

## Assessment of Attention-Deficit/ Hyperactivity Disorder

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Attention-deficit/hyperactivity disorder (ADHD) is described as a "persistent pattern of inattention and/or hyperactivity and impulsivity that is more frequent and severe than is typically observed in individuals at a comparable level of development" (American Psychiatric Association, 1994, p. 78). The behavioral signs are often evident in early childhood, are relatively chronic in nature, and are not readily accounted for on the basis of gross neurological, sensory/language/motor impairment, mental retardation, or severe emotional disturbance. Implied in this characterization is the notion that although the specific etiology of ADHD is not known, there are several causes of similar clusters of behavior that must be ruled out before an ADHD diagnosis is given. This concept, ruling out alternative explanations for ADHD-like clusters of behavior, is a crucial component of any proper assessment of ADHD. Successful undertaking of this task is usually more difficult than it appears, however, especially as the characteristics of ADHD may overlap considerably with other psychological disorders.

Furthermore, the diagnosis of ADHD is controversial, especially as the etiology of the disorder is not known. ADHD is most likely a heterogeneous group of disorders

with multiple etiologies. However, significant disagreement remains regarding the underlying construct of ADHD. Consequently, the clinical diagnosis has been the most prevalent way of investigating abnormalities of attention (Taylor, 1998). In fact, Taylor (1998) argues that ADHD will increasingly be used to describe an *area of investigation* rather than a psychiatric disorder. This is not surprising given the fact that literature reviews regarding the characteristics and causes of ADHD have revealed significant diversity as to what constitutes ADHD. For instance, Goodman and Poillion (1992) conducted a review of the literature on the characteristics and causes of ADHD and found that a total of 69 characteristics and 38 causes were attributed to ADHD. Furthermore, there was no discernible pattern for identifying ADHD and little agreement regarding its etiology. The authors argued that the pattern emerging regarding the evolution of ADHD is similar to that of minimal brain dysfunction (MBD) in the 1960s (Goodman & Poillion, 1992). MBD was initially thought of as a medically based, organic syndrome, and a list of 99 associated characteristics was developed. Ultimately it was because of this proliferation of symptoms and vagueness of defini-

tion that the term was abandoned in 1966 (Coles, 1987).

Clinicians are challenged to consider the possible underlying causes of pathological clusters of behavior before making a diagnosis. As Palmeri (1996) noted, this challenge is especially difficult because the current, fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994) (as well as past editions) is merely a nosology and "(it) unwittingly invites many clinicians to skirt the thoughtful pursuit of pathogenetic considerations" (p. 253).

This chapter focuses on assessing ADHD in such a way as to increase the probability that other causes of ADHD-like clusters of behavior will either be identified or ruled out, as well as provide specific information regarding the ADHD child's deficits and strengths to provide more comprehensive, effective interventions. The chapter covers five assessment-related topics: (1) differential diagnosis of ADHD and comorbidity with other disorders is discussed; (2) general issues related to the assessment of children are presented; (3) our model of psychoeducational assessment (including behavioral assessment and psychoeducational testing) is delineated; (4) information regarding ancillary assessments that may further define the problem and delineate specific areas for remediation is supplied; and (5) treatment recommendations that target the child's specific deficits and use the child's relative strengths are discussed.

## DIFFERENTIAL DIAGNOSIS AND COMORBIDITY

Many psychological disorders are misidentified as ADHD. Teachers frequently mislabel children with mental retardation, borderline intellectual functioning, and learning disabilities as having ADHD (Landman & McCrindle, 1986), although ADHD can occur comorbidly with these conditions.

Physical causes of ADHD-like clusters of behavior include impaired vision and hearing, seizures, traumatic brain injury, acute or chronic illness, poor nutrition, and sleep disorders, indicating that a thorough medical evaluation should be conducted before

an ADHD diagnosis is considered (American Academy of Child & Adolescent Psychiatry [AACAP], 1997).

Various emotional disorders may mimic ADHD as well, including anxiety, depression, sequelae of abuse and neglect, Tourette syndrome, bipolar disorder (BPD), conduct disorder (CD), and oppositional defiant disorder (ODD). Indeed, most psychiatric disorders may present with characteristics similar to ADHD. It is especially important that the best possible differential diagnoses are made because treatment options vary considerably depending on presumed etiology. In fact, inaccurate ADHD diagnoses may lead to treatments that are contraindicated (e.g., prescribing a stimulant for a child whose ADHD-like symptoms are the results of an anxiety disorder). In addition, early-onset BPD may be difficult to distinguish from ADHD, but once again, differential treatment makes it crucial that an appropriate diagnosis is given. Some distinguishing features of ADHD may be earlier age of onset, sustained clinical course, and family history (AACAP, 1997). The Mania Rating Scale may be useful as an adjunctive instrument (Fristad, Weller, & Weller, 1995) to discern symptoms of early-onset BPD from ADHD.

