

**Comorbidity and Mimicry in Attention Deficit Hyperactivity Disorder:
Implications for Assessment and Treatment¹**

James H. Johnson, PhD^a, Heather K. Alvarez, PhD^b, & Trey A. Johnson, BS^a

^aUniversity of Florida; ^bOhio University

Corresponding Author: James H. Johnson, PhD, ABPP, Department of Clinical and Health Psychology, Box 100165, University of Florida, Gainesville, FL 32607, Phone (352) 273 – 6144; Fax: (352) 273-6156 ; E-Mail: jhj@ufl.edu .

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A comprehensive approach to the assessment of children with symptoms of inattention, impulsivity, and overactivity is crucial as various physical and psychological conditions can mimic or co-occur with attention-deficit hyperactivity disorder (ADHD) symptomatology. These factors must be appropriately considered to avoid misdiagnosis and insure proper treatment of the full range of problems displayed by the child. This chapter focuses on the issues of mimicry and comorbidity as they relate to diagnosis and treatment planning with children suspected of having ADHD.

Introduction

ADHD is a chronic, heterogeneous, neurodevelopmental disorder of unknown etiology, with prevalence rates ranging from 2 – 9% in the general population. As such, it represents one of the more common reasons children and adolescents are referred to pediatricians, family physicians, pediatric neurologists, child psychiatrists, and clinical child/pediatric psychologists.

Symptom patterns associated with ADHD are often easily identifiable, owing to the external focus and/or highly impairing nature of the disorder. However, assessment of ADHD diagnostic characteristics alone may not be sufficient for accurate identification of a child's presenting problems and treatment needs. Children with ADHD symptoms also often display a wide range of co-occurring features and comorbid disorders (see Pliszka, Carlson, & Swanson, 1999) that may have substantial implications for long-term outcome, and treatment response.

The Issue of Symptom Mimicry

Problems of activity level, impulsivity, and inattention can be caused by various conditions other than ADHD. Although the topography of the behaviors displayed by the child may be similar, the underlying causal factors may differ. These include various psychological disorders, physical conditions, as well as contextual influences.

Both child anxiety and depressive disorders can result in problems in concentration and symptoms of inattention, as well as increased levels of activity in some instances. Less frequently, childhood bipolar disorder, characterized by rapidly shifting moods, reflected in dysphoria, irritability, and manic symptoms, can mimic ADHD symptoms. Indeed, clinical studies have suggested that hyperactivity is often among the earliest manifestations of pediatric bipolar disorder, thus increasing the risk of misdiagnosis. Likewise, children with histories of physical or sexual abuse or those who have been exposed to other traumatic experiences may

display post-traumatic stress symptoms, which may be reflected in clinically significant attention problems. The behavioral disorganization that can occur in such cases may also result in increased levels of activity that, without adequate assessment, can be confused with ADHD symptoms. Furthermore, with the preschool child, it can sometimes be difficult to distinguish between ADHD and the noncompliant (and seemingly inattentive) behaviors associated with early oppositional defiant disorder. Children of this age may also demonstrate variations in attention and activity level due to their difficulty adapting to the requirements of new, more structured environments (such as school or day care). Elevated expectations for behavioral control and maintenance of attention, combined with a greater number and diversity of stimuli associated with classroom settings, can pose a challenge to some children. This is particularly the case if the home environment or parent expectations differ meaningfully from that of the school or day care setting. Distinguishing between ADHD, mental retardation, and certain pervasive developmental disorders also can pose a challenge because of the problems of inattention and disorganization of behavior that may be seen in each of these conditions. Appropriate differential diagnosis in such instances is best accomplished by considering the total clinical picture and contextual influences rather than simply those behaviors commonly seen as core symptoms of ADHD.

Comprehensive assessment of physical conditions and consideration the child's history is also necessary to appropriately diagnose ADHD and rule out other alternative explanations for ADHD-like behavior. Sensory deficits, such as visual or auditory impairments, can result in problems of inattention and behavioral disorganization that can be confused with ADHD symptoms. Significant problems of inattention, mimicking the symptoms of inattentive-type ADHD, can also occur in children with absence seizures, as well as in children with auditory

processing disorders, which are often associated with a history of severe ear infections. Although rare, children with RTH (resistance to thyroid hormone) frequently display a full complement of ADHD symptomatology. And, medication side effects from certain anticonvulsant drugs, such as Phenobarbital can contribute to hyperactive behavior in children. Finally, available research findings suggest that a significant number of children diagnosed with ADHD have primary sleep disorders that result in daytime behavior that can mimic ADHD symptoms. Included here are conditions such as obstructive sleep apnea (OSA)/sleep-disordered breathing (SDB). These conditions have been shown to be related to increased levels of impulsive, inattentive and hyperactive behavior, with the severity of OSA/SDB symptoms being related to the severity of hyperactive and inattentive symptoms. Additional research has suggested that perhaps one-fourth of diagnosed cases of ADHD may be related to SDB symptoms.

