus regular education . . . is no longer an issue" (Lusthaus et al., 1992, p. 293). To date, individuals with disabilities are fully mainstreamed in regular classrooms. This change in education has allowed educators to focus their attention on refining their knowledge on full integration (Lusthaus et al., 1992). Public policy has allowed for educational changes, however, we still have long ways to go in terms of full social inclusion.

Diagnosis

The net direction of this portion of the literature review is to understand the clinical diagnosis of ADHD and the developing issues surrounding this issue. It is important for teachers

because the diagnosis of ADHD is based on behavioral measures. According to Chandler (2010), "ADHD is a neurobehavioral disorder of great complexity. It is a disorder, which has considerable impact on the lives of those diagnosed with it and as a result of diagnosis it has been a topic of controversial debates over time" (Chandler, 2010, p. 2). Research further states that more individuals are being diagnosed with ADHD (Silver, 2004). Silver (2004) described that this has created much controversy; however, there were many reasons for this increase in diagnosis. To begin, the need to educate parents and teachers about this disability arose years ago, which resulted in an increase in assessments. Furthermore, the author discussed that more professionals became aware of the assessment procedure and criteria, which lead to more referrals. Lastly, Silver (2004) suggested that ADHD was known to be a developmental disability; therefore, there was an increase in adult diagnosis.

According to Silver (2004), "ADHD symptoms include cortical dysfunctions (language, motor, learning, and executive function) and regulatory dysfunctions (anxiety, mood, anger, obsessive compulsive, and tic)" (Silver, 2004, p. 18). Government reports highlighted "symptoms can result in difficulty staying focused and paying attention, difficulty controlling behavior, and hyperactivity" (National Institute of Mental Health, 2008, p. 1). Furthermore, The National Institute of Mental Health (2008) listed three subtypes of ADHD: Predominantly Inattentive, Predominantly Hyperactive, and Combined Hyperactive-Impulsive and Inattentive. According to the DSM-IV-TR, specific diagnostic criteria for ADHD include those listed in Figure 1. There is a strong consensus among mental health professionals, research studies, and government reports that state inattention, hyperactivity, and impulsivity are key behaviors of ADHD (Chandler, 2010; National Institute of Mental Health, 2008; Rickel & Brown, 2007; Silver, 2004, Weyandt, 2001).

Rickel and Brown (2007) presented an ADHD overview to teachers and professionals for daily practice. According to Rickel and Brown (2007), "to be diagnosed with ADHD, an individual can display symptoms before age of 7, the symptoms must be present in two or more settings and there must be clear evidence of disability in social, school or working function for a period of 6 months or more" (Rickel & Brown, 2007, p. 2). ADHD manifests itself differently in children and adults. For the purposes of this literature review the childhood symptoms are listed below.

Figure 1

Main Features of the Diagnostic Criteria for ADHD

1. Either a or b
    a. Six or more of the following symptoms of inattention have been present for at least six months to a point that it is disruptive and inappropriate for the developmental level:
        i. Inattention
            1. Often overlooks details or makes careless mistakes
            2. Often has trouble keeping attention to tasks
            3. Often does not seem to be listening when spoken to directly
            4. Often does not follow instruction and fails to finish task
            5. Often has trouble organizing activities
            6. Often easily distracted, difficulty focusing on one task
            7. Often displays boredom and avoidance of tasks that take a lot of mental effort; unless executing something of interest
            8. Often forgetful in daily tasks

9. Often loses things

b. Six or more of the following symptoms of hyperactivity-impulsivity have been present for at least six months to an extent that it disruptive and inappropriate for the developmental level:

   i. Hyperactivity

      1. Often fidgets with hands, feet, or in seat
      2. Often gets up from seat
      3. Often in motion
      4. Often talks excessively
      5. Often displays difficulty completing quiet tasks
      6. Is often "on the go" or acts as if "driven by motor"

   ii. Impulsivity

      1. Often blurts out comments without restraint and acts without regard for consequences
      2. Often impatient
      3. Often interrupts or intrudes on others' activities

Note. From Attention-Deficit Hyperactivity Disorder in Children and Adults (p. 1-2), by A. Rickel and R. Brown, 2007, United States of America: Hoogrefe & Huber Publishers.

Epidemiology

As educators we must observe our students and target those with symptoms of disabilities in order to refer them for diagnosis and then support them in their learning. This can allow for a better overall learning experience for the individual. Furthermore, it can help build resilience so

that the individual becomes aware of coping strategies, which can translate throughout adolescence to adulthood.

Identification. Early identification is needed for individuals with ADHD (Chandler, 2010; Hutchinson & Williams, 2007; Silver, 2004; Stevenson & Stevenson, 2007; Weyandt, 2001). Stevenson and Stevenson (2007) completed a qualitative study on the manifestation of this disability in the child and adult and proposed "ADHD affects 1% to 8% of adults" (p. 1). By adulthood, the disability manifests itself differently and nonpharmaceutical approaches may be a challenge. Hutchinson and Williams (2007) stated, "undetected ADHD can result in a range of behavioral disturbances which create a burden for mental health, social, and educational services when it persists into adulthood" (p. 129). Early intervention is justified, because adults who are not treated for their ADHD are more likely to have mood disorders and substance abuse disorders in adulthood. They studied behavioral dysfunction by comparing 117 secondary school students (64 girls and 53 boys) to 130 institutionalized students (75 girls and 55 boys). They collected information by interviewing the entire cohort on a variety of matters, including a demographic questionnaire that measured age, religion, education, living circumstances, parental occupation, living arrangements, and criminal history. The study used reliable procedures when testing differences between groups over time. Some of these measures included, *The Conner's Teacher Rating Scale, The Rosenberg Scale, The Brief Psychiatric Rating Scale, The Brief Psychiatric Rating Scale,* and *The Diagnostic Interview Schedule for Children* to document differences between both groups over time. The researchers claimed that measures tested factors that contributed towards the individuals ADHD and dysfunctional behaviors later on in life. This research underlines how unrecognized ADHD symptoms increase the risk of major behavioral problems in early adolescence, and also persist into adulthood. They stated "early recognition

can serve as a preventive strategy to diminish risk of behavioral dysfunction in adulthood" (Hutchinson & Williams, 2007, p. 129). Thus reinforcing the importance of early recognition and identification of ADHD.

Prevalence. Previous studies contend that ADHD affects the general population; therefore, it is prevalent (Weyandt, 2001). Weyandt (2001) referenced a study conducted by Wolraich, Hannah, Pinnock, Baumgaertel, and Brown (1996) in her ADHD Primer. Age was the important factor in this study, "2% of preschool children met the DSM-IV (1994) criteria for ADHD" (Weyandt, 2001, p. 7). Weyandt (2001) referenced this study and emphasized the majority of individuals with ADHD were inattentive (5.4%) followed by the combined type (3.6%) and lastly the hyperactive-impulsive type (2.4%) totaling 11.4% of children from kindergarten to grade 5. However, when additional information was gathered in relation to the degree of impairment, pervasiveness, and onset and parent ratings dropped significantly from 4% to 1% (Weyandt, 2001). This study is a better representation because it aligns with the American Psychiatric Association (1994), which stated, "ADHD is estimated to affected 3% to 5% of the U.S. school aged population" (Weyandt, 2001, p. 6).

According to Rickel and Brown (2007), experts argued that data might not be representative of the actual occurrence of this disorder because ADHD is more prevalent than what is published in data. It is important to keep in mind that research can significantly differ from study to study in relation to the age, geographic location, sex of the individuals studied, and settings. Research studies regarding sex differences may bring out this skew in data, which may be of great interest for school personnel and the early identification of this disability.

Sex. Understanding sex differences is critical for the identification of this disorder. Summaries with general advice insisted that ADHD is most commonly seen in boys (Weyandt,

2001). However, studies conducted by Gershon (2002) and Nussbaum (2012) differ. Gershon (2002) contended that problems reside in epidemiological studies that reveal that this could be a result of clinical settings treating fewer females than males. Gershon (2002) highlighted the serious implications of this missing information. Furthermore, Gershon (2002) examined sex differences through a meta-analysis on participants aged 13 and younger. His aim was to compare his results to previous sex studies in ADHD. This quantitative study revealed that "ADHD girls had lower ratings on hyperactivity, inattention, impulsivity, and externalizing problems compared to that of ADHD boys, furthermore, girls had greater intellectual impairments and more internalizing problems" (Gershon, 2002, p. 143). These results were based on the calculation of effect sizes and aid health professionals and school personnel in understanding that ADHD has a greater effect on girls. The results of this meta-analysis indicated consensus with previous gender research studies regarding individuals with ADHD. Further studies require a wider community-based population with more female referrals for testing.

Hormonal influence. "Compared with males with ADHD, females with ADHD are more prone to have difficulties with inattentive symptoms than hyperactive and impulsive symptoms" (Nussbaum, 2012, p. 95). Nussbaum (2012) reviewed literature and clinical implications specifically concerning females with ADHD. She provided a much needed literature review on the hormonal influence of attention and emphasizes the differences between the male and female brain. She highlighted findings that accept those claims of Gershon (2002). Nussbaum (2012) stated "ADHD is predominantly diagnosed in males during childhood; however, the number of females may be equal to that of men with this disorder" (p. 87). Further

research with equal populations of male and female are necessary to fill the gaps of sex studies in individuals with ADHD. It is important for school personnel to understand that while males externalize their behaviors, females internalize it, making it a struggle when targeting females because their symptoms are not observable. For these reasons, females receive a diagnosis later than males (Nussbaum, 2012). Females are more introverted in nature therefore they tend to display less inappropriate behavior in school, which may artificially reduce referrals.

Developmental disability. Research has shown that ADHD is a developmental disability (Mick et al., 2011; Reef et al., 2010; Rickel & Brown, 2007). It is critical for teachers, parents, and health professionals to recognize the onset of ADHD because it "typically emerges early in life (before the age of 7) and is a chronic disorder" (Rickel & Brown, 2007, p. 4). Reef, Meurs, Verhulst, and Ende (2010), reiterated this through a study on the continuity of disabilities from childhood to middle adulthood. The researchers sampled 1339 subjects across a 24-year follow up study (Reef et al., 2010). The researchers agreed that if the disabilities (Anxiety Disorder, ADHD, Oppositional Defiant Disorder, Conduct Disorder, and Mood Disorder) are present during childhood, then continuity exists through to adulthood (Reef et al., 2010). This continuity existed in both externalizing and internalizing behaviors. These results were conducted by means of a Child Behavior Checklist rating scale (at baseline and follow up) and for each child there were parent reports, which investigated associations between age, sex, parental socioeconomic status, and Total Problem Score (Reef et al., 2010). This large sampled study was conducted over a long period of time using a logic regression measurement. This study indicates that childhood symptoms translate to adulthood. Thus, early assessment and interventions are necessary to provide support and long-term benefits for the child, which can

increase developmental and educational gains for the child and reduce future persistent problems. These long-term benefits are addressed in the following paragraph.