Children with ADHD frequently experience other psychological disorders as well. Comorbidity estimates range from 10% to 50% depending on the diagnosis and criteria used (AACAP, 1997). As many as 50% of clinically referred children with ADHD have an ODD diagnosis, 30–50% have a CD diagnosis, 15–20% have a mood disorder diagnosis, and 20–25% have an anxiety disorder diagnosis (Biederman, Newcorn, & Sprich, 1991; Newcorn & Halperin, 1994). Tourette syndrome, chronic tic disorder, substance abuse, and speech/language delays commonly co-occur with ADHD, although estimates of the prevalence are not known (AACAP, 1997).

When assessing a child with characteristics of ADHD it is extremely important to remember that several disorders show manifestations similar to ADHD. Determining that a child exhibits significant "inattention, hyperactivity, and impulsivity" is not sufficient to warrant an ADHD diagnosis. A functional assessment in which the "causes" (for lack of a more accurate term) of the

ADHD behaviors are established is crucial if the best treatment is to be provided. Although DSM-IV does not take into account the etiology of a particular constellation of behaviors, there is sufficient evidence from the behavior analytic literature to suggest that the etiology of disorders is important for treatment purposes. Therefore, although a child exhibiting the classic ADHD "triad" of behaviors may meet technical criteria for a DSM-IV diagnosis, clinicians should be wary of automatically labeling the child as ADHD because treatment options vary considerably based on the underlying causes of the symptoms. Indeed, a cautionary statement in DSM-IV indicates that "the specified diagnostic criteria for each mental disorder are offered as *guidelines* for making diagnoses" (p. xxvii), suggesting that there are conditions in which an individual may meet criteria for a disorder but that it should be withheld.

### GENERAL ISSUES IN THE ASSESSMENT OF CHILDREN

Because children are referred for assessment and treatment by an adult, practitioners should address some important but practical issues. First, child behavioral assessments should be conducted within a developmental framework to determine whether the child's behavior is within the expected developmental limits. However, guidelines for what is normative behavior may conflict with a parent's view of what is acceptable for his or her child. When this is the case, educating the parent about normal child development may resolve the problem or change the parents' perception of the severity of the problem. Second, assessment of a child's behavioral difficulties requires evaluation of the behavior of relevant persons in the child's environment (e.g., parents, siblings, teachers, and classmates), and this requirement may be uncomfortable for the referring adult who views the child as the only source of the problem. Communicating with other relevant persons with regard to their own behavior and its impact on the child's behavior necessitates considerable tact and adept interviewing skills.

The theory underlying a behavioral approach to assessment such as that delineated

in this chapter requires adequate sampling of relevant settings and stimuli to address the variability of children's behavior across settings. This is best accomplished by using a multimodal assessment approach in which multiple informants are interviewed, problem behaviors targeted for intervention are observed in multiple settings, and a fluid process of hypothesis testing is employed regarding the nature of the problem, antecedent conditions, likely consequences without intervening, and expectations for treatment (Barkley & Edwards, 1998; Mash & Terdal, 1988).

### PSYCHOEDUCATIONAL ASSESSMENT

An assessment model based on a consideration of myriad biopsychosocial individual differences coupled with a proficient understanding of developmental processes is essential in conducting a thorough assessment and thereby designing an effective intervention. In our clinic, we adhere to a biopsychosocial model which stipulates that assessment and treatment should include consideration of the interaction of biological, social, and psychological factors. Impairments in functioning in any area may affect a child's functioning in other areas with possible bidirectional effects. This model emphasizes integration of numerous variables and their interactions. It has particular utility in the assessment and treatment of children's disorders, such as ADHD, that may result from impairments in these domains of functioning (Newcomb & Drabman, 1995). Using this model to guide and organize our multisource data collection, we assess variables in each domain (biological, social and psychological) to distinguish those impairments most relevant for a particular child. This assessment is achieved via our psychoeducational approach, which consists of focused clinical interviews with the parent(s), teacher(s), and referred child; parent-completed rating scales; and administration of a thorough psychoeducational assessment battery.

#### Parent Interviews and Rating Scales

The first step is conducting a focused clinical interview with the child's parent(s) pri-

vately. We begin by eliciting a description of the presenting and related problems and then orally administer the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983). Rather than administering it in its pencil-and-paper format, our oral administration often leads parents to volunteer information and elaborate on items. This format also allows us to ask for characteristics we might not have requested to better understand the nature of the problem (e.g., endorsement of "poor schoolwork" reveals that the child has poor penmanship but understands the material). This approach increases the accuracy of the data collected. Next, we obtain a thorough developmental history (medical, physical, social, and academic) of the referred child and complete a family history form to assess first- and second-degree biological relatives' functioning in behavioral, emotional, addictive, and educational domains. Finally, we administer a Learning Styles Questionnaire developed in our clinic to assess learning difficulties represented by a list of 50 behavioral referents of the processing variables based on the Horn-Cattell Gf-Gc theory of cognitive processing (Waschbusch, Daleiden, & Drabman, 2000).

