



## **ADHD as a Disorder of Executive Function: Implications for Understanding Academic Functioning and Improving Assessment of ADHD**

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Current research suggests that ADHD is better characterized as a disorder of Executive Function rather than a disorder of attention. This article will review several important aspects of ADHD that support this notion. Specifically, the following topics will be covered:

- » What are Executive Functions?
- » ADHD as a disorder of Executive Function
- » The impact of ADHD and Executive Functions in the school setting and academic performance
- » Important implications in the assessment of ADHD.
- » What are Executive Functions?

Executive Functions comprise a group of higher order skills necessary for effective problem solving and task completion. These skills are often drawn upon heavily by corporate executives, hence the term “Executive Functions.” Corporate executives are often excellent multi-taskers, and have excellent planning, organization and time management skills. Executive Functions help us organize our thoughts and behavior, hold relevant details in short-term memory and avoid the mental traps of distractions and irrelevant information. Specific skills that best capture the various descriptions of Executive Functions include: the ability to initiate behavior, inhibit behavior or “put on the brakes” when needed, planning and organization skills, flexibility in using different problem-solving approaches, the capacity to hold relevant information in short-term memory (working memory) and being able to monitor and evaluate one’s own behavior. Executive Functions are analogous to a conductor in an orchestra. They help us mobilize and orchestrate all of our basic skills in order to efficiently solve problems and carry out daily activities. Like the conductor of an orchestra, Executive Functions can either produce a symphony (effective goal-oriented behavior) or a cacophony (complete planning disasters!).

### **ADHD as a Disorder of Executive Function**

The diagnosis of ADHD is based on symptoms of inattention and/or hyperactivity and impulsivity. However, our current understanding of ADHD suggests that Executive Function deficits represent the underlying cause of the hyperactive and inattentive behaviors associated with the condition. The redefinition of ADHD within an Executive Function framework provides a more comprehensive way to incorporate and understand the wide range of symptoms associated with ADHD beyond the limited triad of inattention, hyperactivity and impulsivity. Children with the combined subtype of ADHD, characterized by both inattentive and hyperactive/impulsive behavior, often have problems with the ability to inhibit behavior or “put on the brakes” when needed. Children with the predominantly inattentive subtype of ADHD, characterized by inattention without the accompanying hyperactivity/impulsivity, often have difficulty holding information in short-term memory or “working memory” (e.g., trouble remembering tasks that involve more than one or two steps). These children often have problems with initiating behavior as well.

Children with ADHD are often reported to have memory problems, even though they typically perform normally on memory tests. Such “memory problems” may actually reflect inefficient learning caused by more primary Executive Function deficits (i.e., poor planning and organization skills, becoming easily distracted and not blocking out irrelevant information). Research has demonstrated that if we can better organize the information that we are attempting to learn, it is more likely that we will be able to encode this information and retrieve it when needed. This would be akin to having an efficient and well-organized

filing system. Our brain and memory system work similarly, in that we can more easily retrieve and access information if it is better organized. The organization of information is often an inherent weakness in individuals with ADHD. Therefore, even when a child with ADHD knows the information it might still not be retrieved quickly enough, such as during a timed test.

### **ADHD and Academic Functioning:**

Given the nature of Executive Function deficits in ADHD, it is not surprising that academic problems are prevalent in the condition. A number of studies have actually found Executive Functions to be a stronger predictor of grades and general school performance in children with ADHD than IQ. The large majority of children with ADHD actually have completely normal intelligence as well as intact or average reading and academic skills. The breakdown is usually not in the lack of skill or the ability, but in the lack of application. Children with ADHD often “know how to do the work,” but fail to succeed at school because their Executive Function deficits impede academic function. The Executive Function deficits associated with ADHD, such as poor planning and organization, inhibitory control and difficulty holding relevant information in short-term memory, often result in failure to complete homework and classwork assignments in a timely manner. In support of this notion, my research has found that academic underachievement in children with ADHD is more often the result of poor study skills (e.g., not finishing class work on time, not completing homework, not preparing for tests and class) rather than lack of skill (i.e., deficient reading or math skills). Academic success requires not only knowledge of academic skills but also their effective application through proper organization and planning.

### **Important Considerations in the Assessment of ADHD**

Neuropsychological testing can be a valuable tool in the assessment and diagnosis of ADHD. However, children with ADHD can often perform normally on individually administered performance-based tests of attention and even Executive Function in the clinic setting. How can this be? For starters, children are often tested in a highly structured environment that involves working one-on-one with an examiner in an office. The highly organized and structured environment of the test setting is devoid of the distractions and disorder that children typically encounter in the real world (e.g., completing assignments in a classroom with many other rambunctious children and minimal supervision, or attempting to finish homework instead of playing video games while at home). Therefore, relying too heavily on test results drawn primarily from individually administered performance based measures (paper and pencil tests) without careful consideration of clinical history, particularly parent and teacher input, can be misleading. For this reason, the use of behavior rating scales (questionnaires) is critical in the assessment of ADHD. First, questionnaires provide information about a child’s Executive Functions through observation of their behavior within a natural setting rather than a test clinic. Second, information on a variety of different skills and potential problem areas can be gathered with a single questionnaire in a short period of time (usually minutes), which often cannot be gathered in a test clinic, even when a large battery of individually administered tests are used. Third, questionnaires collapse observations of a child’s Executive Functions over an extended time interval (weeks to months), which cannot be done with individually administered performance-based measures. Therefore, the use of parent, teacher and self-report questionnaires is critical in the diagnosis and assessment of ADHD. In summary, our understanding of ADHD as a disorder of Executive Function has led to important implications in our conceptualization of the condition and its impact on academic function, and has also improved diagnostic accuracy when assessing and screening for ADHD.

For more information about the assessment of executive functioning skills people can contact the Help Group UCLA Neuropsychology Program at (818) 781-0360.