

A Clinical Perspective on AD/HD and Learning Disabilities

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For information on the treatment of AD/HD
or learning disabilities please go online to
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Fast Facts

- AD/HD is the most common, developmental, neurobehavioral disorder of childhood and has core symptoms of inattention, hyperactivity, and impulsivity.
- A leading theory proposes that AD/HD is tied to an impaired ability to mentally delay reacting to a stimulus long enough to engage in self-regulated behavior.
- The deficits associated with poor self-regulation translate directly into academic, workplace, and behavioral problems.
- AD/HD is diagnosed using a battery of tests, including diagnostic interviewing, parent and teacher rating scales, and testing data.
- Learning disabilities are sometimes associated with AD/HD, so it is critical to test a child with AD/HD for them.

Attention Deficit/Hyperactivity Disorder (AD/HD) is recognized as a disability by the courts, the United States Department of Education, the Office for Civil Rights, the United States Congress, the National Institutes of Health, the U.S. Surgeon General, the Centers for Disease Control, and all major professional medical, psychiatric, psychological, and educational associations. Individuals with appropriately identified AD/HD are therefore protected from discrimination based on disability by the Americans with Disabilities Act, the Rehabilitation Act of 1973, Equal Employment Opportunity Act, and the Individuals with Disabilities Education Act. Because many of the typical behaviors of AD/HD are misunderstood as deliberate, individuals are subjected to discrimination and fail to be provided with appropriate and needed accommodations required by law (Booth, 2000; Gordon and Keiser, 1998). The purpose of this article is to provide current information on the assessment and treatment of Attention Deficit/Hyperactivity Disorder and learning disabilities in children and adolescents.



Although AD/HD is recognized as a disability in court, many with the disorder **experience discrimination** and **do not receive the protection** required by law. For advocates representing children with disabilities, **understanding the accepted treatment,** and educating and supporting families is critical.



Attention Deficit/ Hyperactivity Disorder

Description

AD/HD is the most common developmental, neurobehavioral disorder of childhood (Pediatrics, 2000), with core symptoms of inattention, hyperactivity, and impulsivity. The term developmental implies that it is not categorical (you either have it or you do not), but rather dimensional (representing the extreme end of the continuum). It is estimated to affect three percent to five percent of school-age children who, by definition, exhibit impairment across multiple settings, for example in home, school, or peer relationships. AD/HD does not discriminate. Previously thought to be a disorder restricted to children, AD/HD is now recognized to exist across the lifespan affecting individuals of all ethnicities, all socioeconomic statuses, and at all levels of intelligence (Biederman, Faraone, et al., 1993).

The name and diagnostic criteria for AD/HD have changed numerous times in the past few decades. Advances in research have shifted the focus in AD/HD from hyperactivity as the primary feature (1960s and 1970s) to attention and distractibility (1980s) to disinhibition and impulsivity (1990s). Currently, AD/HD is defined in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994) (see sidebar). The current consensus definition requires that children meet six of nine symptoms of inattention and/or six of nine symptoms of hyperactivity-impulsivity. In addition, onset should be in childhood, the symptoms should be present across settings (i.e., school and home), there must be a significant impairment in major life activities (i.e., school performance), and other major disorders must be excluded as the cause of the symptoms (i.e., psychosis is a rule-out).

The DSM-IV describes three subtypes of AD/HD: Combined type, Predominantly Inattentive type, and Predominantly Hyperactive-Impulsive type. Research has found differences between children with attention problems only and children who have atten-



tion problems along with hyperactivity and impulsivity, leading some in the field to suggest that the Predominantly Inattentive type is a separate disorder. In addition, it is unclear if the Hyperactive-Impulsive type represents a separate group or an earlier developmental manifestation of AD/HD, Combined type, as studies have shown that this subtype is found mainly in preschoolers. Recent conceptualizations indicate that AD/HD is an executive function disorder with either inattention (Brown, 1996) or behavioral disinhibition (Barkley, 1998) as the central feature.

Children with the Inattentive type of AD/HD are often described as more anxious, lethargic, and much more inattentive compared to other children. While they make more mistakes following oral and written directives, their errors are not due to rushing and not checking work but rather to a possible memory, perceptual-motor speed, and processing deficit. In addition, children with this subtype differ from children with hyperactivity-impulsivity in that they do not have the associated problems with aggression and interpersonal problems at home and school. Both groups struggle in school, but children with the Combined type often have more social problems.

A leading theory of AD/HD (Barkley, 1998) focuses on impaired behavioral inhibition more than inattention as the main factor behind AD/HD, Combined type symptoms. Self-regulation refers to a person's overt or covert (cognitive) ability to delay a response long enough to engage in self-regulated behavior.