Although we do not routinely use more traditional rating scales for assessing ADHD (e.g., Conners scales), many appropriate instruments could be used in conjunction with the CBCL, Teacher Report Form, and the Learning Styles Questionnaire. Many behavior rating scales have been designed to assess symptoms of ADHD and other behavior disorders. The most frequently used rating scales for assessing ADHD include the CBCL and its related Teacher Report Form (TRF) (both of which we use), Conners Rating Scales—Revised (CRS-R), ADD-H Comprehensive Teacher Rating Scale (ACTeRS), Eyberg Child Behavior Inventory (ECBI), the Home Situations Questionnaire (HSQ), and the School Situations Questionnaire (SSQ). A discussion of the strengths and weaknesses of each of these questionnaires is not detailed here. However, clinicians using these instruments should familiarize themselves with the psychometric and normative properties of each scale before selecting a rating scale for use. Furthermore, rating scale use should be tailored to meet the needs of the assessment

process in such a way as to provide useful information for diagnostic and treatment purposes, rather than administered simply because a rating scale is labeled "an ADHD assessment tool." For example, if a parent interview yields vague information concerning when and where problem behaviors occur, then using the HSQ as an adjunct to pinpoint specifics may be helpful, particularly because the HSQ was designed to identify specific situations in which the problem behavior occurs (e.g., playing alone, at church, while watching TV, and in the car). In general, selection of rating scales should be determined by the specific information sought, should help define the problem in objective terms, and should assist in clarifying specific target behaviors for intervention.

### Teacher Interviews

In addition to the TRF, we phone interview the child's teacher as a measure of reliability for our impressions of the child's testing behavior, to assess motivation and attention span, gather more information regarding the child's academic strengths and weaknesses, and evaluate the child's rate of academic, social, and behavioral progression and strengths. This information is combined with the information from the parents to ascertain whether the child presents with a motivation/discipline problem at home or school, has difficulty with peer relationships, or has a personality conflict with a teacher.

Another reason for interviewing the teacher is that children frequently behave differently in school than compared to at home. Interviewing the teacher will assist in assessing ADHD in that the clinician can get specific information regarding behavioral problems that occur only in the school setting. Information that should be obtained from the teacher includes child behavior in a variety of contexts (e.g., classroom, hallway, lunchroom, and playground), teacher responses to child misbehavior (e.g., reprimand, ignoring, redirection, and detention), peer relationships, and academic performance. Assessing teacher behavior is crucial because the teacher may not handle many ADHD-like behaviors (e.g., off-task behavior) appropriately and thus sustain an oth-

erwise modifiable problem behavior. Interviewing multiple teachers is also helpful, when possible. Junior high school students typically have more than one teacher, and occasionally we assess a child who is exhibiting significant behavior problems in one teacher's class but not in another's class. Sometimes this discrepancy is related to child variables (e.g., performs normally in physical education class but has difficulty in math); at other times the discrepancy is best explained by teacher variables (e.g., class structure, discipline style, and personality factors). When discrepant information is explained mostly by teacher variables, an ADHD diagnosis may not be warranted, in spite of the fact that a particular teacher consistently reports the standard ADHD-triad of inattention, hyperactivity, and impulsivity.

### Child Interview

We also interview the referred child. If the child is old enough, the Youth Self-Report (YSR) form of the CBCL or the Behavior Assessment Scale for Children (BASC) may be administered orally, with similar advantages to those previously noted with the parents. Next, the child is asked to draw a picture of his or her family members and of him- or herself. Then, for each family member, including self, the child is asked to list "three things that the person does that makes you happy, sad, and mad." Then for the self picture, the question is "three things you do that make you happy, sad, and mad and three things you do that make others happy, sad, and mad." Finally, once rapport is sufficiently established with the child, we seek the child's view of the presenting problem.

### Psychoeducational Testing

The second part of our psychoeducational assessment involves extensive testing of the child using a battery of standardized intellectual and achievement tests (i.e., the Woodcock-Johnson Psycho-Educational Battery—Revised [WJ-R; Woodcock, 1989] and portions of the Wechsler Intelligence Scale for Children—Third Edition [WISC-III; Wechsler, 1991]), as well as additional measures of attention, memory processing,

motor and perceptual capabilities. We administer the entire WJ-R battery because it is based on the hierarchical Gf-Gc (fluid and crystallized intelligence) model of cognitive abilities from the Horn-Cattell theory (McGrew & Flanagan, 1998). We believe that this model is the most valid and useful model for conceptualizing cognitive processing in the measurement of intellectual functioning. The main factors that we obtain from testing include comprehension-knowledge, fluid reasoning, visual processing, auditory processing, short-term acquisition and retrieval (visual and auditory), long-term storage and retrieval, and processing speed. The child's standardized performance on these processing variables illuminates how he or she can best use information in learning situations which may lead to recommendations for changes in curriculum, program design, and presentation of academic tasks and assignments (Neul & Drabman, 1999).