Mick, Byrne, Fried, Monuteaux, Faraone, and Biederman (2011) tested the predictors of ADHD persistence through a five year follow up study on females. The researchers aimed to understand the diminution in symptoms of ADHD from childhood through to adolescence and adulthood. The participants were between the ages of 6 and 17, with 123 females diagnosed with ADHD and 106 females not diagnosed. The researchers completed, "follow up assessment procedures, functional measures, cognitive assessments, and statistical analysis' to reveal the Kaplan Meier curve which depicts that by the age of 16, ADHD was persistent in 71% of the girls" (Mick et al., 2011, p. 186). These conclusions help professionals understand that ADHD is a disability that can persist through adulthood and remains a part of one's identity throughout their life. These conclusions support Rickel and Brown (2007) who stated, "ADHD is understood to be a childhood disability with 60% of these children living through to adulthood with this disability" (p. 4).

Comorbidity

ADHD is often present with other psychiatric disabilities (Chandler, 2010; Conner & Doerfler, 2007; Silver, 2004; Weyandt, 2001). Comorbidity is a norm rather than an exception for an individual with ADHD. ADHD is a complex learning disability, which can significantly impact one's life. The complexity of ADHD and its impact on an individuals learning and every day life is of great importance for professionals. In stating this, it is crucial to understand the degree of severity of comorbid symptoms in order to manage and accommodate appropriately.

Chandler (2004) stated "ADHD is most commonly comorbid with Oppositional Defiant Disorder (ODD) at 20% to 40% of ADHD children and Conduct Disorder (CD) at 33% to 50% of ADHD children" (Chandler, 2004, p. 66). Chandler (2004) defined ADHD with the existence of ODD as a disorder in which a child disregards rules to a greater extent than they would be with ADHD alone. He points of that an individual with ADHD and ODD "can be argumentative, provocative, and prone to temper outbursts" (Chandler, 2004, p. 66). Furthermore, "the behavioral profile for an individual who has ADHD with the presence of CD includes antisocial activities, theft, and vandalism (which can affect the individual's life more than the ADHD)" (Chandler, 2004, p. 66).

Similarly, Conner and Doerfler (2007) tested for differences in disruptive behavior disorders between individuals with ADHD and CD and individuals with ADHD and ODD. They studied 200 participants with a mean age of 10.6 years. The participants included male children and adolescents including 65 individuals with ADHD, 85 individuals with ODD, and finally 50 individuals with CD. Connor and Doerfler (2007) used a cross-sectional methodology and assessed using a structured diagnostic interview, a clinical assessment of the child, and rated parents, teachers, and clinicians using a scale that included relevant domains. By means of assessments and measures such as *Child Behavior Checklist, Children's Global Assessment Scale,* and *Conner's Abbreviated Teacher Questionnaire*, the authors found that there were significant distinctions for parenting, treatment history, and school variables between ODD and CD in children with ADHD (Conner & Doerfler, 2007). Furthermore, the authors stated that symptom severity fluctuated, "the most severe being ADHD with CD, followed by ADHD with ODD and finally ADHD had the least severe symptoms" (p. 126). CD and ODD are the most common comorbidities of ADHD (Chandler, 2010; Conner & Doerfler, 2007). These

comorbidities also include Anxiety Disorder, Depression, Obsessive Compulsive Disorder (OCD), Tourettes Syndrome, and substance abuse (Chandler, 2010, p. 66).

Theories of ADHD

Understanding the theories that contribute to the causes of ADHD can lead to better treatment and intervention of the disability. There are scant data on the causes of ADHD because researchers and scientists are not sure about the major contributing factor. Ultimately, there is no underlying cause of ADHD, but what is to follow is a review of past studies that help us understand the disability. Genes play a large contributing role; however, it is imperative that we do not rule out the environmental contributions (Rickel & Brown, 2007; Silver, 2004).

Thapar, Cooper, Eyre, and Langley (2013) examined genetics and selected environmental risks of ADHD through a qualitative research study. They stated, "no single risk factor explains ADHD" (p. 3). Furthermore, they stated that both inherited and noninherited factors contribute, and the effects are interdependent for ADHD (Thapar et al., 2013). Psychologists and researchers provided much data and theoretical perspectives pertaining to the various contributions of ADHD. This suggests that ADHD is complex and multifaceted disability. This section outlines previous research behind the causes of ADHD according to biological and psychosocial contributions.

Biological contributions. This segment will describe biological contributions such as genetic and neurological variables that apply to ADHD. It will explain necessary parts of genetics that apply to ADHD, methods and tools used for understanding brain functioning, and differences in the brain structure and regions.

Genetic variables. Genes are blueprints inherited from our parents and predispose individuals to ADHD (Rickel & Brown, 2007). For these reasons, an individual with ADHD is

more likely to have an offspring with the disorder as compared to an individual without the disability (Rickel & Brown, 2007; Silver, 2004). According to Silver (2004) "as many as 50% of children and adolescence inherit ADHD" (p. 24). Furthermore disability runs in families with siblings, parents, and extended relatives who have ADHD (Silver, 2004). Spencer, Biederman, and Mick (2007) provided a number of studies that display results in accord with this notion in their evidence based overview report of ADHD. Based on numerous twin studies, Spencer et al. (2007) exposed the mean heritability rate for ADHD as being 77%. This suggests that ADHD is highly genetic. Similarly, Rickel, and Brown (2007) stated that the "manifestation of the gene is unknown and therefore there are no genotypes for individuals with ADHD" (p. 17). ADHD exists in families and therefore it is understood that there is genetic contributions to ADHD (Rickel & Brown, 2007; Spencer et al., 2007).

Neurological variables. To date, the neurobiology of ADHD is not completely understood; therefore, researchers continue to study it (Rickel & Brown, 2007). The most compelling research comes from Magnetic Resonance Imaging (MRI) and Electroencephalographic (EEG) studies, which support a neurological basis for ADHD (Rickel & Brown, 2007, p.18). There exist structural and chemical differences in the brain of those with ADHD than the typically developing brain (Rickel & Brown, 2007). It is important to remember that these differences are not necessarily responsible for ADHD symptoms.

Beginning with the anatomical differences, Spencer et al. (2007) described smaller volumes in the frontal cortex, cerebellum, and subcortical structures of the brain for persons with ADHD (p. 79). Spencer et al. (2007) stated, "these structural differences are part of the neural circuitry, which allow for motor control, executive functions, inhibition of behavior, and the modulation of reward pathways" (Spencer et al., 2007, p. 79). Furthermore, the cerebellum

significantly contributes to cognitive functioning and the corpus collosum connects the two hemispheres. The structural differences may degrade communication and result in some of the cognitive and behavioral symptoms of ADHD such as deficiencies in verbal fluency, perseveration, motor sequencing, planning, and working memory (Spencer et al., 2007).

In addition, neurochemical differences reside in the neurotransmitters of the brain: serotonin, dopamine, and norepinephrine (Weyandt, 2001). Weyandt (2001) found that serotonin and dopamine play a crucial role in attention. The chemical imbalance in the ADHD brain resides in the dysregulation of these neurotransmitters, which allow for decreased cerebral blood flow to the prefrontal region and abnormalities in dopaminergic functioning. Advances in technology will further provide us with knowledge on ADHD and its biological contributions.

Psychosocial contributions. The psychosocial contributions of ADHD include persistent theories of ADHD and societal impact. This section will look at development in-utero, environmental factors, parenting styles, diet, and toxins that impact ADHD.

Prenatal and postnatal variables. Prenatal life and postnatal life are significant periods of time in relation to one's development. In context of this literature review, postnatal life includes life after birth. Silver (2004) stated, "events or early experiences while in-utero, at the time of delivery or soon after delivery can affect the developing brain" (p. 26). A large body of literature suggests that malfunctions during the prenatal period and exposure to specific toxins are increasing the risk of ADHD (Neuman et al., 2007; Thapar et al., 2013). Thus the following are contributing factors that increase an individual's chance of developing ADHD.

Development in-utero is an important time for an individual. Neuman, Lobos, Reich, Henderson, Sun, and Todd (2007) agreed that alcohol and nicotine use during pregnancy may be associated with the development of ADHD. Neuman et al. (2007) examined the joint effects of

genetic and prenatal substance exposures on a population of males and females twins aged 7 to 19 years and diagnosed with ADHD. The researchers used a two stage sampling design in which they interviewed the mother using a traditional *Zygnosity Questionnaire* followed by the completion of a family diagnostic interview (Neuman et al., 2007). *The Zygnosity Questionnaire* is used for twin studies. Samplings of DNA were obtained from families and data multiple logistic regression models were used as means of data analyses in order to answer the research question of whether genetic effects and prenatal smoking or alcohol use are related to ADHD subtypes (Neuman et al., 2007). Results of this study were in agreement with most studies because they "indicate that smoking during pregnancy is associated with specific subtypes of ADHD in genetically susceptible children" (Neuman et al., 2007, p. 1320).

Maternal smoking during pregnancy is associated with low birth weight (Fried & O'Connell, 1986; Neuman et al., 2007; Silver, 2004). Moreover, studies found that premature delivery and low birth weight have been studied to be factors that increase individuals' risk of developing ADHD (Huizink & Mulder, 2005; Knopik et al. 2005; Neuman et al., 2007; Silver, 2004). Fried and O'Connell (1986) compared the effects of prenatal exposure to tobacco, alcohol, cannabis, and caffeine on birth size and growth. They interviewed 700 women regarding their uses of cigarettes, alcohol, cannabis, and caffeine at prepregnancy, first trimester, third trimester, and average use over pregnancy. The authors used a regression analysis, which studied the relationship between usage and growth parameters. This analysis concluded that nicotine use during prepregnancy and pregnancy was negatively related to birth weight and head circumference of offspring at birth. The conclusions derived from Fried and O'Connell (1986) are consistent with literature which suggest that low birth weight result in cognitive deficits. Huizink and Mulder (2005) also proposed that such factors have significant negative

consequences to the fetus. This review provides an overview of studies that conclude "prenatal exposure to nicotine, alcohol or cannabis result in common neurobehavioral and cognitive deficits including symptoms of ADHD, increase externalizing behavior, decreased general cognitive, functioning, and deficits in learning and memory tasks" (Huizink & Mulder, 2005, p. 24). Furthermore, Knopik et al. (2005) interviewed parents of twins in Missouri and investigated genetic and environmental influences of ADHD. The researchers used a structural equation model to determine the contributions of parental smoking and drinking. Knopik et al. found that "ADHD was more likely diagnosed in girls whose mothers or fathers were alcohol dependent, whose mothers reported heavy alcohol use during pregnancy, and in those with low birth weight" (p. 625).