Although these conditions are not likely to perfectly mimic the developmental history or constellation of symptoms reflected in ADHD, children with these disorders are often referred for evaluation of ADHD. Given that psychological and physical factors, such as the ones cited here, can result in problems of inattention and/or activity level that can mirror ADHD symptoms, it is clear that such factors must be ruled out prior to rendering a diagnosis of ADHD. In attempting to make a differential diagnosis, it is important to evaluate possible causal factors, contextual influences, neuroanatomic and physiologic data, as well as the pattern and severity of symptoms developmentally and across settings.

The Issue of Comorbidity

Over the past two decades, there has been increasing focus on defining and evaluating the concept of comorbidity in psychiatric research and practice. Although there have been a variety of definitions offered in the literature, the term is generally used in medicine to refer to the

presence of two or more unrelated disorders displayed by the same individual. From a medical epidemiologic perspective, comorbidity has been defined as any distinct disease entity that has existed or may occur during the clinical course of another disease entity. Unlike disorders in the medical arena, where the etiology and pathologic processes of a specific disease entity are often reasonably understood, it has been argued that the use of the term “comorbidity” may not be appropriate with psychiatric disorders, the underlying causal factors of which are often less well understood. Unless the etiology of comorbid conditions is known, it is not possible to determine whether the conditions are, in fact, unrelated.

It is argued that despite attempts to develop reasonably objective classification systems, such as the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders, fourth edition*, (DSM-IV), health professionals cannot be certain that individuals meeting diagnostic criteria for more than one disorder actually have unrelated disorders. What appear to be separate disorders may instead be the result of overlapping diagnostic criteria from categorical distinctions between what are thought to be different syndromes but that are really variations of the same underlying condition. Those who criticize the use of the term “comorbidity” in the diagnoses of child and adult psychopathologies have often suggested the use of other terms, such as “diagnostic co-occurrence” or “covariation,” to refer to diagnostic overlap at the descriptive rather than pathologic/etiologic level.

Although it should be used with caution in reference to psychopathology, the term “comorbidity” is used for purposes of the present discussion for several reasons: (1) the term has come to be widely used in the psychopathology literature to refer to instances where individuals with one disorder also meet criteria for another disorder; (2) comorbidity studies of child psychopathology, specifically studies of ADHD, provide data suggesting that evidence of

comorbidity is found even when one controls for overlap in diagnostic criteria; (3) recent research findings dealing with issues of family risk provide data to suggest that comorbidities related to ADHD are likely related to factors other than inadequacies of classification; and (4) there are ample data to indicate that children and adults with ADHD with comorbid entities have clinical, demographic, biologic/genetic, and family environmental characteristics that can result in distinctly different clinical course and treatment outcomes than those with ADHD alone.

The following findings regarding comorbidity are relevant to clinical practice:

- Approximately 25% of children with ADHD display a diagnosable learning disability of some sort. Many more show significant school-related difficulties, such as lowered levels of achievement, grade repetitions, school failure, and behavioral problems that interfere with classroom learning.
- Perhaps as many as 50% of clinically referred children with ADHD show evidence of oppositional defiant disorder or more serious forms of antisocial behavior consistent with a diagnosis of conduct disorder.
- Between 25 and 30% of clinically referred children with ADHD show evidence of some type of anxiety disorder. This is especially true for younger children and those with ADHD, whose problems are primarily reflected in inattention rather than hyperactive/impulsive behavior.
- Of clinically referred children with ADHD, between 10 to 30% are likely to show evidence of some sort of mood disorder (usually major depressive or dysthymic disorder). Although depressive disorders can result from various factors, there is speculation that some child depressive disorders may develop secondary to the social, academic, and other impairments resulting from ADHD.

- Findings regarding ADHD and child/adolescent bipolar disorder are less clear, although several studies have suggested rates of comorbidity on the order of 16 to 21%. Rates of ADHD in children, previously diagnosed with bipolar disorder, are much higher, although findings in this area are open to question due to controversy regarding the specific nature of this disorder in children.