Review of the aforementioned information helps determine whether additional testing is required (e.g., anxiety or depression self-report measures) and whether formal behavioral observations and/or functional assessments are needed at home and/or school to clarify conflicting reports or have families demonstrate behavioral processes that they cannot aptly describe. Direct observation of the child's behavior in a naturalistic setting (e.g., home and school) can provide important additional information and gives the clinician an opportunity to witness behaviors that parents and teachers are reporting. Direct observation of classroom behavior has been found to be a useful tool for accurately identifying behavior disorders in children. Skansgaard and Burns (1998) examined the agreement between teacher ratings and direct observation of 217 children with ADHD, CD, and ODD. They reported that interrater agreement for the direct observations was higher for all disorders, suggesting that direct observation may play an important role in the proper assessment of ADHD. The accuracy of this type of measurement depends largely on the training and performance of the observers. Therefore, careful monitoring of the data for observer effects (e.g., reactivity, bias, or drift) is necessary.

At times a semiformal functional assessment of specific problem behaviors may be

needed in order to recommend appropriate interventions. In its simplest form, functional assessment is a type of direct observational assessment that involves observing and recording in sequence events that occur closest in time to the onset and to the ending of target behaviors. These data are then used to generate hypotheses about the possible function(s) or purpose(s) of the child's behavior. The goal of identifying these functions or purposes is to teach the child an appropriate alternative behavior(s) that will get his or her needs met. For example, two different children may engage in "off-task" behavior while in the classroom but for very different reasons. For one child, off-task behavior may occur during difficult assignments because the child does not understand the material. For another child, off-task behavior may occur because it gets the teacher's attention or because other children encourage "clowning." In each of these cases, interventions would necessarily be different in order to increase on-task behavior.

Ultimately, the data from these myriad sources are organized, interpreted, and then communicated in the form of an assessment report written at a level for ease of interpretation. This information is also communicated via a feedback session during which the main findings and impressions are reviewed with the parents and child (if mature enough) and recommendations made with specific directions on how to best implement them.

## ANCILLARY ASSESSMENTS

Up to this point, we have outlined a comprehensive behavioral assessment model that we use to address behavioral difficulties, much like those observed in ADHD, of referred children. The phenomenon of ADHD is not entirely understood and its existence as a syndrome is sometimes disputed, as there are no definitive, biological measures available to make a diagnosis (Silver, 1999). Relatedly, many problem behaviors are often misdiagnosed as ADHD. Therefore, the main goal of assessment is to evaluate the referred child and the environments in which the child interacts to determine behavioral excesses and deficits versus

determining the existence of the diagnosis, itself. This is achieved in part by conducting a thorough behavioral and psychoeducational assessment as described in the previous section. However, we would like to highlight the importance of evaluating certain child, parent, family, and environmental characteristics that are rarely included as a standard part of child behavioral assessments. We believe that assessing these factors on a routine basis is a crucial part of the assessment process. The factors that are discussed include child temperament, sleep disturbances, chronological age at school entry, school environment, and family issues. The importance of evaluating these factors is based on a combination of our clinical experience and empirical evidence.

### Temperament

Thomas and Chess (1977) defined temperament as a behavioral style, or the characteristic way that one experiences and responds to internal and external environmental factors. This behavioral style contributes to a child's development and to her ability to navigate the social environment (McClowry, 1998). Temperament research has demonstrated a link between temperament characteristics and behavioral problems in early-elementary-age children (Garrison & Earls, 1987). For example, a behavior style may not be aberrant but viewed as such due to a "poor fit" between the child's temperament and a parent's or teacher's expectations or own temperaments (Carey, 1998). Therefore, a child who exhibits behaviors associated with ADHD, such as hyperactivity, inattention, and impulsivity may be a child with a high-activity-level temperament that is at odds with parental and/or academic expectations. A lack of a "goodness of fit" between a child's innate abilities and environmental conditions thus produces a maintaining condition for problem behavior (Guevremont, DuPaul, & Barkley, 1993, p. 164). An intervention based on educating the parents about environment-temperament fit and adjusting the environmental demands, expectations, and opportunities to better fit the child's temperament (McClowry, 1998) can significantly improve the child's behavior without having to make a diagnosis of ADHD.

### Sleep Disturbance

Sleep disturbances are often associated with developmental disorders, such as mental retardation, learning disabilities, and emotional disorders (Day & Abmayr, 1998). The cardinal behavioral signs of ADHD: inattention, hyperactivity, and impulsivity (American Psychiatric Association, 1994) closely resemble symptoms of sleep deprivation; therefore, a child's sleep-wakefulness patterns should be assessed (Corkum, Tannock, & Moldofsky, 1998). Previous versions of *Diagnostic and Statistical Manual of Mental Disorders* (DSM) (e.g., DSM-III; American Psychiatric Association, 1980) included sleep disturbances as a diagnostic criterion for ADHD; however, the current version does not include this criterion which attests to the controversy over whether and in what ways sleep problems are associated with ADHD (Day & Abmayr, 1998).

A simple way to assess whether a child is getting enough sleep is to inquire about bedtime. Generally, young children (ages 4–8) should get 8 to 12 hours of sleep per night depending on the individual child's need (University of Chicago Primary Care Group, 1995). Another issue to assess is the family's and child's television viewing habits, specifically whether the child has a television in his or her bedroom. A recent retrospective study revealed that 25% of the parents of kindergarten through fourth-grade children reported that their child had a television in his or her bedroom. Results demonstrated that increased daily television watching and, especially, bedtime watching in one's bedroom were most significantly associated with sleep disturbances (Owens et al., 1999).