Environmental variables. In the context of this review, environmental factors include everything that impinges on the organism. One's exposures to substances, family dynamic, and social conditions are factors that inflict an organism. Environmental predispositions for individuals with ADHD and several studies found that these environmental specifics can increase the risk of the disorder (Cruz & Bahna, 2006; Milichap & Yee, 2011; Thapar et al., 2013).

Parenting. Home structure and parenting have its effects on symptoms of ADHD (Keown, 2011; Schroeder & Kelley, 2009). Schroeder and Kelley (2009) studied 134 parents of 6 to 12 years old diagnosed and non-diagnosed ADHD children. The researchers aimed to study the relationship between family environment and parenting practices (Schroeder & Kelley, 2009). Parents completed a *Behavior Rating Inventory of Executive Function* form, *Parent Child Relationship* form, and *Family Environment Scale* (Schroeder & Kelley, 2009). The results of these forms and questionnaires were then analyzed using several correlation variables. Schroeder and Kelley (2009) reported "compared to the control group, parents of children

diagnosed with ADHD reported their children as exhibiting greater problems with behavioral control and metacognitive abilities, and described their family environments as less organized and higher in family conflict" (p. 233). Furthermore, "in children without ADHD, higher levels of family cohesion, organization, and expressiveness, and lower levels of family conflict were significantly correlated with greater behavioral control" (p. 233).

Keown (2011) conducted a three-year longitudinal study investigating preschool paternal and maternal parenting as predictors of ADHD. He discovered a relationship between parenting and teaching and predictors of ADHD symptoms in boys from early to middle childhood. This study revealed parenting influence on the symptoms of children with ADHD. He studied 93 four-year-old boys by observing interactions between parents and offspring at two time periods. This analysis revealed that, "less paternal sensitivity and maternal positive regard predicted higher levels of inattentiveness in middle childhood, while, intrusive paternal behavior was predictive of hyperactive impulsive behavior at school, and less maternal warmth were predictive of later ADHD" (Keown, 2011, p. 569).

Diet. Diet influences the severity of ADHD symptoms (Cruz & Bahna, 2006; Milichap & Yee, 2011). Cruz and Bahna (2006) wrote an informative review of literature on the relationship between food additives and the development of ADHD. Cruz and Bahna (2006) highlight the relationship between food additives and behavior disorders in children, which were studied years ago after a publication by Benjamin Feingold. "The Feingold Association revealed the augmentation of ADHD symptoms when exposed to artificial flavors, coloring agents, preservatives, sugar, and aspartame" (Cruz & Bahna, 2006, p. 725). A double-blinded study conducted on 15 ADHD boys (aged 6 to 12) who were given the Feingold Diet for four weeks confirm the relationship between food additives and ADHD development (Cruz & Bahna, 2006).

This study exposed a significant reduction in symptoms of ADHD for those who participated in the diet as opposed to the control group (Cruz & Bahna, 2006). Furthermore, Millichap, and Yee (2011) report "worsening of hyperactivity after excessive ingestion of candy or diet soda" in their comprehensive article overview, which emphasized controlled studies (p. 333). Diet is an environmental predisposition of ADHD that can be modified; therefore, if caregivers or parents believe diet to be a contributing factor to the severity of ADHD symptoms they should consult an experienced physician.

Toxins. Studies and literature reviews assert consensus that exposures to toxins during prenatal or postnatal development increase an individual's risk of developing ADHD (Chandler, 2010; Silver, 2004; Thapar et al., 2013). Thapar et al. (2013) insisted that pesticides, toxic industrial products and lead exposure can damage neural systems. Thapar et al. (2013) review literature from 1997 onwards and cite many research studies conclude that these environmental toxins, in particular, organic pollutants and lead link to ADHD symptoms.

The Attention Deficit Hyperactive Student

The Attention Deficit Hyperactive Student is an individual who experiences psychological challenges especially relevant to their learning and behavior (Silver, 2004). These difficulties can translate to everyday life and are described to be difficulties in executive function skills (Houghton et al., 2012). Researchers administrated executive function tests, completed a two-way multivariate analysis of covariance, and found that deficits in executive function skills are clearly located in those with ADHD (Houghton et al., 2012). Executive function skills involve cognition and behavior and are the skills that help us navigate through everyday life by helping us plan, organize, and manage life tasks; Gottchall and Rozendaal (2011) emphasized executive functions training with evidence-based practices to provide elementary and secondary

teachers with practical resources. The authors stated that executive functions are a collection of cognitive and behavioral skills localized in the frontal lobe area of the brain. Furthermore, the authors described cognition to include working memory, organization, and metacognition, while behavior examines inhibition and emotion.

Learning. The following section outlines research on executive function skills that relate to individual learning and behavior for the Attention Deficit Hyperactive Student. Consequently, practitioners can provide effective interventions and pedagogical services to help families with children with ADHD. As discussed previously, these students represent a large number of the population, therefore, establishing a forum to address this multifaceted disability will allow parents, teachers, and other professionals to begin communicating about improving and enriching the lives of these students. Understanding the Attention Deficit Hyperactive Student is important in the intervention process and will guide professionals in understanding the disability.

Cognition. Students with learning disabilities have different patterns of strengths and weaknesses. For an individual with ADHD, weaknesses lie in organization, metacognition, emotional control, cognitive flexibility, and planning (Silver, 2004). Silver described these skills as executive function skills. These mechanisms are located between the input and output processes of learning.

> The first step is input-gathering information into the brain from the eyes and ears primarily. When this information arrives, the brain needs to make sense out of it-a process called integration. Next, the information is stored and later retrieved-the memory process. Finally the brain reacts through talking or using the muscles-the output process. (Silver, 2004, p. 54)

As outlined previously in the section entitled diagnosis, students with ADHD experience short attention span, impulsivity, and hyperactivity. When working with a student with ADHD, these symptoms are observable and can affect the input and output processes in learning. For a student with ADHD the primary stage of gathering information is difficult because they are not fully able to attend to a task, therefore, visual and auditory perception are hindered. The integration stage, which includes sequencing, abstraction, and organization, is also disabled due to neurological differences, which constrain individuals with ADHD to a low working memory and difficulties with cognitive flexibility. For these reasons, the information is often not stored to their short term working memory. Finally, the individual enters the output process. For students with ADHD the output process, which includes language and motor ability, is disabled as a result of being confined during the first stages.

These findings established consensus with Rommelse et al. (2007) who conducted a study on 816 children between the ages of 5 and 19, to study the baseline measure of speed and accuracy in motor inhibition and cognitive flexibility for individuals with ADHD. "Poorer performance on executive tasks in children with ADHD may result from deficiencies in lower order cognitive processes and not only from higher order cognitive processes" (p. 957). Individuals with ADHD were overall less accurate than their controls as a result of response speed (Rommelse et al., 2007). This study highlighted that individuals with ADHD have slower cognitive processes; therefore, it may take these individuals longer to complete a task.

Working memory. Working memory is one of several factors that can influence the development of a student's comprehension skills. Concurring evidence from past studies provide consensus that deficits in working memory result from attention problems (Flory et al., 2006; Kieviet, Elburg, Lafeber & Oosterlaan, 2012). Flory et al. (2006) studied core deficits in

story comprehension among children with ADHD. They examined 116 children aged 7 to 9 years in their understanding of a story. The experimenter administer two testing sessions to study the core deficits of ADHD such as inattention, inhibition, planning, and working memory, as well as, phonological processing and verbal skills. Deficits in attention accounted for missing elements of the story (Flory et al., 2006). These findings are consistent with those of Kieviet et al. (2012).

Kieviet et al. (2012) examined "severity, specificity, and neurocognitive underpinnings of attention problems in very preterm children" (p. 824). The researchers conducted parent and teacher questionnaires and used several measures to test information processing speed, executive attention, and working memory (both verbal and visuospatial). Kieviet et al. (2012) studied the differences of preterm sample and control group and found that out of 132 participants (mean age of 7.5 years) there were an alarming percentage of decreases in visuospatial working memory, which resulted from attention problems. These studies contend that attention problems lead to verbal and spatial working memory deficits. Such deficits have effects on everyday tasks. Miller, Montenegro, and Hindshaw (2012) examined 140 preadolescent girls with a control group of 88 preadolescent girls and concluded that low working memory predicted poor reading scores and increased volumes of misbehavior at school. These findings continue to suggest the importance of assessing and developing interventions that target executive function skills for individuals with ADHD.

Academic performance. Students with symptoms such as inattention, hyperactivity, and impulsivity, have academic difficulty (Birchwood & Daley, 2010; Pondé, Freire & Silveira, 2011). Birchwood and Daley studied the impact of ADHD symptoms on academic performance in 324 adolescents from the United Kingdom between the ages of 15 and 16. The researchers

examined ADHD symptoms using the *Adult ADHD Rating Scale*, anxiety and depression using *The Hospital Anxiety and Depression Scale*, aggression using *The Aggression Questionnaire*, motivation using *The Inventory of School Motivation Questionnaire*, and a general cognitive ability by means of *The Raven's Standard Progressive Matrices Cognitive Test* (Birchwood & Daley, 2010). Students' government test scores measured academic performance and results from a multiple linear regression and highlighted that "ADHD symptoms, motivation, and cognitive ability exert a similar significant impact over academic performance" (p. 228). The conclusions drawn from this past study were consistent with those of Pondé et al. (2011) studied the impact of ADHD symptoms on learning problems in 774 primary school children from Salvador, Brazil. Pondé et al. (2011) assessed each child by means of standardized testing and subsequently used The Attention Deficit Hyperactivity Disorder Scale–Teachers Version to evaluate ADHD symptoms and learning problems. This study indicated a strong correlation between ADHD symptoms and learning problems (Pondé et al., 2011). These studies contend that students with ADHD symptoms showed scholastic difficulties in educational achievements from childhood to adolescence. Both studies contend that these difficulties were a result of ADHD symptoms such as attention, hyperactivity, and impulsivity (Birchwood & Daley, 2010; Pondé, Freire & Silveira, 2011).

Gremillion and Martel (2012) examined 546 children (aged 6 to 12) using a cross sectional study to understand the relationship between semantic language and academic performance. They into account working memory impairments and ADHD symptoms when conducting interviews and standardized rating tests (Gremillion & Martel, 2012). Gremillion and Martel (2012) stated, "language impairment and working memory fully explained the association between ADHD and reading underachievement, in line with developmental models

suggesting that language and working memory conjointly influence the development of attention and subsequent academic achievement" (p 1339). This study displayed how ADHD symptoms translate to everyday life events and learning experiences. For these reasons, students with language difficulties need interventions to focus on executive function, self-regulatory, and language processes in order to promote individual functioning.