This ability is critical to academic, career, and interpersonal success. It represents a reflective versus a reactive response to situations and is a central component of a constellation of cognitive abilities known as executive functions.

In Barkley's six-component model of AD/HD, the ability to self-regulate, or perform behavioral inhibition, is the foundation on which four executive processes evolve:

- (1) *Nonverbal working memory*—the cognitive ability to sense the past and to use this past experience to sense the future before behavior is executed (planning)
- (2) *Verbal working memory*—problem solving, rule-governed behavior, reading comprehension
- (3) *Self-regulation of affect/motivation/arousal*
- (4) *Reconstitution*—analysis and synthesis of behavior, verbal fluency, and behavioral fluency

These four functions impact the sixth function in this model—*Motor control/Fluency/Syntax*—which refers to one's ability to re-engage in a task after a disruption and to execute novel/complex motor sequences.

Many of these deficits are detected on neuropsychological testing and may not be immediately obvious to parents. Parents often report this constellation of behaviors anecdotally but do not put it into the larger context. For example, a common referral is a ten-year-old boy who is struggling in 5th grade, because he does not finish class assignments, forgets his homework, is ostracized by peers due to his impulsivity, and does not seem to learn from past mistakes. Although he had satisfactory grades in early elementary school, he began to fall apart in 4th grade when the demands exceeded his limited ability to organize himself. Despite his parents' and teacher's efforts, he

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How Attention Deficit/Hyperactivity Disorder is diagnosed

A. Either (1) or (2):

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

INATTENTION

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

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

HYPERACTIVITY

- (a) often fidgets with hands or feet or squirms in seat
- (b) often leaves seat in classroom or in other situations in which remaining seated is expected
- (c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
- (d) often has difficulty playing or engaging in leisure activities quietly
- (e) is often "on the go" or often acts as if "driven by a motor"
- (f) often talks excessively

IMPULSIVITY

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

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

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

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

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

American Psychiatric Association (1994), DSM-IV Diagnostic and Statistical Manual of Mental Disorders (4th Edition). Washington, DC: American Psychiatric Association.

continually turns in homework late and receives failing grades. The parents, frustrated by their son's inability to self-motivate, punish him. The child, frustrated by his continual academic and interpersonal failures, becomes sullen and angry.

In practical terms, the deficits associated with poor self-regulation translate directly into academic, workplace, and behavioral problems during childhood and adolescence. The limited sense of the past and future, distorted time perception, and tendency to live in the moment appear as procrastination, not meeting assignment and homework deadlines, and making the same mistakes over and over despite receiving negative consequences. The key to understanding AD/HD's impact is recognizing that self-regulation also permits individuals to develop intrinsic motivation toward future-directed behavior. As the model indicates, AD/HD often interferes with this ability to delay, hence leaving one a victim of the moment. The individual who does not receive an accurate diagnosis and treatment is often subjected to pejorative labels such as "lazy" and "underachiever." Since so much of learning requires deferred gratification, it is easy to see how an individual who has a deficiency in his or her capacity to wait is going to struggle in school. Even in the most intelligent individuals, AD/HD can hinder academic performance and productivity.

Etiology

Although heterogeneous in origin, AD/HD usually has a neurobiological etiology. Over the past decade, neuroimaging studies, including magnetic resonance imaging (MRI), positron emission tomography (PET), and functional MRIs, have shown that specific brain regions, the prefrontal cortical and striatal areas, are affected when an individual has AD/HD. In addition, family and genetic research has shown that AD/HD is hereditary.

Current studies confirm family clustering of AD/HD (Smalley, 2000). Examination of the families of children with AD/HD shows that 10–30 percent of parents and 20–30 percent of siblings are affected. Numerous twin studies have shown that the heritability of AD/HD is even stronger than the heritability of IQ and have proven that a child's environment, or rearing, does not cause AD/HD. If an identical

twin has AD/HD, the other twin is also affected 60–80 percent of the time. Fraternal twins, who share only 50 percent of their genes, both have AD/HD approximately 20–30 percent of the time. Current research suggests that multiple genes contribute to one's susceptibility to AD/HD and to the heterogeneity of its expression. Greater understanding in this area will undoubtedly drive treatment interventions so that medications and educational accommodations will be able to target specific types of AD/HD.

The role of various environmental toxins and allergens has also been studied extensively. The notion that excessive sugar consumption or food allergies cause AD/HD has been refuted in several well-designed studies. However, it has been established that prenatal alcohol and/or prenatal tobacco exposure is associated with symptoms of AD/HD in offspring.

In sum, studies to date weigh heavily on the genetic and developmental neurological factors as primary causes of AD/HD and minimize the influence of social and environmental factors such as child rearing style.