Behaviors of hyperactivity and inattention are also associated with symptoms related to more serious sleep disorders such as sleep-related breathing disorders (e.g., apnea and snoring) and periodic limb movements (PLMs) (Chervin, Dillon, Bassetti, Ganoczy, & Pituch, 1997; J. Janusz, personal communication, September 4, 1999; Picchiatti, England, Walters, Willis, & Verrico, 1998). In a group of children diagnosed with ADHD, habitual snoring was more frequently reported and excessive sleepiness and restless legs were relatively less frequently reported compared to non-ADHD

psychiatric and general pediatric referrals (Chervin et al., 1997). In a group of children not previously diagnosed with ADHD, severity of hyperactivity and inattention was directly associated with snoring and excessive daytime sleepiness. These results suggest that symptoms of sleep disorders may actually cause inattention and hyperactivity. If such a relationship exists, the data suggest that treatment of snoring and sleep-related breathing disorders might significantly decrease the prevalence of ADHD in children presenting with sleep-related symptoms.

Finally, sleep disturbances, such as difficulty settling down, conflicts about bedtime rituals, and nighttime awakenings often occur and cause significant conflict in parent-child interactions (Day & Abmayr, 1998). These disturbances can contribute to problems the next day in terms of difficulty awakening on time and daytime sleepiness which may cause a child to be inattentive, irritable, hyperactive, and impulsive. Screening for these sleep disturbances in families reporting ADHD-like problems is crucial in determining the etiology of the presenting symptoms and the effectiveness of interventions designed to improve the problems.

### Chronological Age

Determination of school entry is based primarily on the chronological age of the child (e.g., 6 years old by October 1 of the academic year) (Tarnowski, Anderson, Drabman, & Kelly, 1990). If a child turns 6 years old just before this deadline, this child will be as much as 11 months younger than the oldest students in the same class. In a preliminary (Drabman, Tarnowski, & Kelly, 1987) and follow-up, investigation by Tarnowski and colleagues (1990) found that younger children were disproportionately referred for psychological services with the youngest children in each class more often referred for academic and behavioral problems. However, no evidence emerged suggesting that the younger children were actually less competent (for their age) than the relatively older children. As a result, these young-for-grade children may be at a greater risk for inappropriate intervention. In a similar

study examining young-for-grade children in fifth-grade classrooms in Virginia, LeFever, Dawson, and Morrow (1999) found that young-for-grade children were at an increased risk for medication use across all sex by race groupings. These results indicate that teachers, parents, and professionals may make inappropriate assumptions about young children's behaviors (i.e., misunderstanding of developmentally appropriate inattention, impulsivity, and hyperactivity) and academic abilities leading to unnecessary referrals and use of stimulant medications.

### School Environment

As a practitioner, it is important to be familiar with the reputations of the public and private schools located in one's referral area. Information regarding academic expectations and standards for students can provide a criterion by which a referred child can be compared to peers in terms of academic performance. A student referred for poor academic performance due to ADHD-like behaviors of inattention, hyperactivity, and/or impulsivity who maintains a C average may be viewed by a practitioner as experiencing problems in need of intervention. However, the school the student attends may have high academic standards in which a C average is the best the student can obtain. The presenting ADHD-like behaviors may be due to the child's struggle with the coursework and anxiety over not being able to do as well as her peers.

As mentioned previously, children referred for psychological services are often young-for-grade and are more likely to receive drug prescriptions (LeFever et al., 1999). In the LeFever and colleagues (1999) study, three times as many boys as girls and twice as many Caucasian as African American students received drug therapy for ADHD behaviors. These statistics may be explained by the fact that more Caucasian parents have resources to send their children to private schools, resulting in increased academic pressure for parents, children and schools. However, it is not known whether private schools have proportionally more children taking medications such as Ritalin (methylphenidate). Therefore, it is impor-

tant to be aware of the academic environment, as well as the referring parents' academic standards and expectations when examining the child's behavioral and related academic performance difficulties.

### Family Issues

The quality of a child's family relationships and experiences with parents substantially impact the likelihood of clinical referral, severity of presenting symptoms, possibility of comorbidity issues, response to treatment, and prognosis (Woodward, Taylor, & Dowdney, 1998). For instance, children's problem behaviors are associated with strained family relations among parents, siblings, and the referred child (Kaplan, Crawford, Fisher, & Dewey, 1998). In the assessment and treatment of children's behavioral problems, problem behaviors must be considered in the context of their function (Erdman, 1998). To assess the function of problem behaviors, family contextual variables must be examined such as the general functioning of family members and as a familial unit, health of the marital relationship, nature of the parent-child attachment, presence of parental psychopathology, level of parenting skills and typical practices, parental attributions regarding their child's behavior, and child-sibling relationship(s). Assessment of caregiving responsibilities and load may reveal information regarding the general functioning of the family unit. Specifically, assessing the mother's employment demands, child workload, and support from father can illuminate potential areas for problems or evidence of protective factors (Barkley, 1981; Harvey, 1998). Disordered attachments (i.e., insecure, avoidant, and/or ambivalent attachment relationships) are associated with disordered parent-child interactions, often leading to child noncompliance and coercive parenting practices (Erdman, 1998). These coercive patterns lead to parental mismanagement of behavior (i.e., parental attention given to a child's negative behavior, thereby inadvertently reinforcing these negative behaviors) resulting in problem behaviors similar to those seen in children diagnosed with ADHD (Barkley, 1981). Effective behavioral strategies are not possible without con-