Behavior. The following section outlines research on behavior for the Attention Deficit Hyperactive Student. As already mentioned, in addition to the primary symptoms, children with ADHD tend to be at risk for several other problems. Interventions are available in such cases to target associated problems and provide effective means to help. Individuals with ADHD are generally negative towards others and can result behavior in school. Targeting these behaviors and implementing interventions in the school environment is a very important component to school life.

Motor Ability. As already mentioned, students with ADHD are predisposed to several factors that can affect motor and inhibition skills. Findings are consistent with Tseng, Henderson, Chow, and Yao (2004) who investigated the relationship between motor performance, attention, and impulsivity in children with ADHD. The authors studied 42 children (36 males and 6 females) with a mean age of 8 years and 2 months. They tested motor ability with the *Bruininks Oseretsky Test of Motor Performance* and they tested attention and impulse with the Gordon Diagnostic System. Furthermore, parents and teachers completed two *Activity Level Rating Scales*, which measured motor activity. Stepwise regression indicated that attention and impulse control were important predictors of fine and gross motor skills in children with ADHD.

Social skills. Executive function skills help individuals analyze situations, formulate a plan, and act accordingly. In order to do so, individuals must be able to adjust their actions. For individuals with ADHD, doing so is not always easy. Studies found that students with ADHD have a difficult time in social situations (Kats-Gold, Besser & Priel, 2007; Shimon, Engel-Yeger, & Tirosh, 2012). This may be a result of comorbidity. Kats-Gold, Besser, and Priel (2007) investigated the role of emotion recognition skills for at risk boys of ADHD and examined the effects of these on the social skills and behavior of 111 Israeli boys in fourth and fifth grade who were at risk for ADHD. The authors requested for the completion of The Conner's Rating System Questionnaire by each child's teacher and the completion of social skills rating questionnaires by children, parents, and teachers (Kats-Gold et al., 2007). These measures were used prior to each child's session with an experimenter who asked each child to complete a peer rating questionnaire, computerized task regarding the understanding of facial expression and an intelligence test (Kats-Gold et al., 2007). Through a Multivariate Analysis of Variance, Kats-Gold et al. (2007) proposed that boys who are at risk of ADHD have poorer emotion recognition skills than their controls. Structural Equation Modeling Analyses allowed the researchers to understand that this defiance had a profound affect on the participants' social function and behavior (Kats-Gold et al., 2007). This research study is in agreement with the conclusions drawn from Shimon, Engel-Yeger, and Tirosh (2012).

Shimon, Engel-Yeger, and Tirosh (2012) conducted a study to understand executive dysfunctions in everyday behavior and performance-based tests among boys with ADHD. They focused on correlation between the two variables through the means of *The Behavior Assessment of Dysexecutive Functions for Children* and *The Behavior Rating Inventory of Executive Functions* on 50 boys aged 8 to 11 (Shimon, Engel-Yeger, & Tirosh, 2012). A strong correlation

was found between the measures, which emphasized notion that boys with ADHD had lower executive function skills, which affects everyday behavior (Shimon, Engel-Yeger, & Tirosh, 2012).

Nonpharmaceutical Interventions

It is important for students to understand how they learn best at a young age. This will enable them to have a deeper learning experience and create meaningful situations from the material they encounter throughout their lives. Thus resilience and success are attainable. For individuals with ADHD, multimodal treatment approaches are necessary to target learning and behavior difficulties (Young & Amarasinghe, 2010). Young and Amarasinghe (2010) reviewed several nonpharmaceutical interventions available to youth and adults with ADHD. The authors adopt a developmental framework, in that; they emphasize appropriate treatment options for different age groups. After reviewing several studies, the authors found that parent training is most appropriate for preschoolers, while a combination of classroom behavioral interventions and parent training is best suited for school-aged children. Furthermore, the authors concluded that multimodal interventions that integrate home and school treatment strategies, as well as social skills training were best for adolescents. Lastly, they found that stimulant medication was the best treatment for adults; however, cognitive behavioral therapy was effective in addressing complex needs of this population. For these reasons, it is important to consider different forms of interventions when answering the question of how one might remedy it.

In our ever-changing society it is crucial that future educators learn to be innovative in the techniques they use to meet the ever-evolving educational needs of their students. Collectively, we can build a classroom of learners with a multi-faceted plan-using technology, multi-media, music, multicultural texts, and multi-disciplinary approaches. As educators we

have no control in matters such as medication. This realm requires psychologists, medical professionals, and parents' approval. Our profession demands that we provide the best education for all students in the classroom, not our opinions or judgments on the best pharmaceutical treatments for our students. Therefore, what is in our control is our ability to adapt our teaching to involve numerous strategies that target different learning styles.

The following are several evidence-based interventions that aid students in their educational experiences. It is important to understand each intervention separately to highlight their methodology and effectiveness in relation to an individual with ADHD. It is essential to consider that each child is different. For these reasons, multiple interventions to effectively target students' academic performances and behavior are necessary. The following interventions coincide with my personal teaching philosophy and experiences of working with ADHD students. For the success of these interventions, several mediators and professionals would have to be apart of the process of these psychosocial interventions in order to allow for the best overall outcome of the student.

Educational interventions. School and home play an important role in the day-to-day life of a child. Identifying students and implementing effective interventions at school and translating this to the home environment are necessary for overall success (Mautone, Lefler, & Power, 2011; Murray, Rabiner, Schulte & Newitt, 2008; Sheridan & Colton, 1994). Teachers and parents need to have a basic understanding of ADHD in order to help with the complex disability. I believe the learning process encompasses the students, teachers, and the educational institution all working in conjunction to transform a child into a life-long learner. I firmly believe that a connection should always exist between the student and teacher, amongst the students themselves, and between the students and the material. The following is an educational

intervention, which targets both the home and school environment. As a practicing educator I see the advantages of this link, as it allows the student to improve their behavior in both settings. Strengthening these ties can allow for overall consistency.

Conjoint Behavioral Consultation. According to Sheridan and Colton (1994), Conjoint Behavioral Consultation (CBC) strengthens ties between the home and school environment for improved academic, behavioral, and social-emotional skills. The authors introduced CBC using a conceptual framework that events occurring at home can affect a child's behavior and academic performance at school. The authors highlighted that the goals of CBC, "sharing the responsibility for problem solution, improving communication and interaction among the child, family, and school personnel, obtaining comprehensive and functional information related to the identified problem, and improving the skills of all parties (i.e., family members, school personnel, and the child-client)" (Sheridan & Colton, 1994, p. 212). They highlighted the four stages of CBC, which included, problem identification, problem analysis, treatment implementation, and treatment evaluation. These stages were used when studying a six-year-old boy who was scared of sleeping in his own room at night. The child described reports of monsters and spiders present in his room. Together, the teacher and parents agreed to discuss the problem to the school psychologist. The data collection process began with a *Child Behavior Checklist*, completed by parents and teachers. Followed by a problem analysis interview. "A conditions analysis revealed no significant antecedents immediately preceding bedtime or the bedtime routine" (p. 222). A behavior program was developed and "it was believed that Mark's difficulty sleeping in his own bedroom stemmed from a cognitively based setting event (irrational fear) which was reinforced by his parents who allowed him to sleep in their bedroom" (p. 222). The treatment was implemented for 15 consecutive nights where the boy's parents

gradually moved him back to his own bedroom. This case study suggests that CBC may be an effective model specific to child problems apparent at home. It is supportive of the development of school-based services to collaboratively allow parents and teachers to promote a students overall well-being. This study allows us to the see that issues at home can affect school, "although the Mark's academic productivity is not believed to have been affected deleteriously, he often provided exaggerated highly emotional accounts of monsters and spiders in his bedroom while at school" (p. 223). By adopting this intervention the child's behavior positively adapted in the home and school environment.

Murray, Rabiner, Schulte, and Newitt (2008) examined the daily report card (DRC) intervention, which incorporates CBC. The authors examined the viability of DRC and assessed its effectiveness. Adherence Measures, Acceptability Ratings, *Conners' Rating Scales, SKAMP Teacher Report Measure*, and *The Academic Performance Rating Scale* were used on 24 participants recruited from four public schools. 15 of the 24 students were randomized to the intervention group and the rest to the control group. Results revealed that DRC intervention was practical and acceptable for parents and teachers; therefore, there were significant improvements in academic skills for students who were a part of the intervention group. This study highlighted that a CBC approach would be beneficial for the DRC intervention and that the DRC intervention allows teachers to understand the practical uses of CBC.

Family school success. Mautone, Lefler, and Power (2011) discussed The Family School Success (FSS) intervention program by describing the theoretical framework and the main components of the program through an in-depth literature review. The authors highlighted that the program goals include, "strengthening the parent-child relationship, improving parents' behavior management skills, increasing family involvement in education at home, and promoting

family-school collaboration to address educational difficulties" (p. 45). Literature results suggested that when all of the above three interventions were conducted and consistency existed between child motivation and self regulation in both the home and school environments there were improvements in the child behavior at home and in the classroom as well as an improvement in the child's academic performances. Mautone, Lefler, and Power (2011) focused on the FSS intervention program as it is grounded in psychological theories, such as, attachment theory, social learning theory, and the ecological systems theory. Overall this literature review allows us to study the benefits of building skills by means of strengthening relationships.

Behavioral interventions. Students with ADHD experience symptoms that affect their behavior. Implementing interventions that target behavior can allow for a decrease in the frequency of behaviors. This type of treatment can allow for individuals to understand their thought processes and the effects of their behavior on their own learning (Boyajian et al., 2001; Levine & Anshel, 2011; Majeika et al., 2011; Miranda & Presentación, 2000). Behavioral interventions include many parties such as school personnel, psychologists, teachers, and families. As a practicing teacher, I observe students with ADHD in the classroom and it is undeniable that there are advantages to behavior intervention programs for these students. Research suggests that these programs can allow for a better learning experience and understanding (Boyajian et al., 2001; Levine & Anshel, 2011; Majeika et al., 2011; Miranda & Presentación, 2000).

Cognitive Behavioral Therapy. Cognitive Behavioral Therapy (CBT) is a psychotherapeutic treatment that helps individuals understand thoughts and feelings that influence behaviors. Miranda and Presentación (2000) stated that CBT is a program that helps individuals acquire the skills to recognize the underlying reasons for specific feelings and

thoughts so that the individual can take action to deal with them. 32 children aged 9 to 12 years old participated in a cognitive behavioral self-control training intervention conducted by two therapists. The therapists applied the Stop and Think program to 16 of the 32 ADHD children to improve concentration and reflection. The intervention aimed to allow train children to use self instructional strategies to problem solve. By defining the problem and thinking of all possible courses of action, as well as, focusing children's attention on finding a way to fix the problem, results indicated important improvements on several measures, including basic ADHD symptoms, general school problems, and antisocial behavior. Miranda and Presentación (2000) indicated the usefulness of CBT for the Attention Deficit Hyperactive Student.