Diagnosis

The diagnosis of AD/HD is reliably made using a battery approach that includes diagnostic interviewing, parent and teacher rating scales, and testing data. A thorough evaluation requires approximately five hours, during which the clinician evaluates whether a child has AD/HD based on the DSM-IV criteria for AD/HD and other conditions. The parent interview is the primary tool in the evaluation (Robin, 1998). Parents highlight their concerns while clinicians collect developmental, medical, and school histories. In addition, the clinician inquires about past and present AD/HD symptoms and examines possible co-morbid conditions and differential diagnoses.

Since other conditions have symptoms mimicking those of AD/HD, the diagnostic phase must systematically examine the following factors: (1) Environment (family stresses, divorce, poverty); (2) Educational (learning disabilities); and (3) Psychiatric co-morbidities (mood disorders, anxiety disorders, conduct disorder, substance use disorders). It is imperative that the clinician is sensitive to cultural and ethnic factors in conducting the interview, asking, for example, "Do you consider this to

be a problem for Tommy compared to other children of your ethnic group?"

In addition to the core symptoms, individuals with AD/HD have a higher likelihood of having another co-morbid condition in the cognitive, emotional, behavioral, and/or academic area. A significant number of children and adolescents with AD/HD have a co-morbid psychiatric condition such as oppositional defiant disorder or conduct disorder (25–50 percent), antisocial disorder (adults only, 11–22 percent), depression (27 percent), or substance use disorders (10–20 percent) and personality disorders (adults only). A discussion of each of these conditions is beyond the scope of this article. For complete assessment guidelines, refer to the texts by Barkley (1998), Goldstein (1997), and Robin (1998). In addition, several support services and websites are listed as sidebars to this article.

While not all children with AD/HD exhibit these associated conditions, it is critical to assess for the more common coexisting disorders in order to facilitate a comprehensive treatment plan. For example, if a child is diagnosed with AD/HD and the evaluation did not include psychoeducational testing to rule out a specific learning disability, the student's school struggles may continue despite pharmacological intervention.

Educational Issues

Children with AD/HD often have great difficulty in both academic performance (productivity) and achievement (mastery of material). Most children referred to clinics are performing significantly below known expectations, based on IQ and achievement tests. Children with AD/HD are more likely to perform significantly lower than their peers on standardized achievement tests, for example, in reading, spelling, and math.

The educational statistics are startling. Up to 56 percent of children with AD/HD require academic tutoring, 30 percent repeat a grade, 30–40 percent may receive special education services, as many as 46 percent may receive school suspension, and 10–35 percent may fail to graduate from high school (Barkley, 1998). While approximately 20 percent enter college, only 5 percent graduate.

As the statistics indicate, it is critical to determine if a child has a specific learning dis-

On the Web

Expanded article with information on the treatment of AD/HD and learning disabilities:

www.michbar.org/journal/home.cfm

LD On Line: www.ldonline.org

Special Ed Advocate:
www.wrightslaw.com

Family and Advocates Partnership for Education: www.fape.org

Individuals with Disabilities Education Act practices:
www.ideapractices.org

U.S. Department of Education (DOE):
Search Page: www.search.ed.gov

Office of Special Education Services:
www.ed.gov/offices/OSERS/IDEA/geninfo.html

Office for Civil Rights:
www.ed.gov/offices/OCR

ability in addition to, or instead of, AD/HD. Learning disabilities are not causal but are sometimes associated with AD/HD. Even if a learning disability is not immediately obvious (e.g., early reading problems), subtle language deficits often have a lasting effect on adolescent and adult functioning, not to mention the toll on self-esteem.

Learning Disabilities

Assessment

A child is diagnosed as having a learning disability if he or she struggles to learn despite having normal ability, for example, a student who scores at least in the average range, at or above a standard score of 90 on an IQ test. The following definition is provided in the *Michigan Protection & Advocacy Service Manual* (2000, pp 4–8, 4–9):

A specific learning disability means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations. The term includes such conditions as perceptual impairments, brain injury, dyslexia, and developmental aphasia. The term does not include students who have learning problems that are primarily the result of visual, hearing, or motor impairments, of mental retardation, of emotional disturbance, of autism, or of environmental, cultural, or economic disadvantage.

The limited sense of the past and future, distorted time perception, and tendency to live in the moment appear as procrastination, not meeting assignment and homework deadlines, and making the same mistakes over and over despite receiving negative consequences.