sidering the context in which these strategies are to be applied. If the parent-child relationship is not understood or addressed in the intervention program, then the problem behaviors may very well continue to exist, thus creating more relationship difficulties. Finally, parental attributions should be assessed because they are important sources of information and can alert the clinician to possible obstacles in designing interventions and ensuring the parents' "buy into" the potential effectiveness of the interventions.

Perhaps as important as the parent-child relationship is the relationship between a child and his or her sibling(s). Eighty percent of children in the United States have siblings (Dunn, 1996). Growing up with a friendly, supportive sibling(s) versus a hostile, antagonistic sibling(s) may have a significant impact on a child's social and emotional development. Poor sibling interactions (especially aggressive interactions), early behavior problems, and disturbed parent-child relations lead to later disturbed behavior. Therefore, assessment of a referred child's relationship with his or her sibling(s) is important for understanding the overall functioning of the family unit and particular difficulties within the family system. Other factors to assess are the child's birth position, age difference between siblings, and the gender of the child and siblings. The magnitude of the age gap should be noted and considered within the context of how a child or parent describes the sibling relationships. For example, if a younger sibling is advancing beyond her older sister on academic tasks, the older sister may resent her younger sister, thus leading her to physically and/or emotionally mistreat her. This sibling relationship problem provides a context in which the younger sister's behavioral difficulties may be due to anxiety, anger, and/or frustration over her situation rather than being associated with ADHD. Also, the gender of the referred child and siblings should be noted. In early childhood, the influence of gender on sibling relationships is inconsistent. In middle childhood and early adolescence, gender appears to impact sibling relationships, with older sisters being more intimate and affectionate toward their younger siblings compared to older brothers (Buhrmester, 1992; Dunn, Slomkowski, & Beardsall, 1993). In addition

to these sibling relationship patterns, the parent-sibling relationships should be assessed in terms of differential treatment of siblings by parents and involvement of parents in sibling conflict. Mothers who differentially treat their children often have children who have difficult, hostile sibling relationships (Dunn, 1996). In sum, assessing these family and sibling variables provides important supplementary information that should be considered when formulating hypotheses and designing formal interventions.

### RECOMMENDATIONS ON FINDINGS: TREATMENT APPROACHES

Just as a behavioral approach to assessment requires a multimodal approach, treatment and prevention programs for various child behavior difficulties (including ADHD) require a multimodal approach (Barkley, 1998a; Fee & Matson, 1993; Silver, 1999; Singh, Parmelee, Sood, & Katz, 1993). In fact, these multimodal treatment approaches are receiving much support as a "best practice" treatment approach (Johnston & Ohan, 1999). This type of approach is based on a combination of pharmacological, psychological (family parent, and child based), educational, and social skills training strategies (Barkley, 1990, 1998a, 1998b; Garber & Garber, 1998; Pelham, Wheeler, & Chronis, 1998; Schleser, Armstrong, & Allen, 1990). However, limited research data exist to support the efficacy of this multimodal approach (AACAP, 1997). This is due to the time, cost, and complexity associated with participant attrition, breadth and specificity of hypotheses, and large sample sizes needed for such investigations to adequately assess a multimodal treatment program's efficacy. Short-term efficacy of medication (e.g., Ritalin) and most types of behavior therapy have been well documented; however, the long-term cost-benefit analyses have yet to be studied for these types of treatment and their combinatory effect (Pelham et al., 1998). Specific to psychopharmacological intervention, efforts are currently underway to examine medication efficacy for new formulations. For example, pharmaceutical companies continue to introduce extended release (ER) forms of

existing stimulant medications (e.g., Concerta as the ER form of methylphenidate), as well as develop new, nonstimulant-based medications, such as atomoxetine (ATM), which has recently been shown to be effective in managing symptoms of ADHD in children and adolescents (Michelson et al., 2002). The Multimodal Treatment Study of Children with ADHD (MTA Study; Arnold et al., 1997) and the FAST (Families and Schools Together) Track Program (Conduct Problems Prevention Research Group [CPPRG], 1992) are the most current systematic, long-term, multimodal treatment studies designed to address the foregoing, multimodal treatment issues (Hinshaw, Klein, & Abikoff, 1998). The outcome results are currently being compiled, but the goal of these multimodal programs is to directly target multiple functions over extended periods of time in order to positively influence posttreatment adjustment.

