



Attention Deficit/Hyperactivity Disorder (ADHD)

As presented in the DSM 5 Diagnostic Criteria, ADHD is a persistent pattern of inattention and/or hyperactivity and impulsivity that interferes with functioning or development.

Recent research has led to some academics moving away from classifying ADHD as a behavioral disorder, observing that many diagnosed with ADHD do not experience any behavioral issues, while for many the symptoms extend far beyond what is outlined in the DSMV5. Instead, many are reclassifying ADHD as a cognitive issue rooted in Executive Function Disorder.

Etiology

According to the American Psychiatric Association, there is no specific scientific cause for the disorder. There is evidence that genetics does contribute in the development of the disorder; three out of four children with ADHD have relatives with the disorder. Other factors that also contribute to the development of the disorder might be, but is not limited to, premature birth, brain injury, extreme stress or use of alcohol or tobacco during pregnancy.

Onset

The average age of diagnosis is eight years old. Since ADHD is a physiological condition, research supports the idea that ADHD is present since birth but difficult to diagnose with its symptoms before age five.

Characteristics

According to the APA, ADHD is diagnosed as one of three types:

- **Predominantly Hyperactive-Impulsive:** this presents itself with symptoms of hyperactivity and impulse control but little trouble with inattention
- **Predominantly Inattentive:** this presents itself with symptoms of inattention but with little trouble with hyperactivity and impulse control
- **Combined Presentation:** this is a combined presentation of hyperactivity/impulsivity and inattention

Prevalence

ADHD affects up to 1 in 20 children in the USA. There is no strong consensus about the prevalence of ADHD in the world, but evidence suggests that the prevalence of ADHD is greater in males than females.



ADHD and Executive Function

The following six clusters of executive functions tend to be impaired in individuals with ADHD:

- **Activation:** organizing tasks and materials, estimating time, getting started
- **Focus:** focusing, sustaining focus, and shifting focus between tasks
- **Effort:** regulating alertness, sustaining effort and processing speed
- **Emotion:** managing frustration and modulating emotions
- **Memory:** using working memory and accessing recall
- **Action:** monitoring/ regulating actions

Executive functions are mediated primarily by the prefrontal cortex, which is responsible for sending messages to the rest of the brain regarding what actions to take, why, and when. It is common for a person to have weaknesses in more than one area of executive function. It is also prevalent for areas of strength to co-exist alongside areas of executive functioning weakness.

ADHD and Working Memory

Working memory helps an individual hold information in their brain to use in the short term, focus on a task and remember what to do next. If a student has impairments in working memory, they may have trouble remembering and following teacher directions, memorizing and recalling math facts or spelling words, computing problems in their head or retrieving information from memory when they need it.

One of the most consistent findings in research studies is that students with ADHD have poor working memory, particularly when they must remember visual information, such as graphs or images. This has serious impact on their learning.

As a result of poor working memory, students with ADHD struggle in all areas of learning. They also find it difficult to cope with simple tasks in the classroom, such as following instructions, keeping track of where they need to be, and remembering to do their homework.

Twice Exceptionality (2e) and ADHD

“Twice Exceptional” is a term used to refer to individuals with one or more disabilities presenting alongside one or more exceptional strengths.

Some characteristics of gifted learners overlap with characteristics of children with ADHD. More recent empirical research confirms that high-ability students can and do have diagnoses of ADHD, and that their school performance difficulties, behavioral presentation, and family history of an ADHD diagnosis is very similar to average ability students with ADHD.



Physiology:

Evidence suggests that there is association between ADHD and possible functional, structural, and neurotransmitter alterations in regions of the brain.

Physiology of ASD	
Neurotransmitter	Levels of available dopamine receptors and transporter molecules are typically lower in patients with ADHD. Maturation of certain dopaminergic neural pathways appears to be delayed in patients with ADHD.
Functional	Impairments in prefrontal-striatal networks and in the frontal-limbic networks may contribute to ADHD. Moreover, brains of patients with ADHD show under-activation of systems involved in executive function and attention, and under-activation of fronto-striatal and fronto-parietal circuits.
Structural	Lower grey matter density, white matter abnormalities, reduced total brain volume and volume of some brain structures, and cortical differences may result in ADHD.

Comorbidity of ADHD with other disorders is between 60% and 80%. Some common comorbid disorders are listed to the right.



- Oppositional Defiant Disorder
- Depression
- Anxiety
- Bipolar Disorder
- Learning Disorder
- Conduct Disorder

Treatment/ Services available:

- **Behavioral Therapy** - this is recommended to help managing the symptoms of ADHD. For children, the therapy focuses on teaching them to control their behavior and make good choices. It also consists of teaching parents and teachers how to provide positive feedback for desired behaviors and consequences for negative behaviors.
- **Individualized Cognitive Enhancement Program** - this is recommended to address cognitive skill weaknesses that may be contributing to the diagnosis of ADHD, including Working Memory, Attention, Processing Speed, and Executive Functions.



ADHD and COGx

COGx programs approach ADHD by first looking at a learner's unique cognitive profile. In ADHD cases, it is typical for individuals to have weaknesses in working memory &/or processing speed, which often results in symptoms of ADHD. It is also very common with students with ADHD to struggle with Executive Functions. COGx programs can target these skills by identifying and targeting the manifestation of these ADHD symptoms. Research also shows that Metacognition—specifically a learner's awareness—is perhaps the most influential factor in improving these skills. Raising Metacognition is a pillar of COGx programs and is critical to meaningful results for students with ADHD.

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