These findings coincide with those of Levine and Anshel (2011). Levine and Anshel (2011) completed a case study on an eight-year-old boy with ADHD and found that CBT can address obstacles experienced by those with ADHD. The school psychologist conducted parent and teacher interviews, followed by, observations of the child in three different settings. The goal of this CBT was to improve behavior and academic participation. The course of treatment included parent and teaching training on behavioral interventions, as well as, child focused interventions where the school psychologist counseled the student to reframe his self-evaluations of himself. Results of this case study reveal that a collaborative treatment and the central role of CBT in school-based ADHD management.

Functional Behavioral Assessment. A Functional Behavioral Assessment (FBA) looks beyond the behavior itself and focuses on the functions of the behavior identifying significant causes, such as, social, emotional, cognitive, or environmental factors associated with the occurrence of specific behaviors (Boyajian et al., 2001; Majeika et al., 2011). By understanding the functions of a specific behavior we can attempt to decrease the frequency of such behaviors

by accommodating and working around the central issue. Majeika et al. (2011) studied the effects of FBA and on-task behavior. FBA was used on a 17-year-old Caucasian male student at a public school in the United States of America. Anecdotal observations were conducted in English class and targeted off-task behaviors as being engaging in anything other than the teacher directed activity. Liaisons and the teacher discussed this off-task behavior and a decision was made to replace this behavior with a desirable on-task behavior. Desirable behaviors were for the student to engage in any teacher-directed activity. This desirable behavior was gained by adjusting the antecedents "together, the liaisons, teacher, and student developed a behavior contract establishing clear expectations for the student and teacher," the reinforcements "providing behavior-specific praise contingent on appropriate on-task behavior," and extinction components "to withhold attention, with the exception of a brief redirection, for off-task behavior" (p. 60-61). "During the baseline phase the student was on-task for an average of 52.86%" (p. 62). Once the intervention was implemented on-task behavior immediately increased to 80.67%. These significant increases suggest the benefits of FBA. Furthermore, when the intervention was reserved, the student returned back to a mean of 48.05% mean of on-task behavior. These findings agree with those of Boyajian et al. (2001).

Boyajian et al. (2001) studied the efficacy of FBA on three preschool boys at-risk for ADHD. Steps to this FBA included a problems identification interview, brief functional analysis, and intervention and evaluation implementation. The results of the FBA intervention were analyzed visually by inspecting the data changes in trend, intercept, and level across phases. Frequent aggressive behavior was deemed unmanageable for teachers. Positive and negative reinforcement contingencies were put into place through the FBA and for all three boys problem behavior decreased (Boyajian et al., 2001). Such results highlight FBA as a suitable

classroom intervention as it reduces the frequency of an undesirable behavior. For students with ADHD, such an intervention can aid to increase desirable behaviors in the classroom setting.

Social behavioral interventions. I believe that the role of the school is to provide students with a safe environment while encouraging emotional, social, and intellectual stimulation. I firmly believe the classroom is a space reflective of the students in it; therefore, I believe the students' voice to be a major component of the classroom. Through student centered classrooms students become active participants in their own education. This can allow for a fuller understanding of the world around us in a way that is personally relevant and transferable to the students' lives. In stating this, I acknowledge that when students learn, they extort different meaning from a singular stimulus. Since no student is identical to another, his or her thinking and learning will be different as well. As previously mentioned, individuals with ADHD have difficulties in their social skills. Such skills are essential for functioning in life and enable us to know what to say, how to make good choices, and how to behave in diverse situations. Social skills can influence a student's academic performance, behavior, social, and family relationships, as well as, involvement in extracurricular activities and school safety. For these reasons, it is important to consider interventions at the social level. The following are social skills training interventions that address learning, appropriate behaviors through modeling, coaching, and role-playing.

Social skills training. Social skills training is a form of behavior therapy used to address social deficits. Corkum, Corbin, and Pike (2010) evaluated a school based social skills training program for children with ADHD called, Working Together: Building Children's Social Skills Through Folk Literature. Baseline data measures were obtained from the parents, teachers, and participants prior to the intervention. These measures were obtained from *The Conners' Parent*

and Teacher Rating Scales, Kaufman Brief Intelligent Test, Children's Communication Checklist, and *Social Skills Rating System*. 16 children participated in a one-hour social skills session, The Working Together program for ten weeks. "Feasibility of the program was subjectively evaluation on attendance rates, participation of the parents and teachers in the program, while, effectiveness of the program was evaluated by conducting paired sample t tests on the pre- and post-skills training measures completed by the parents, teachers, and the students" (Corkum, Corbin, & Pike, 2010, p. 146). This study found that The Working Together program was feasible to implement in the school setting and was effective for increasing social skills in students with ADHD. Furthermore, the authors stated that there was a strong correlation between pragmatic language skills and social skills, pressing the need to identify effective interventions that target social skill training for students with ADHD.

Parent training. Individuals with ADHD have a difficult time organizing themselves in their day-to-day activities. As previously stated, if a child is exposed to an unorganized environment at home, this can affect their performance at school. By implementing parent interventions, both the parents and the individual with ADHD can benefit. This can allow for modeling by the parent for the child. Gerdes, Haack, and Schneider (2010) studied parent training in families with ADHD children. The objective of this study was to study the clinically meaningful effects of parent training by examining 20 children with ADHD and their parents. This parent-training psychoeducation program included information sessions for parents that lasted 8 to 12.50 minutes on effective instruction, time out, and praising behavior to manage children's behavioral problems at home and school. Five measures were used, including, a client information form, *a Parent Teacher DBD Rating Scale*, *Parenting Sense of Competence Scale, Parenting Stress Index Short Form*, and *The Alabama Parenting Questionnaire* (Gerdes, Haack,

& Schneider, 2010). Results from this study highlighted statistically significant improvements in some domains of parenting behavior for both mothers and fathers and a reduction in most domains of parenting stress for mothers. "10% to 55% of mothers and 7% to 40% of fathers fell into one of the reliability improved categories for all domains of parenting stress as well as parenting behavior" (Gerdes, Haack, & Schneider, 2010, p. 152). These results concur with those of Fabiano et al. (2009) and Chacko (2009). Fabiano et al. (2009) completed a study on parent training programs for fathers of children with ADHD and Chacko (2009) studied parent training for single mothers of children with ADHD. Both studies indicated positive treatment results of parent training and improvements in behavior in children with ADHD.

Coaching. "Coaching is clearly more than just monitoring weekly progress, rewards, and consequences" (Swartz, Prevatt, & Proctor, 2005, p. 651). Swartz, Prevatt, and Proctor (2005) studied an eight-week coaching intervention for college students with ADHD. The participants completed a Coaching Topics Survey then proceeded to the initial coaching session. They were coached on setting long-term goals, weekly objectives, rewards, and consequences. The weekly sessions involved strategizing the client's behaviors by discussing obstacles, problem-solving solutions, and modifying consequences. Feedback, such as, praise and reminders were given to the participants. Results proved that coaching was a useful intervention, which complemented academic advising, and intensive therapy. Setting such goals can aid ADHD individuals to develop strategies to organize themselves and understand their purposes and functions.

Mindfulness. Mindfulness training seeks to promote psychological health and well-being (Napoli, Krech, & Holley, 2005; Oord, Bögels, & Peijnenburg, 2012). Napoli, Krech, and Holley (2005) conducted a 24-week training program on 228 first, second, and third grade students. This training program intended to aid students with their attention. Activities of this

interventions included breathing exercises, movement, and sensorimotor awareness activities. Prior to and at the end of the 24-week training, each child either completed or was measured by *The ADD-H Comprehensive Teacher Rating Scale, the Test of Everyday Attention for Children,* and *The Test Anxiety Scale*. Post evaluation findings indicated that there were fewer problems noted by teachers, a decrease in test anxiety scores, and an increase in selective attention scores. Benefits of mindfulness training were noted in the studies that follow.

Mindfulness training for parents and their children with ADHD increased children's compliance and reduced ADHD symptoms (Oord, Bögels, & Peijnenburg, 2012; Singh et al., 2010). Oord, Bögels, and Peijnenburg (2012) studied the effectiveness of an eight week mindfulness training for 22 children aged 8 to 12 with ADHD and parallel mindful parenting training for their parents. The intervention was conducted in groups of four to six children and parents lasting for 90 minutes. Both parent and child training interventions were based on Mindfulness Based Cognitive Therapy and Mindfulness Based Stress Reduction Training. The mindfulness-parenting training allowed parents to learn "to be deliberately and fully present in the here and now with their child in a non-judgmental way, to take care of themselves, accept difficulties of their child, answer rather than react to difficult behavior of their child, and parents were also instructed on how to encourage their child to do meditation exercises" (p. 142). By engaging in these sessions, parents experienced a significant reduction in parental stress. The mindfulness-child training included sessions where "children learned to focus and enhance their attention, awareness, and self-control by doing mindfulness exercises during the training and as homework assignments. Furthermore, students were taught to apply mindfulness in difficult situations such as being distracted in school" (p. 142). Results of this training indicated reduction in children's ADHD symptoms.

These results concur with those of Singh et al. (2010) who studied mindfulness training for parents and their children with ADHD to understand the compliance. Singh et al. (2010) studied this intervention by conducting 12 sessions for two mothers and their sons which included mindfulness in everyday life, basic meditation exercises, self reflective exercises on being mindful, and application of mindfulness to different environments. Results from a multiple baseline across the participants highlighted that by giving the two mothers mindfulness training their son's demonstrated increased compliance. Studies show that mindfulness training for both the parent and their ADHD child can support well-being.

Alternative interventions. As previously mentioned, there are many factors involved with ADHD. For these reasons, it is important to consider all interventions including simple lifestyle changes such as diet and exercise.

Exercise. A healthy diet and exercise are important to maintain a healthy mind and body. Exercise uses specific movements to improve the way the body and mind functions. There are many benefits to exercise intervention for students with ADHD (Azrin, Ehle, & Beaumont; Kiluk, Weden, & Culotta; McKune, Pautz, & Lombard). McKune, Pautz, and Lombard (2003) studied the behavioral effects of exercise on children with ADHD. 19 children diagnosed with ADHD participated in a five-week afternoon exercise program, which included 60 minutes of exercise. The exercises included relay runs, simple plyometric exercises, obstacle courses, a distance run of one to two kilometers, and skipping. The authors studied the subjects using a modified *Conner's Parent Rating Scale*, which rated the children's behavior one week prior to intervention, three weeks after exercise, and immediately after the five-week intervention. Results indicated significant improvements after the intervention in domains of total behavior,

attention, emotion, and motor skills. These results suggest that an exercise program as such can be beneficial for individuals with ADHD.