Once again, similar to the approach of child behavioral assessment, the design of multimodal treatment programs should be based on a developmental perspective to identify the prime time points for introducing or refurbishing interventions for children, their parents, and their teachers (Johnston & Ohan, 1999). As mentioned at the beginning of this chapter, ADHD is most likely a heterogeneous group of disorders with multiple etiologies. Furthermore, the expression of ADHD is associated with environmental factors (Barkley, 1996, 1998a). As a result, treatment of ADHD and ADHD-like problems should be aimed at management of behavioral difficulties and any associated academic performance problems. As Johnston and Ohan (1999) proposed, treatments for ADHD will be most efficacious when they help the child perform specific behaviors in the natural environment. This proposal reflects Barkley's (1998a) delineation of ADHD as a disorder of performance (e.g., "when" and "where" to perform a behavior) rather than a disorder of skill (e.g., "how" and "what" behavior to perform). Behavior management techniques are most useful in developing such a treatment approach. Specifically, the function of the problematic behaviors determined from a thorough, multimodal assessment approach is altered by manipulating the associated antecedent and consequent events.

Specific guidelines for developing the behavior-based and academic performance segments of the treatment program are to design interventions that directly alter the stimulus conditions that control the problematic behavior, as well as the pattern, timing, or reinforcement value of the consequences. Of course, these interventions must be applied across multiple situations within the home and school setting and must be administered for a sufficient length of time to prevent a return to pretreatment levels of symptoms. Most research has focused on improving vigilance and impulse control by applying contingent consequences in the form of reinforcement and punishment (usually response cost). Yet a paucity of research exists on altering the stimuli that may control or produce the problem behaviors. Decreasing the frequency of these problem behaviors should include altering the stimulus properties of the immediate environment and tasks assigned to these children.

One method for altering the antecedent conditions of these problem behaviors is to generate hypotheses that will allow changes in the antecedents using the Horn-Cattell Gf-Gc theory of cognitive processing. Because Horn-Cattell theory has been useful in illuminating the cognitive processing capabilities in normally developing children, this theory may also be useful in understanding the cognitive processing of children with ADHD and ADHD-like symptoms (Waschbusch et al., 2000). For example, Barkley, DuPaul, and McMurray (1990) have found that predominantly hyperactive ADHD children have more difficulty with sustained attention and impulse control whereas predominantly inattentive ADHD children have difficulties with focused attention and information processing speed. Our assessment, based on Horn-Cattell theory, helps us to generate hypotheses about the child's strengths and weaknesses and therefore assists us in designing interventions to change the appropriate antecedents which may decrease the necessity of using behavioral and/or medical techniques for children displaying ADHD-associated behaviors (Neul & Drabman, 1999). Some examples of altering the antecedent conditions may include increasing task novelty and reducing task difficulty to meet the

child's capability level, repetition of task instructions throughout the task's duration, direct-instruction-based drills of important academic skills, and frequent shifting of tasks in both the home and school setting (Pffifner & Barkley, 1998). Other methods for altering the antecedent conditions could include incorporating concrete cues for time limits and rules to maintain on-task behavior, such as allowing the child to use a portable timer on his or her desk or in the home within a visible range and/or use of "reminder" cards to be placed in the child's work area delineating the rules for on-task behavior, organization, and study cues. These antecedent-based interventions should be paired with a consequence program in which successful use and application of the aforementioned techniques should be rewarded (e.g., with tokens, points, or extra recess time) (Pffifner & O'Leary, 1993) and unsuccessful use or noncompliance should be punished (e.g., response-cost in the form of token or point loss or loss of play time at home contingent upon poor behavior reports from school) (Anastopoulos, Smith, & Wien, 1998).

These specific techniques of the multimodal treatment program can be applied at home as well as at school. Successful management of the referred child's problems is considerably more probable when contact between home and school exists (Pffifner & O'Leary, 1993). Parental communication with their child's teacher(s) via notes using the child as a messenger can ensure that the behavior modification program is reliably administered between settings, new behavioral problems can be quickly addressed, and reporting of successes can be communicated to the child both at home and at school. This interaction will help maintain the application of the interventions in both settings, thereby improving generalization of behavior improvements to other settings and longer-term maintenance of treatment gains.

Once the actual program is developed, the first step in implementing a comprehensive treatment program is to assist the child's parents in understanding that the treatment is multimodal and that ADHD and ADHD-like behaviors are managed rather than cured (Goldstein & Goldstein, 1989). It should be explained to the parents

that a variety of treatment techniques will be applied in the management of their child's behavioral problems, such as parent training in behavior modification principles to be used consistently at home, a school-based behavior management program to target classroom-related problem behaviors, and medication (if recommended). Depending on the parents' view of medication use, the clinician should educate regarding the potential benefits and side effects of stimulant medication, with a specific focus on what they can expect the medication to do (increase on-task time, improve short-term performance) and not do (e.g., improve organization and increase task or good behavior motivation) for their child's problems (DuPaul, Barkley, & Connor, 1998; Garber & Garber, 1998). With regard to the parent- and school-based treatment components, the clinician should determine the parents' level of motivation and desire to learn the techniques and then monitor their implementation at home and at school (Barkley, 1988; Goldstein & Goldstein, 1989). The clinician should also assess the motivation and desire of the teacher(s) to implement and monitor the treatment recommendations. It should be explained to the parents and teacher(s) the importance of consistent and immediate application of behavior modification techniques, to expect some initial resistance and/or worsening of symptoms in the child as a reaction to the new environmental contingencies being imposed (e.g., an extinction burst effect) (Barkley, 1981), and the importance of having to adjust the program as needed to meet new behavioral challenges and/or adjust to improvements in behavioral symptoms.