Likewise, children with ADHD have been shown to display comorbid Tourette's syndrome or other tic disorders. Here, the number of children with ADHD who develop Tourette's syndrome is thought to be approximately 7%. Clinical studies have suggested that, of those diagnosed with Tourette's disorder, 40 to 50% show evidence of comorbid ADHD, with the development of ADHD typically preceding the onset of Tourette's symptoms.

Several other clinical characteristics also are correlates of ADHD. Included here are speech and language disorders, as well as delayed motor coordination, frequent somatic complaints, health problems such as upper respiratory infections and allergies, sleep difficulties, and increased risk for accidents of various types. Indeed, it has been suggested that almost 50% of children with ADHD can be considered accident-prone. As many as 15% children with ADHD experience multiple serious injuries, and as many as 20% experience accidental poisoning.

Patterns of correlates and comorbid conditions also differ as a function of ADHD course and characteristics. Children with inattentive-type ADHD are more likely to display internalizing symptomatology, learning disorders, and speech/language problems as compared to those with hyperactive/impulsive or combined subtypes. Furthermore, children with early-onset ADHD tend to display more comorbid aggressive symptoms whereas those with later-onset ADHD are more likely to have comorbid anxiety or depressive conditions. Comorbid conditions may differ

across the lifespan as well, with certain disorders such as substance use disorder emerging more during adolescence and early adulthood, primarily in those with comorbid conduct disorders.

Although many questions remain to be answered, it is clear that the issue of comorbidity is an important one for understanding, assessing, and treating children with ADHD. Indeed, as indicated above, there is evidence that many children with ADHD display comorbid conditions and other clinically relevant characteristics. Many children show more than one comorbid disorder, with the presence of comorbid disorders often increasing during the adolescent years. These comorbid features have important implications for assessment and long-term outcome. Here, comorbid disorders may complicate the initial clinical presentation of ADHD symptoms. And, children who display comorbid disorders also frequently show more serious levels of impairment, are more likely to have longstanding problems (including substance use disorders), often have a poorer prognosis, and tend to show a greater use of healthcare services than do those without comorbidity.

Implications for Assessment and Diagnosis

Diagnosing ADHD and confirming the presence of comorbid conditions may require a comprehensive and detailed psychological or psychiatric evaluation. However, it is possible for primary-care physicians to appropriately assess for the presence of ADHD and screen for other psychiatric conditions that a child may display. Relevant clinical data can be obtained via parent interview, observation of the child, and the use of relatively brief, evidence-based, parent and teacher-report measures. Here, clinical practice guidelines for the evaluation of children with Attention Deficit/Hyperactivity Disorder, such as those provided by the American Academy of Pediatrics, can serve as a useful framework for multimodal assessment.

Clinical Interview

A wealth of information can be obtained through an interview with the child and his/her parent(s) or caretakers. Here, questions related to the child's functioning across domains such as school (e.g., standardized test results, current grades, teacher reports of inattentiveness, overactive behavior and overall school performance), home (e.g., attention/activity level, adjustment to routines, family interactions), and social settings (e.g., social adeptness, withdrawal, aggressive behavior), can provide valuable diagnostic information. A useful approach for obtaining information regarding the presence of both ADHD and other comorbid conditions can be patterned after any of several structured and semi-structured interview formats that have been developed for diagnosing child psychopathology (see McClellan & Werry, 2000). These offer clinicians the opportunity to screen for psychiatric problems specifically based on DSM-IV diagnostic criteria as well as gather information relevant to developmental, psychosocial, and physical history.

Behavior Checklists

Other useful assessment methods involve the use of parent-report and teacher-report checklists that can provide information regarding symptoms of ADHD and conditions that often co-occur with or mimic ADHD symptoms (see Pelham, Fabiano & Massetti, 2005). Examples of commonly used evidence-based checklists of this type include the revised Conners' Parent Rating Scale (CPRS-R: L), the Behavior Assessment System for Children (BASC), and the Child Behavior Checklist (CBCL).

The CPRS-R is an 80-item parent-report measure that provides information regarding child behavior that is reflective not only of ADHD symptomatology (hyperactivity, impulsivity, and inattentiveness) but also of characteristics such as anxiety, emotional lability and oppositional

behavior. Of special note is the fact that the Conners' rating scales provide measures that are specifically reflective of DSM IV Hyperactive-Impulsive and Inattentive symptoms. The BASC is an objective parent-report measure that provides scales assessing hyperactivity and attention problems as well as measures of aggression, conduct problems, anxiety, depression, atypical behavior, withdrawal, and adaptive behavior. The CBCL (113 items) is an additional parent report measure that provides information regarding possible comorbidities. Among the CBCL scales are those reflective of attention problems, social problems, somatic complaints, anxiety/depression, withdrawal, thought problems, and oppositional/aggressive and conduct-disordered behavior.