These results coincide with Azrin, Ehle, and Beaumont (2011) who studied the relationship between physically exercises and calmness on a four-year-old boy diagnosed with ADHD. The intervention was based on five conditions completed on separate days, which included, shaping, descriptive praise, noncontingent reinforcement, reconditioning, and baseline recordings. "The intended reinforcer was a one minute opportunity to play in the adjacent outside playground containing typical gymnastic equipment (slides, ladders, swings, rotary wheels, climbing structures)" (p. 566). Results indicated attention and calmness in the participant when using exercise to reinforce behavior.

Physical activity can help with anxiety for children with ADHD (Kiluk, Weden, & Culotta, 2009). Kiluk, Weden, and Culotta (2009) highlighted these findings in their study on sport participation and anxiety in children with ADHD. The authors studied 65 children diagnosed with ADHD and found that when children participated in two or more extracurricular sport activities displayed significantly fewer anxiety symptoms, increase in positive attitudes, and fewer depressive symptoms. Conclusions were drawn from several neuropsychological evaluations such as, *The Wechsler Intelligence Scale for Children*, *Woodcock Johnson III, California Verbal Learning Task, Rapid Automatized Naming Task, Controlled Oral Words Association,* and *The Category Test*. Correlations between the number of sports and Child Behavior Checklist T-Scores highlighted these results.

It is important to remember that the potential for flaws in research are enormous; however, the accumulated research suggests that these interventions can allow for more educational opportunities and therefore more learning within one's immediate environment.

Conclusion

ADHD is a prevalent emotional, cognitive, and behavioral disorder. Epidemiological studies indicated that it is a major clinical and public health concern. It is characterized by symptoms of inattention, hyperactivity, and impulsivity and is comorbid most often with CD and ODD. ADHD is a developmental disability that can have profound effects on daily functioning. This brief review contends that environmental and psychosocial factors contribute to ADHD. ADHD is a complex disability; therefore, individuals may struggle academically and socially at school. Specifically, individuals suffer from academic underachievement, low self-esteem, behavior problems, and problematic peer, teacher and parent relationships. These difficulties at school can effect others in the child's environment. For these reasons, it is essential to focus on how we can reduce symptoms and maximize learning at school.

As a teacher, I defend that nonpharmaceutical interventions can support students with their learning experiences. Therefore, this literature review provides research-based interventions, which reduce ADHD symptoms and increase academic and social-emotional behavior. Research indicates that in order to support a child with ADHD, we must understand them and the way they learn. More attention must be given to the child, family, and larger social community so that school psychologists and personnel can provide the means with which students with learning disabilities can overcome adversity and lead more productive and successful lives. By doing so school personnel, students, and families can strive for resilience and cultivate inclusive classroom settings, which can ultimately lead to children feeling optimistic, ownership, and personal control. Multimodal interventions for ADHD include classroom modifications and interventions, parent education and training, social skills training, family therapy, and individuals therapy. Developing effective interventions developed

specifically for each student and accommodating the need of children with ADHD may help us move forward to a day when education can truly be personalized for all children.

I strongly believe that an inclusive classroom is one in which pupils feel valued and safe, where they can learn to respect each other and each other's right to be different. I believe inclusion to be the appreciation and respect of the differences that exist in and around our classroom and school. Adopting a positive attitude toward diversity is paramount. Key to my classroom is an awareness of how diverse learners and thinkers will engage in the material presented. By doing this, we are able to provide the best for our students and assist them in their early stages of development to foster resilience and allow for success. I strongly believe that every child's education should be a personal experience that celebrates his or her inherent individuality. I strive to maintain an environment that caters to the individuals and see value in investing time for students to expand and build their knowledge and skills through teamwork and interaction with one another. By educating ourselves with different learning styles, we can apply various strategies in the classroom to embrace diversity and create a meaningful learning experience for all children.

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MANUAL FOR TEACHERS

Includes . . .

- Recap of ADHD
- Identification of ADHD
- Research based strategies
- Handouts

. . . and more!

GENERAL OVERVIEW OF ADHD

- Most common emotional, cognitive, and behavioral disorder
- Developmental disability: begins in childhood and persists to adulthood
- Recent increases in trends of prevalence
- More common in males than females as a result of lack of referrals
- Comorbid disability (often with Conduct Disorder and Oppositional Defiant Disorder)
- Causes are inconclusive; however, common risk factors include, genetics, brain injury, premature birth, alcohol or tobacco use during pregnancy, exposure to toxins, environmental variables
- School-based strategies can support individuals with their learning and can have positive academic and behavioral outcomes

IDENTIFYING STUDENTS WITH ADHD

✔ Inattention

- Individual does not pay attention to detail or makes careless mistakes
- Distracted easily and has trouble focusing
- Seems to not listen when being spoken to
- Has trouble following directions and remembering things
- Unorganized and has trouble planning ahead and finishing product of activities
- Often loses or misplaces items

✔ Hyperactivity

- Constantly moving and fidgeting
- Often gets up from seat at times when sitting quietly is expected
- Always moving around
- Talks excessively
- Lots of energy

✔ Impulsivity

- Screams out answers without waiting to be called on or before hearing the entire question
- Has difficulty waiting for their turn
- Frequently interrupts and disrupts others
- “Intrudes” on other peoples conversations or activities
- Lots of energy

SCHOOL DIFFICULTIES FOR STUDENTS WITH ADHD

Here is a list of some common difficulties experienced by students with ADHD. To follow is the liaison between research and school-based strategies. School-based strategies attempt to reduce difficulties for students with ADHD.

Academic underachievement

- Language
- Processing Speed
- Motor cortex: working memory
- Executive function skills

Behavior difficulties

- Antisocial behaviors
- Aggressive behaviors
- Conduct problems

Social-Emotional difficulties

- Negative interactions with parents
- Negative interactions with teachers
- Problematic peer relationships
- Low self-esteem

STRATEGIES AND RESEARCH FINDINGS

To follow are school-based strategies to support students with ADHD in their academic and social endeavors at school. The following school-based strategies were developed in accord with the nonpharmaceutical interventions explored in Section 1: Review of the Literature.

School-Based Strategy	Target	Research Findings
Encouraging Achievement	Self-esteem Academic	Social Behavioral Interventions Educational Interventions
Student Observations	Academic Behavior	Educational Interventions
Communication between Teachers, Parents, and Professionals	Academic Behavior Social-Emotional	Educational Interventions Behavioral Interventions Social Behavioral Interventions
Attention	Academic Behavior Social-Emotional	Educational Interventions Behavioral Interventions Social Behavioral Interventions
Time Management and Organization	Academic	Educational Interventions
Homework and Study Skills	Academic	Educational Interventions

School-Based Strategy: Encouraging Achievement

PROVIDING strength based instruction can encourage achievement for all students and especially for students with ADHD. For students with ADHD, self-realization of strengths and self-knowledge is an important asset.

Tool 1: Instruction

Tips

- Students with ADHD have a difficult time regulating their social-emotional problems.
- Working through students' strengths can provide a positive spin on learning especially for students who experience difficulty in school.
- Differentiated instruction can support learning disabled students.

Resource

- Use self-evaluation checklists when planning for instruction.

- ☐ Study and practice models for education
- ☐ Provide activities that focus on students' individual gifts and interests
- ☐ Provide open-ended outlets for the demonstration of knowledge
- ☐ Use differentiated instruction
- ☐ Provide tasks that fit students' learning styles
- ☐ Provide multisensory instruction
- ☐ Provide guided discovery (especially new topics)

Tool 1: Instruction

Resource

☐ Give students choices
☐ Use collaboratively designed rubrics
☐ Provide hands-on experiences
☐ Provide real-life tasks
☐Integrate visual and performing arts

- Content

☐ Use multiple texts
☐ Use varied resources
☐ Compact curriculum
☐ Provide learning contracts

- Process

☐ Use interactive journals
☐ Use tiered assignments
☐ Create interest centers
☐ Create learning centers

- Product

☐ Provide varied modes of expression, materials, and technologies
☐ Use self- and peer evaluations
☐ Provide authentic assessment
☐ Provide higher-order thinking assignments

Tool 2: They did it! So can I!

Tips

- It helps to understand that role models experiences learning difficulties.
- Integrate activities and lessons that include these role models so that students recognize that students who encounter such difficulties can be successful.

Resource

- The following is a short list of role models with learning disabilities:
  - Hans Christian Anderson
  - Alexander Graham Bell
  - Orlando Bloom
  - James Carville
  - Bill Cosby
  - Leonardo Da Vinci
  - Tom Cruise
  - Patrick Demsey
  - Winston Churchill
  - Walt Disney
  - Albert Einstein
  - Galileo
  - Malcolm Forbes
  - Benjamin Franklin
  - Whoopi Goldberg

Tool 3: Praise

Tips

- Students with ADHD tend to have low self-esteem.
- It is important to verbally encourage these children to reinforce behavior.
- A positive, hopeful, optimistic, and cheerful attitude should be a natural component of a teachers repertoire.

Resource

- Catch a student being good and reinforce with statements such as

✔ I like the way you . . .
✔ I'm glad you're pleased.
✔ How do you feel about it?
✔ I had not thought about that idea. Good thinking.
✔ I really appreciate your effort in math today.
✔ I can really see the result of your effort. It looks great!
✔ Look at the progress you have made!

Tool 4: Goal Development

Tips

- It is important to help children develop both short and long-term goals.
- Below is a list of questions you can go through with your students when setting goals.

Resource

- What is one area of my school or personal life that I want to improve?
- What is one thing I can do to accomplish my long-term goal?
- How can this goal be attained? What steps do I need to attain my goal?
- What are some barriers that I might face?
- Will I need help to reach my goal?
- How will I check my progress and make sure that my plan is working?
- How will I remind myself of my goal?
- Does my plan need to be revised?
- Have I reached my goal?

School-Based Strategy: Student Observations

GATHERING information about a child is imperative. Teachers can learn more about a child by observing them. This process can better allow teachers to cater to the student's needs. There are many systems of observation. This section provides some examples we can use when teaching students with ADHD.

Tool 1: Tracking ADHD Symptoms

Tips

- Students with ADHD exhibit many symptoms that can affect their academic performance.
- The idea is to get a good sample of the child's current functioning.

Resource

- Teachers should be sensitive to requirements of observation.
- Observations can be effective in a very brief period of time (10 minutes) if the target behaviors are clear, small in number and easily defined.
- Observation in multiple subjects are often better because each school subject has different information and demands.
- Social skills observations can be taken at recess, in hallways, the cafeteria, the gymnasium, and line-ups might be best.
- Attention and concentration can be observed during silent work.
- When reporting ADHD symptoms for physician feedback, use target core symptoms such as, restlessness, impulsivity, organization skills, mood, anxiety, and so on.