Some general principles should be followed to ensure effective implementation of the treatment program and to increase the likelihood of treatment gains. First, when rewarding or punishing behavior, it should be done immediately and consistently to ensure that the child clearly learns the contingencies and their consequences. Second, a *combination* of positive reinforcement and punishment (e.g., time out or response cost) should be used. If a problematic behavior is punished to reduce its frequency, it must be replaced with an acceptable, appropriate alternative that can be rewarded to increase its frequency. Third, the overall goal in ad-

justing the environment as a part of any behavior-based treatment program is to set up the referred child for success. Doing so will increase the likelihood that the child will "buy into" the program creating a higher probability of treatment maintenance success.

## SUMMARY AND CONCLUSIONS

Current research suggests that ADHD is a heterogeneous group of disorders with multiple etiologies. Furthermore, researchers have noted that current characterizations of ADHD are subjective in nature, and at times contradictory (Goodman & Poillion, 1992). For example, such characteristics as "disorganized" (American Psychiatric Association, 1980; Bacon, 1982; Hunsucker, 1988) and "talks excessively" (American Psychiatric Association, 1987; Hunsucker, 1988; Ingersoll, 1988) are relative terms that may be defined differently by different people. Furthermore, some characteristics that have been used to describe children with ADHD are not observable, such as "accident prone" (Rutter, 1989) and "poor planner" (Kuehne, Kehle, & McMahon, 1987), and must be inferred from behavior, which is a highly subjective process. Furthermore, Goodman and Poillion (1992) concluded that 10% of the ADHD characteristics cited in the literature contradict one another. For instance, "underachievement" (Cohen, Caparulo, & Shaywitz, 1981) is contradictory to "no significant academic difficulties" (Kuehne et al., 1987), yet each is cited as characteristic of ADHD. As another example of this contradiction, Hunsucker (1988) reported that "normal IQ" was a characteristic of ADHD, whereas Rutter (1989) stated that these children were of "below-average intelligence."

Hypothesized causes of ADHD are too numerous to list, and those that have been identified empirically have been based on correlational data (e.g., lead toxicity) (Goodman & Poillion, 1992). Furthermore, there is a general lack of agreement among researchers regarding the proposed etiologies, with approximately 50% of researchers in one study believing ADHD had a genetic cause, 36% believing ADHD was caused perinatally/prenatally, and 28% be-

lieving ADHD was the result of neurodevelopmental immaturity (Goodman & Poillion, 1992). Adding to this confusion regarding the etiologies and expression of ADHD is the frequency of the diagnosis. For instance, DSM-IV suggests that approximately 5% of children have ADHD, yet teachers believe that 25% of their students exhibit the clusters of behaviors that are associated with ADHD (Pelham, Gnagy, Greenslade, & Milich, 1992). Of course, teachers (via parents) make most of the referrals for treatment of ADHD. If DSM-IV statistics are correct, then five times as many referrals of individuals who should be diagnosed may be made.

Because of the uncertainty of the nature of ADHD, we believe the diagnosis has limited usefulness at this time. Diagnosing a child as "ADHD" does not provide useful information regarding the most effective treatments given the heterogeneous characteristics and proposed etiologies of the disorder. More important than determining a "diagnosis" for a child is identifying the child's relative strengths and weaknesses (both behaviorally and cognitively) that can be used to develop effective interventions. We believe that determining the functions of specific problem behaviors, as well as their antecedents and consequences, is currently the most effective strategy for improving child problem behaviors, regardless of the child's diagnosis. Furthermore, because many children who exhibit ADHD-like behaviors experience academic difficulties it is necessary to evaluate the child's cognitive processing. As mentioned earlier, we believe that Horn-Cattell theory is currently the most valid and useful model for conceptualizing cognitive abilities. We have found that the assessment of the factors associated with Horn-Cattell theory has resulted in useful information regarding the child's cognitive processing capabilities in a variety of domains that leads to specific recommendations. Children exhibiting the ADHD-like cluster of behaviors have varied problem behaviors and academic difficulties, as well as varied cognitive abilities. As such, assessment of these children must involve technologies that are likely to identify all combinations of the myriad problems these children face. We conclude this chapter with an analogy that helps clarify our beliefs re-

garding ADHD. A rash on one's arm may be caused by internal (biological/genetic) or external (environmental) factors, or a combination of both. Discovering the rash's cause can be essential to its cure. The same is true for the cluster of behaviors labeled "ADHD." The cause may be internal, external, or both. Ideally, advances in brain imaging as well as psychological investigations using neuropsychological and Horn-Cattell theory will lead us to a better understanding of the variety of causes of this cluster of behaviors. Perhaps this understanding will lead us to more specific and therefore more effective treatment.

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