The Individualized Educational Program Team (IEPT) may determine that a student has a specific learning disability if the student does not achieve on an equal basis with his or her age and ability levels in one or more of the areas listed above, when provided with learning experiences appropriate for the student's age and ability levels. The multidisciplinary evaluation team may determine that a student has a learning disability if that student exhibits a severe discrepancy between achievement and intellectual ability in one or more of the following areas:

- (e) oral expression;
- (f) listening comprehension;
- (g) written expression;
- (h) basic reading skill;
- (i) reading comprehension;
- (j) mathematics calculation; or
- (k) mathematics reasoning.

Support Services

Children and Adults with Attention Deficit/Hyperactivity Disorder (CHADD)

8181 Professional Place, Suite 201
Landover, MD 20785
301-306-7070
www.chadd.org

National Attention Deficit Disorder Association (ADDA)

P.O. Box 972
Mentor, OH 44061
800-487-2282
www.add.org

Learning Disabilities Association of America (LDA)

4156 Library Road
Pittsburgh, PA 15234
412-341-1515
www.ldaa.org

Learning Disabilities Association of Michigan

200 Museum Drive, Suite 101
Lansing, MI 48933-1914
888-597-7809; 517-485-8160
www.lदानat.org/Michigan

Michigan Protection and Advocacy Agency

106 West Allegan, Suite 300
Lansing, MI 48933-1706
517-487-1755; 800-288-5923

A comprehensive evaluation should include a diagnostic interview with parents and child, parent and teacher rating scales, classroom observation, and psychoeducational testing such as IQ, achievement, memory, and continuous performance tests. There are a variety of ways to calculate whether or not an individual meets criteria for a specific learning disability. One approach is to calculate and compare IQ and achievement test standard scores (for example, mean of 100, standard deviation of 15) so that a significant discrepancy is defined as a set point difference such as 15 points or one standard deviation. Another approach is to identify a learning disability when a score falls below 1.5 standard deviations below the normal mean on a given achievement test (7th percentile), regardless of one's IQ score. There are inherent dangers in relying on only one of these formulas. Using a very rigorous standard combining the two formulas, studies have shown that approximately 8–39 percent of children with AD/HD may have a reading disability, 12–30 percent may have a math disability, and 12–27 percent may have a spelling disorder (Robin, 1998).

Research addressing specific subtypes of learning disabilities focus on two types of skills necessary for optimal learning (Goldstein, 1997; Rourke, 1989):

1. *Auditory-verbal processes.* Relative weakness leads to reading and other language-based disorders.
2. *Visual, perceptual, and motor processes.* Relative weakness may lead to reading problems but are more often linked to mathematics, handwriting, and possible social skill deficits.

The most common learning disability is a reading disorder. Two types of reading disorder are commonly associated with AD/HD—dyslexia and reading disorder of recall/Comprehension (Lyon, 1999; Mather, 2000).

Dyslexia is an inherited disorder that is associated with the following three deficits: phonological awareness, the ability to notice and manipulate the individual sounds in words; weak rapid automatized naming; and weak orthographic processing, remembering

how words look when spelled correctly and how the constellation of letters relates to the phonics of the word. Individuals with weakness in these areas often spell poorly because of an inability to connect sounds to letters and a poor memory of the appearance of properly spelled words.

The second reading disorder has not been studied as extensively, although it is commonly described by individuals with AD/HD who report that while they can read fluently and are good spellers, they have difficulty remembering what they read. Testing reveals that these individuals exhibit none of the problems associated with dyslexia. Researchers speculate about a weakness in verbal and nonverbal working memory, an executive process implicated in AD/HD.

In addition to reading, many children and adolescents with AD/HD have associated learning problems with written expression, verbal and nonverbal working memory, mathematics, and spelling. Silver (1992) distinguished between problems of input, organization, memory, and output. Children with input problems have difficulty receiving information through listening, reading comprehension, or visual channels. Children with organizational difficulties cannot sequence or categorize new information efficiently. They have trouble identifying the most salient points and relating them to the general topic. Memory problems are often identified if a student has good class participation but poor test performance, poor spelling, and difficulty memorizing rote information such as multiplication tables. Output problems are often experienced by children who, despite adequate knowledge, offer a paucity of information orally and/or in writing.

Many students who do not appear to have learning problems in elementary or even middle school begin to struggle in high school. Several factors are hypothesized as being buffers in the earlier academic years, including having a higher IQ, a high degree of parental assistance and monitoring, and milder symptoms of AD/HD. Adolescents who did not show a hyperactive-behavioral component are often missed until their academic performance

problems are acute. In many instances, these individuals are referred for depression and/or anxiety symptoms.

It is imperative that all who work with children understand the accepted standard of care for AD/HD and learning disabilities, educate families early on about the necessary ingredients for success at each developmental phase, and support them on their journey. ♦



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