Tool 2: Functional Behavioral Assessment (FBA)

Tips

- When students behavior becomes a significant concern in school, FBA can aid in finding a pattern or chain of events that lead up to a behavior.
- FBA was designed to:
  - Identify positive behaviors to reduce undesirable behaviors.
  - Select appropriate behaviors to be substituted in replacement of the inappropriate ones.
- FBA is based upon assumptions:
  - Challenging behaviors do not occur in isolation
  - Behaviors occur in response to a stimulus
  - Behaviors are governed by consequences that follow them
  - Behavior is a form of communication
  - Behaviors have a purpose
    - To get something
    - To avoid/escape something

Tool 2: Functional Behavioral Assessment (FBA)

Resource

- It is helpful to specifically identify the function of a students behavior rather than to assume or jump to conclusions.

ABC BEHAVIOUR CHART
(Antecedent, Behaviour, Consequence)

Name: _____ **Date:** _____

Setting Information:

Time / Staff	Situation / Antecedent	Behaviour	Consequence / What the "Adult" Did to Respond

School-Based Strategy: Communication Between Teachers, Parents, and Professionals

OPENNING lines of communication between students, staff, and parents/ guardians is crucial for student success. There should always be collaboration between these parties in order for all parties to be on the same page at home and school.

Tool 1: School-Home Report Card

Tips

- A "report card" that is transported between home and school each day is a helpful to can allow parents to have feedback from school.

Resource

Student's Name: _____

Date: _____

Circle one number for each behavior below.

Remains on task during class work	1 2 3 4 5
Raises hand to participate	1 2 3 4 5
Comes to class prepared	1 2 3 4 5

Comments:

_____

_____

_____

_____

_____

Note: 1=very poor, 2=poor, 3=satisfactory, 4=good, 5=very good

Tool 2: Daily Communication Log

Tips

- A log similar to the one below can allow both parents and teachers to create an ongoing dialog about the student.
- Communication can include discussions about grades, improvements, concerns, missing assignments, behavior etc . . .

Resource

Date Week of ____	Parents Comments	Teacher Comments
Monday		
Tuesday		
Wednesday		
Thursday		
Friday		

Tool 3: Report to Parents

Tips

- Once you gather information, use the below form to summarize information.
- a clear understanding of an individual student's educational history, strengths, needs, and learning styles.
- Work with parents to complete the form to a clear understanding of an individual student's educational history, strengths, needs, and learning styles.

Resource

Student name:_____
Date: _____

Review of student records, including the following:
Recommendations for additional needed information:

Analysis of student's strengths and needs based on record review:

Information on specific educational programs:

Additional resources and related services:

Short term action plan:

Long term action plan:

Follow-up:

Tool 4: Parent-Teacher Conference Guide

Tips

- The following tool can be used to structure a meaningful conference between parents and teachers.
- Such conferences require planning to get a full understanding of a student, socially, emotionally, and intellectually.

Resource

Student name: _____

Grade: _____ Date: _____

Fill in blanks with S=strength, G=growth, N=(has) need

Intellectual
___ Initiative
___ Resourceful
___ Problem solving
___ Follow through on plans
___ Evaluates own work
___ Originality

Social
___ Cooperation with teacher
___ Cooperation with other students
___ Self-reliant
___ Leadership among peers
___ Ability to follow
___ Ability to give and take
___ Appreciation of others
___ Contributes to group effort
___ Responsibility

Emotional
___ Self control
___ Speech and conduct
___ Respect for others
___ Attentiveness
___ Recognition of standards

Work Habits
___ Prompt
___ Persistent
___ Follows directions
___ Independent
___ Achievement according to ability

School-Based Strategy: Attention

NOTHING of value can be accomplished without focus and concentration. The following are simple strategies to help students with ADHD develop strategies to sustain attention.

Tool 1: Calming Techniques

Tips

- Often students with ADHD display anxious, inattentive, and restless behaviors.
- Use relaxation therapy, yoga, and meditation in the classroom.

Resource

- The following is a technique for calming and stabilizing the nervous system.

✔ Make sure the room is quiet

✔ Ask students to sit in a position that they can hold for a long period of time (ex: lie down, cross legs, head on desk etc . . .)

✔ Ask students to gently close eyes

✔ Ask students to repeat inspirational phrases, “I believe in myself” or “I am at peace” etc . . .

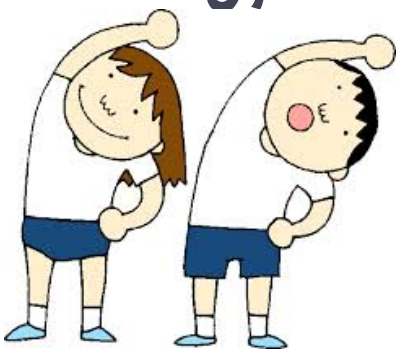
Tool 2: Suggested Breaks

Tips

- Students with ADHD often perform better academically with environments that provide movement.
- These breaks allow students to refocus and recharge, while, preventing fatigue.

Resource

- ✔ Stretch
- ✔ Get a drink of water
- ✔ Take a walk in the hallway
- ✔ Run an errand for the teacher
- ✔ Drawing or doodling
- ✔ Playing with kinesthetic manipulative (ex: squishy toy, dry sponge etc . . .)



Tool 3: Planning Facilitation

Tips

- Often children with ADHD have difficulty verbalizing their ideas when completing a task.
- Help the student by suggesting effective strategies.

Resource

- Use **probes** to encourage the child to learn how to plan effectively.
- Probing statements to help students verbalize ideas and think about planning strategies:

✔ How did you do this assignment?
✔ What did you notice about the way you completed this assignment?
✔ What did this assignment teach you?
✔ What will you do next time?
✔ Do you think you will do anything different next time?

Tool 4: Talk Aloud

Tips

- Students with ADHD have difficulty self-monitoring their attention to task.
- Private speech or 'Talk Aloud' helps students self-regulate.

Resource

✔ Have student describe their action out loud.

✔ Then have student guide their action by saying the same thing in his or her head.

Tool 5: Self-Monitoring

Tips

- Students with ADHD have difficulty self-monitoring on-task behavior.
- Self-monitoring charts can help these students learn how to reach a desirable behavior.

Resource

- Establish target behavior with student
- Determine duration of each self-monitoring session
- Ask students to circle number of each occurrence of the target behavior
- Provide reinforcement for improvement

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	Target Behavior:	Target Behavior:	Target Behavior:	Target Behavior:	Target Behavior:
SESSION 1	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10
SESSION 2	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10	1 2 3 4 5 6 7 8 9 10

Tool 6: Visuals

Tips

- Students with ADHD may learn better when they are presented with visuals, verbal cues, and physical proximity.
- Below are some visual cues which can support learning in the classroom.

Resource

Stop, Think, Options, Plan

Listening

I **look** at the person who is giving oral instructions.

I **repeat** the steps in my head.

I **repeat** the instruction out loud.

I **check** that I have completed all the steps in the task.

I **complete** the task.

School-Based Strategy: Time Management and Organization

MANY individuals with ADHD have difficulty with time management and need support to develop internal sense of time. These individuals need reminders to complete tasks to help them stay on-task. Furthermore, these individuals have difficulty organizing their materials and ideas due to their deficits in executive function skills.

Tool 1: Daily Routine at School

Tips

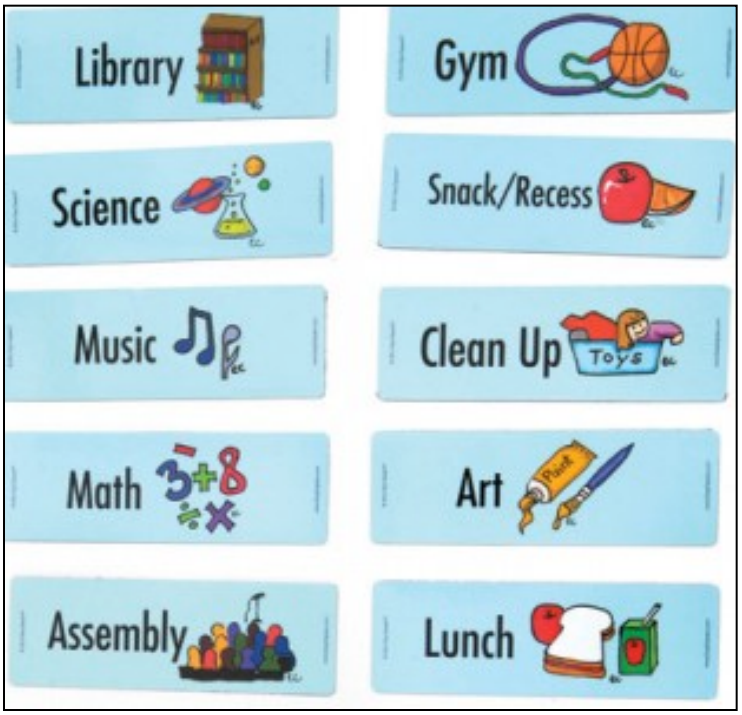
- A daily routine at school is crucial in helping establish consistency and structure for children with ADHD.

Resource

✔ Go over the routine of the day in the morning and point to each planned activity on the board.

✔ Ask students to verbally repeat plan.

✔ Develop a morning and afternoon routine at the beginning of the year so the students know what is expected of them.

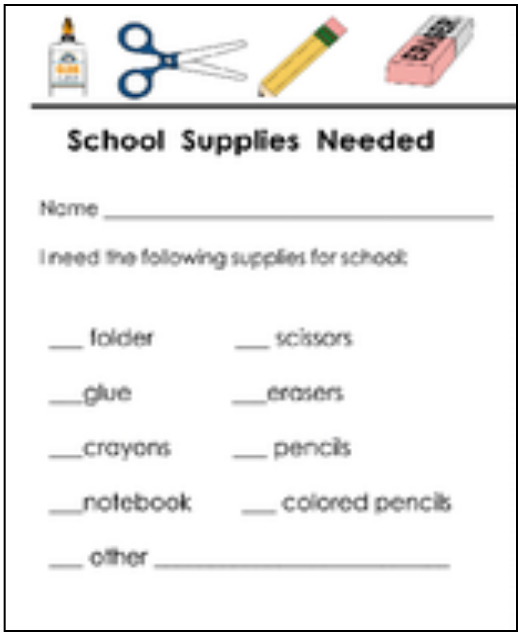


Tool 2: Organization of Materials

Tips

- Students with ADHD have difficulty managing their school materials. They often loose things and are forgetful.
- Use a checklist or organizational chart to help with such difficulties.
- Teach the student how to use the chart so they can eventually self-monitor materials from home and school.