Teacher-report versions of each of these measures are also available. Given that child behavior often varies across situations, obtaining data from multiple informants in different settings can provide a more accurate picture of a child's clinical symptoms and associated levels of impairment than can be obtained from parent ratings alone. Child/adolescent versions of the Conners, BASC, and CBCL are available as well. These may be particularly useful in those cases where the child is suspected of having a comorbid anxiety or depressive disorder as children are thought to be more accurate reporters, than parents and teachers, regarding the presence and severity of internalizing problems.

Although interview data and measures such as these, used alone, are not always sufficient to make a definitive diagnosis of ADHD and certain comorbid conditions, they are frequently useful in providing the clinician with data that can be of value in diagnostic and treatment decision-making. In other instances, this type of information can be useful in deciding whether a referral to other professionals may be necessary.

There are some cases where screening data are ambiguous, where time constraints or other factors (e.g., a parent who is a less-than-adequate informant) do not permit clear conclusions to be drawn regarding the presence/absence of ADHD and comorbid features. In these sorts of situations, it may be useful to refer the child for full psychological evaluation so that a more comprehensive approach to assessment can be undertaken.

The psychological evaluation of a child with ADHD may vary in complexity, depending on the case, and typically includes using multiple sources of information. The assessment will usually consist of a review of available records (e.g., educational, medical) to capture information about prior functioning and interventions and accommodations previously used, as well as the onset and course of presenting problems. A developmentally oriented parent interview is also generally conducted. This interview is usually designed to obtain information about family medical and psychiatric history, pregnancy and birth complications, alcohol, tobacco or drug use during pregnancy, early illnesses or injuries, the age at which developmental milestones were met, early child temperament, the nature of family and peer relationships, the child's academic functioning, the range of problems displayed (e.g., problems of activity and inattention or other disruptive behaviors, symptoms reflective of anxiety or mood-related difficulties, atypical behaviors), variability of problematic behavior across settings, and factors that might contribute to these difficulties. It is important for the clinician to obtain specific information regarding the extent to which the child displays core symptoms of ADHD, the age of onset and duration of these symptoms, and assess carefully for clinical characteristics that may signify the presence of comorbid conditions. The parent interview is usually supplemented by an age-appropriate interview with the child.

Interview findings may be supplemented by psychological testing to further support or rule out the presence of conditions that may mimic ADHD symptoms and provide additional data regarding possible comorbid conditions. Testing can also help to answer questions posed by parents or the referral source and address other clinically relevant issues raised during the course of the evaluation. Here, testing can include individually administered measures of intelligence, academic achievement and cognitive processing (of value in assessing children suspected of having intellectual deficits or learning disabilities), as well as a range of personality/behavioral assessment measures.

Included here are parent-report measures, such as those discussed earlier, that assess for ADHD symptoms as well as possible comorbid conditions. These measures are usually supplemented by assessment data obtained from teachers and others familiar with the child, as well as by direct observation of the child's behavior. Commonly, the child may be administered computerized measures of attention and impulsivity to supplement parent and teacher ratings. In general, the focus of assessment is on obtaining data from multiple methods and multiple sources that address the diagnostic requirements of ADHD and consider the full range of possible comorbid features and conditions that can mimic ADHD symptoms. A comprehensive ADHD evaluation will also assess the extent to which the child displays evidence of impairment in areas such as school/academic, family and social functioning. Material in the Pelham et al. article, listed in the suggested readings, reviews available evidence-based measures of impairment. It should be emphasized that an assessment of impairment is an essential aspect of a comprehensive evaluation, as treatment should not be limited simply to symptom reduction but should also target impairments in family, school, and social functioning that are likely to be associated with negative long-term outcomes.

Again, the extensiveness of the evaluation will vary, depending on the complexity of the case. The assessment of a child who only demonstrates symptoms of ADHD, with minimal levels of impairment, may be relatively straightforward (and, indeed, may be dealt with directly by the primary-care physician), whereas the evaluation of a child with multiple presenting problems may, of necessity, be much more detailed in nature. In these more complicated cases, where the results of a comprehensive assessment highlights the presence of ADHD that is associated with relevant comorbid features and marked levels of impairment, detailed assessment data can be very useful in planning efficient and effective approaches to intervention.

