

Assessment and Diagnosis of AD/HD in Children and Adolescents

by Sam Goldstein, PhD

THOUGH THE CURRENT *DIAGNOSTIC AND STATISTICAL MANUAL OF MENTAL DISORDERS*

(DSM-IV-TR) provides the definitive diagnostic criteria for the assessment of AD/HD, in practice, the assessment process is not so well defined. Given that children with AD/HD have high rates of co-occurring emotional, behavioral, learning, and medical problems—and that only a minority of children experience AD/HD exclusively—most medical, educational, and mental health professionals agree that broader assessment within the context of diagnosing AD/HD is required. The extent of that assessment is also not clearly agreed upon, however. Some professionals believe that a basic screening for co-occurring problems through the use of checklists during the assessment of AD/HD is more than sufficient. Others offer the executive dysfunction theory of AD/HD as evidence that the assessment and diagnostic process for AD/HD should include measures of intelligence, neuropsychological functioning, and emotional status.



It is important to note that no single score or observation can confirm or rule out the presence of AD/HD and/or co-occurring problems. Researchers have demonstrated that use of the DSM criteria alone is a good place to start but not a good place to finish, as it may lead to overdiagnosis. The collection of in-depth data during assessment facilitates the evaluator's ability to deal with the critical issue of false positives. Symptoms of impulsivity and inattention are characteristic of AD/HD but are also associated with other emotional, behavioral, developmental, and adjustment problems in children and adolescents. A careful review and integration of all collected data are essential to avoid false positives. Though concern about false negative diagnosis may be less of an issue with the combined type of AD/HD, it is certainly an equally challenging issue for children with the inattentive type of AD/HD.

In this Research Brief, I have chosen a number of articles that highlight research on very different paths for developing accurate measures in the assessment and diagnosis of AD/HD. Readers should be aware that this area of AD/HD research is broad, diverse, and sometimes difficult to understand and interpret.

Sam Goldstein, PhD, is a member of the faculties of the University of Utah and George Mason University. He is the Clinical Director at the Neurology, Learning, and Behavior Center in Salt Lake City, and serves as editor in chief of the *Journal of Attention Disorders*. Goldstein is a contributing editor and member of Attention's editorial advisory board and CHADD's professional advisory board.

► **Bastain, T. M., Lewczyk, C. M., Sharp, W. S., James, R. S., Long, R. T., Eagen, P. B., Ebens, C. L., Meck, J. M., Chan, W., Sidransky, E., Rapoport, J. L., & Castellanos, F. X. (2002). Cytogenetic abnormalities in attention-deficit/hyperactivity disorder. *Journal of the American Academy of Child and Adolescent Psychiatry, 41*(7), 806-810.**

These authors systematically assessed the prevalence of a variety of genetic abnormalities, such as Fragile X, and

velocardiofacial syndrome in a group of children with AD/HD. Very few findings were obtained. The authors concluded that in the absence of clinical signs or positive family history, relatively expensive laboratory assessments for specific genetic disorders in children with AD/HD of normal intelligence are not clinically indicated nor recommended as a component in the assessment of AD/HD.

What We Have Learned

- › The symptoms of AD/HD occur in many genetic conditions and likely should be evaluated when children experience those conditions; however, the converse is not necessarily true. Children presenting with hyperactive, impulsive, and inattentive symptoms have a very low probability of suffering from any of these genetic abnormalities.
- › Though there has been much debate about gender-specific symptoms, norms, and diagnostic criteria for AD/HD, current research suggests that males and females with AD/HD are much more similar than different in their presentation, co-occurrence of psychiatric problems, and cognitive, social, academic, and family functioning. Gender differences seen in clinical settings are most likely the result of referral biases.
- › Tests of executive function may help to discriminate individuals with AD/HD from individuals without the condition but may not necessarily discriminate one type of AD/HD from another. Further, so many different skills are required for good performance on many of these tests that even failure may not constitute a positive indicator of AD/HD.
- › The traditional equality of all AD/HD symptoms and the counting of symptoms to reach a threshold is not as efficient a diagnostic system as assigning more importance to some symptoms than others in ruling AD/HD in or out.
- › The symptoms that most likely rule AD/HD in or out differ between parents and teachers.
- › Some executive tasks that may discriminate an individual with AD/HD from one without the condition at one age may not work as effectively at another age.
- › Though there is an increasing body of research demonstrating genetic, physical, and biochemical differences in individuals with AD/HD, it is premature to use these data to prove or disprove the presence of the condition.
- › Current research suggests that ultimately AD/HD is caused by multiple genes. Some of these genes are likely present in all family members when one member has AD/HD, but present to a greater degree in those receiving the diagnosis. Understanding this phenomenon may someday assist in helping the siblings of children diagnosed with AD/HD if they too experience problems in school.

Current research suggests that males and females with AD/HD are much more similar than different in their presentation, co-occurrence of psychiatric problems, and cognitive, social, academic, and family functioning. Gender differences seen in clinical settings are most likely the result of referral biases.

► **Biederman, J., Kwon, A., Aleardi, M., Chouinard, V.A., Marino, T., Cole, H., Mick, E., & Faraone, S.V. (2005). Absence of gender effects on Attention Deficit Hyperactivity Disorder: Findings in nonreferred subjects. *American Journal of Psychiatry*, 162 (6), 1083-1089.**

These authors noted that, compared to referred boys with AD/HD, girls with AD/HD are less likely to manifest comorbid disruptive disorders and learning disabilities, characteristics that could adversely affect identification of AD/HD in girls. However, because referral bias can affect outcome these findings require replication in non-referred groups of AD/HD subjects. As such, the authors evaluated gender effects in a large group of nonreferred siblings of subjects with AD/HD and non-AD/HD comparison subjects. All siblings were systematically and comprehensively assessed with measures of emotional, intellectual, interpersonal, school, and family functioning. The assessment battery used for the siblings was the same as that used for the subjects. The nonreferred males and females with AD/HD did not differ in DSM-IV subtypes of AD/HD, psychiatric comorbidity or treatment history. They also showed similar levels of cognitive, psychosocial, school, and family

functioning. The authors posit that these findings suggest that the clinical correlates of AD/HD are not influenced by gender, and that gender differences reported in groups of subjects seen in clinical settings may be caused by referral biases.