Resource



School Supplies Needed

Name _____

I need the following supplies for school:

___ folder ___ scissors

___glue ___erasers

___crayons ___ pencils

___notebook ___ colored pencils

___ other _____

Tool 3: Time Management

Tips

- Problems with time management are common for individuals with ADHD.
- Help students overcome their difficulties by offering supportive and nurturing techniques for work completion.

Resource

✔ Help students to use timeline charts to break large assignments into smaller pieces with subdue dates.

✔ Use watch devices or start and stop timers with reminders, alarms, or buzzers.

✔ Teach student how to use planners or computer planning software.

Tool 4: Time Estimation

Tips

- Students with ADHD often struggle to accurately estimate the amount of time it takes to complete activities.
- It is important for students to learn to allow enough time for tasks, at first overestimating and then becoming accurate with time completion.
- Have the child complete a priority list with assignments, guessed amount of time and actual amount of time to encourage accurate predictions.

Resource

Assignment	Priority	Guess Time	Actual Time

Tool 5: Task Analysis

Tips

- Students with ADHD often display executive function deficits. Completing big assignments are difficult, therefore, individuals can greatly benefit from task analysis for their assignments.
- Task-analysis is breaking down an assignment into steps.
- Teacher should conference with student or class after a multistep assignment is assigned.

Resource

Step 1: Decide on exactly **what** you must do.

✔ Highlight key words in instructions

✔ Use private speech to say out loud (to yourself) what you must do

✔ Read directions one more time

Step 2: Decide on the number of **steps** needed to complete the task.

✔ Make a list of steps to accomplish task.

✔ Rank steps according to importance

Tool 5: Task Analysis

Resource

Step 3: Decide on the amount of **time** each step will take you to do.

✔ Write down steps in the order you ranked them

✔ Record the amount of time for each task

Step 4: Create a **schedule.**

✔ Count number of days you have to do the task

✔ Look at calendar

✔ Write the day you will begin and deadline on calendar

✔ Plan a time to complete each step

✔ Make changes as you go along depending on where you are in completing the task

Step 5: Start!

✔ Get help immediately if you do not understand something

✔ Evaluate finished assignment before deadline

Step 6: Finish the task.

✔ Complete on time

✔ Reward yourself

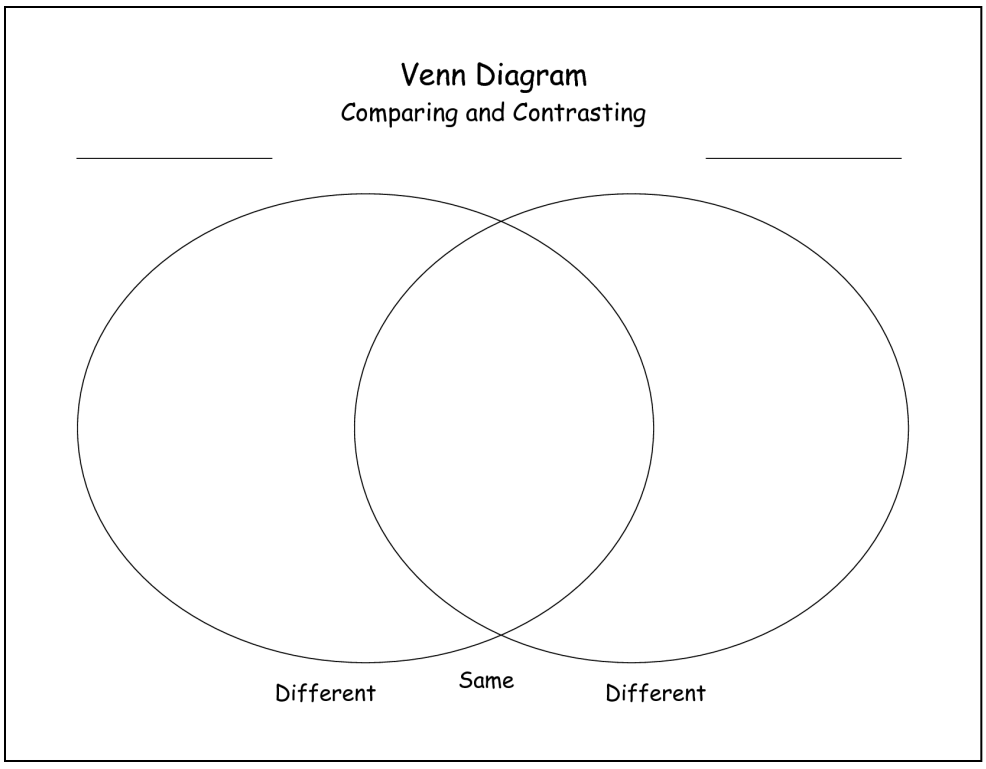
Tool 6: Graphic Organizers

Tips

- Graphic organizers are useful for students to record and organize ideas or information.
- Students with ADHD often struggle with organizing their ideas.

Resource

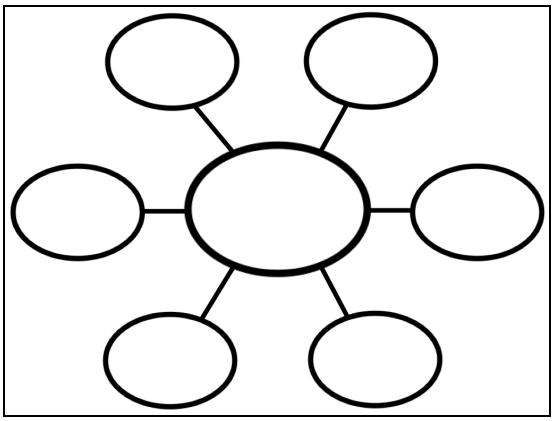
- Venn diagrams allows students to compare and contrast information.



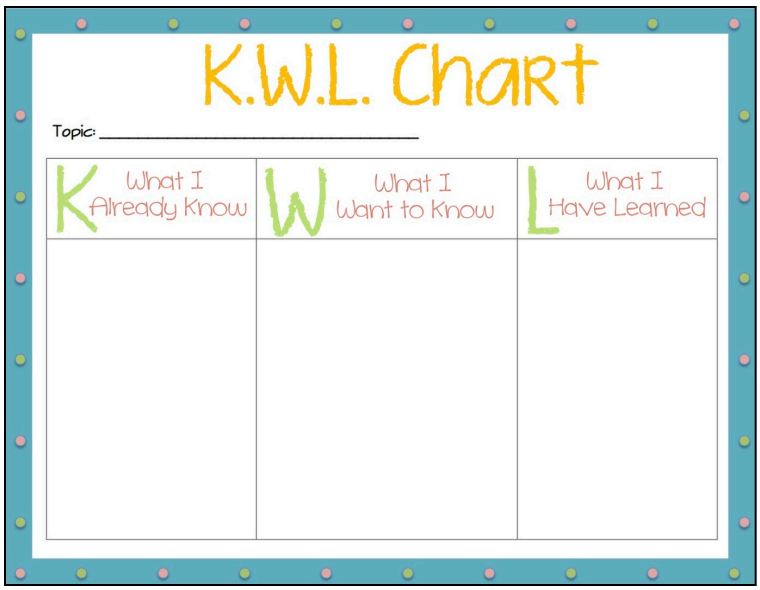
Tool 6: Graphic Organizers

Resource

- A simple web graphic organizer allows students to spider-web their ideas into categories based on thinking, research, reading, or any task related information.



- A **KWL** chart allows students to explore a topic describing what they know, what to know and at the end of the lesson what they learnt.



School-Based Strategy: Homework and Study Skills

INDIVIDUALS with ADHD often get restless and bored with an activity if the task is not one that they particularly enjoy. Completing homework and preparing for tests can be a challenge. Developing strategies for homework and study skills are important for higher education and can benefit a child in the long-term.

Tool 1: Strategies for Homework

Tips

- Many students with ADHD struggle with homework due to their short attention span, restlessness, and impulsivity.
- Students need assistance in paying attention to homework directions to avoid carelessness.

Resource

- ✔ Encourage students to read aloud homework directions to you prior to leaving school
- ✔ Explain to students that when they make a mistake to consider alternative solutions
- ✔ Encourage the student to reread directions after completing the homework to ensure it is done correctly

Tool 2: Technology for Homework

Tips

- Technology can aid in homework completion as it can be engaging and can help break down the barriers to learning for children and adolescents with ADHD.

Resource

- Inspiration Software Inc helps students learn to plan, research, and complete projects effectively.

Elementary School

✔ Categorizing and grouping
✔ Developing literacy skills
✔ Building comprehension skills
✔ Expressing and organizing thoughts

High School

✔ Analyze complex topics
✔ Improve writing proficiency
✔ Develop planning skills

Tool 3: Skills for Using a Textbook

Tips

- Students with ADHD often are not able to break down information into smaller chunks.
- Students with ADHD can benefit from effectively accessing information from a textbook.

Resource

Have a purpose for reading

✔ What do you need to learn?
✔ Why do you need to learn it?
✔ Where will you find the information you need?

Use good strategies

✔ List the things you want to know
✔ Scan the Table of Contents
✔ Take notes
✔ Review notes

Survey the chapter

✔ Read captions
✔ Read boldface subtopics
✔ Look at graphics

The Big Picture

TEACHERS need to learn, teach, practice, and model strategies that support and empower students who have difficulties related to ADHD. To follow is a list of strategies to do so . . .

Tips

Ensure

- ✔ Focus on strengths and interests
- ✔ Instructional adaptations and accommodations

Teach

- ✔ Decoding skills
- ✔ Written process
- ✔ Language conventions
- ✔ Note-taking
- ✔ Highlighting
- ✔ Outlining
- ✔ Summarizing
- ✔ Prioritizing tasks
- ✔ Organizing materials
- ✔ Word processing

Provide

- ✔ Acceleration and enrichment
- ✔ Open-ended tasks
- ✔ Real-life applications
- ✔ Activities with problem solving, reasoning, realistic simulations, and critical thinking
- ✔ Student choice
- ✔ Alternative options
- ✔ Integration of arts
- ✔ An approach that teaches to various learning styles
- ✔ Multisensory approach
- ✔ Flexibility in classroom organization

Tips

Environment

✔ Mutual Respect
✔ Accepting
✔ Organize materials
✔ Flexible
✔ Organized Materials
✔ Fosters student movement
✔ Positive
✔ High Expectations

Academics

✔ Strength-based Instruction
✔ Differentiation
✔ Modified pace
✔ Alternative products
✔ Ongoing evaluation
✔ Peer tutoring

Bordering on Excellence

Tips

Adaptations and Modifications

✔ Extended time
✔ Preferential seating
✔ Chunking tasks
✔ Frequent breaks
✔ Strategy training
✔ Highlighting key points, words, directions
✔ Manipulatives
✔ Additional textbooks for home

Social-Emotional

✔ Positive reinforcement
✔ Teaching social skills
✔ Praise
✔ Awareness

Bordering on Excellence