Implications for Treatment

Given the assumption that proper assessment should lead to optimal treatment, it follows that treatment planning for children with ADHD should address the full range of problems highlighted by assessment findings. For children with ADHD and comorbid conditions, simply treating symptoms of ADHD is not enough. Appropriate case management involves addressing the full range of clinical problems displayed. For example, in instances where a child not only shows characteristics of ADHD but also meets diagnostic criteria for oppositional defiant disorder and learning disability, treatment should focus on problems associated with each of these three areas. This might involve pharmacological treatment for dealing with the child's hyperactive/ impulsive and inattentive behaviors, parent-oriented behavior management approaches to assist parents in modifying oppositional behavior, and employing special education interventions and classroom accommodations to assist the child academically. Likewise, in the case of an older child with ADHD and major depressive disorder, it will be important to treat both the ADHD symptoms and depressive features. Here, treatment might consist of stimulant medication (an evidence-based treatment) to address the child's core ADHD

symptoms as well as cognitive behavioral or interpersonal therapy (both evidence-based treatments) to deal with the child's depressive features and associated impairments in functioning. Similarly, in the case of the child with ADHD and comorbid Tourette's syndrome, it will be necessary to develop a treatment approach that addresses both classes of symptoms. In such cases, proper treatment can sometimes represent a clinical challenge as stimulant drugs, often found useful in treating ADHD, can sometimes exacerbate Tourette's symptoms (especially at higher doses). Although, the use of stimulants with children displaying Tourette's or other tic disorders was once seen as something to be avoided, stimulants are no longer thought to be strictly contraindicated in treating severe ADHD symptoms in children with tic disorders. In such cases, if tics become more pronounced with initial stimulant drug treatment an alternative stimulant may be tried. If stimulants are found to be useful in controlling ADHD symptoms, but tics continue or worsen, the use of an alpha agonist such as clonidine or guanfacine is often used in tic management. In some cases, alpha agonists are considered first in treating children with comorbid ADHD/Tourette's if tics are severe.

The nature of the relationship between ADHD and comorbid conditions is also important to consider when developing treatment goals. Some comorbid conditions, while not resulting directly from ADHD, may be related to the natural consequences of ADHD-related problem behavior. As noted earlier, in some cases of comorbid depression, depressive features can result from increases in negative responses from peers and adults who witness and/or experience a child's ADHD-related behavior or behavior resulting from comorbid conditions. In such instances, it is possible that the amelioration of ADHD symptoms may lead to more positive social interactions, and in turn, support improvements in depressive symptoms without targeting depression directly. Alternative treatments of depression (see above) may be required when the

child's depression results from other factors. As can be seen, effective treatments for children with ADHD, associated comorbidities, and significant impairments in functioning are likely to be multimodal and multidisciplinary in nature, with evidence-based psychosocial treatments often being particularly useful in treating comorbid conditions and addressing areas of impairment (see Chronis, Jones & Raggi, 2006) and necessarily more extensive and complex than treatments for children with "uncomplicated" ADHD.

In all cases, successful treatment of ADHD requires an understanding that the disorder is chronic and, thus, not curative. As such, effective interventions address ADHD symptoms in conjunction with any comorbid disorders that are present, along with impairments resulting from these conditions, and focus on the long-term management of the disorder in ways that involve both the child and his or her family.

Suggested Readings

Pliszka SR, Carlson CL, Swanson JM. *ADHD with Comorbid Disorders: Clinical Assessment and Management*. New York: Guilford Publications; 1999.

American Academy of Pediatrics. Clinical practice guidelines: diagnosis and evaluation of the child with Attention Deficit/Hyperactivity Disorder. *Pediatrics* 2000;105(5):1158–1170

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Pelham WE, Fabiano GA, Massetti, GM. Evidence-based assessment of Attention Deficit Hyperactivity Disorder in children and adolescents. *J Clin Child Adolesc Psychology* 2005;34 (3): 449-476.

Chronis AM, Jones HA, Raggi VI. Evidence-based psychosocial treatments for children and adolescents with attention-deficit/hyperactivity disorder. *Clin Psychol Rev* 2006;26: 486-502.

Practitioner and Patient Resources

National Resource Center on ADHD

National Resource Center on ADHD

8181 Professional Place, Suite 150

Landover, MD 20785

800-233-4050

<http://www.help4adhd.org>

A joint venture of the Centers for Disease Control and C.H.A.D.D., the National Resource Center on ADHD is a clearinghouse to disseminate science-based information on ADHD. Information is available online, as well as from a comprehensive library of books, journals and reports housed in the home office. The center also provides numerous fact sheets on all aspect of ADHD. Overall, this center is an excellent information source for both parents of children with ADHD and professionals working in this area.