► **Kibby, M.Y., Cohen, M J., & Hynd, G.W. (2002). Clock face drawing in children with attention-deficit/hyperactivity disorder. *Archives of Clinical Neuropsychology*, 17(6), 531-546.**

The clock drawing test has been reported to be sensitive to visual-spatial perception, graphomotor skills, verbal reasoning, and executive functioning in frontal lobe maturation in children. Participants in this study included 41 children with AD/HD and 41 normal controls between the ages of six and twelve years matched for age, gender, and handedness. Conceptualization of time and construction of the clock face were assessed separately using a scoring system normed on schooled children. Children with predominantly inattentive-type AD/HD were found to perform similarly to those with combined-type AD/HD. However, children with AD/HD regardless of subtype, performed significantly worse than controls. Qualitative analysis of performance revealed

errors that were subsequent to poor planning during task execution, consistent with executive dysfunction commonly reported for children with AD/HD. Multiple regression analysis demonstrated that a neuropsychological measure of executive function was predictive of clock construction performance in children with AD/HD. Constructional praxis and receptive vocabulary were also predictive of clock construction ability. The authors conclude that their results are consistent with literature suggesting that children with AD/HD present with deficits in executive function. They suggest that clock drawing may be a clinically useful tool in pediatric neuropsychological assessment when incorporated into a battery of tests.

► **Power, T.J., Costigan, T.E., Leff, S.S., Eiraldi, R.B., & Landau, S. (2001). Assessing ADHD across settings: Contributions of behavioral assessment to categorical decision making. *Journals of Clinical Child Psychology, 30(3), 399-412.***

Increasingly, researchers have focused on developing diagnostic algorithms as a means of determining the positive and negative predictive power of specific symptoms within a diagnostic framework. These authors evaluated a school-based sample of five- to twelve-year-old children referred for intervention. Children's behaviors were rated by parents and teachers using the ADHD Rating Scale-IV, which corresponds to diagnostic symptoms in the DSM-IV. Their findings suggested that using a fixed cutoff point, such as six or more symptoms for the DSM-IV AD/HD diagnosis, was often not the best strategy for making diagnostic decisions. Instead, the optimal approach depended on whether diagnostic information was provided by the parent or teacher and whether the assessment was for screening or diagnosis. Also, aggregating symptoms in the order to which they were accurate in predicting a diagnosis of AD/HD seemed to be more effective than the approach used in the DSM-IV, which aggregates any combination of a specific number of items. Of interest was the fact that for parents, the most powerful symptoms predicting AD/HD included inattention items related to problems with sustained attention and keeping

track of materials, as well as hyperactive-impulsive items, including talking excessively, being on the go, and fidgeting. For teachers, the best predictive inattentive items included losing things, problems with organization and lack of follow-through leading to failed work completion, while hyperactive-impulsive symptoms included being on the go, fidgeting, and interrupting others.

► **Riccio, C.A., Wolfe, M.E., Romine, C., Davis, B., & Sullivan, J.R. (2004).** The Tower of London in neuropsychological assessment of AD/HD in adults. *Archives of Clinical Neuropsychology, 19(5), 661-671.*

Current theories of AD/HD have increasingly focused on executive functions, particularly those related to planning strategy, and working memory, as well as the maintenance of attention in the pursuit of specific goals. It is suggested that these behaviors are deficient in individuals with AD/HD. The Tower of London is one task used in the assessment of executive function. These authors evaluated 102 individuals between the ages of 16 and 33 years for the Tower of London performance, along with other executive measures. Based on diagnostic considerations, nearly 2 percent of this sample met the diagnostic criteria for AD/HD. Interestingly, over half presented with comorbid conditions, including depression and learning disability as well. The results suggested that although the Tower of London measured aspects of ability likely not tapped by other executive neuropsychological measures, and therefore may provide additional information concerning individual functioning, findings between these groups were equivocal, suggesting the Tower of London is not an instrument that adults with AD/HD are unable to complete successfully.

► **Slaats-Willems, D., Swaab-Barneveld, H., de Sonnevile, L., van der Meulen, E., & Buitelaar, J. (2003).** Deficient response inhibition as a cognitive endophenotype of ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry, 42(10), 1242-1248.*

Endophenotypes composed of cognitive ability profiles may have value in the search for genetic correlates of AD/HD. The authors hypothesize that nonaffected siblings of children with AD/HD would demonstrate a pattern of response inhibition between that of those with AD/HD and normal controls, although they resemble the controls at a behavioral level. Participants were 25 children with AD/HD, their nonaffected siblings and the control group. All were matched for age and IQ and were between the ages of six and seventeen years. The nonaffected siblings had results similar to those of the AD/HD subjects, who differed from the controls on all inhibition measures. Siblings of AD/HD subjects, while not behaviorally expressing the disorder, thus appear to demonstrate AD/HD deficits in response inhibition. This suggests that subtyping on measures of response inhibition can help to identify genetic susceptibility to AD/HD. Children with the genetic vulnerability to AD/HD may have hidden cognitive deficits in the absence of manifest behavioral problems, according to these authors. Therefore, they should be monitored to detect possible learning problems. ●