An ADHD Primer

Second Edition
To my son, Sebastian,
an extraordinary boy.
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Thousands of scientific papers exist on attention deficit hyperactivity disorder (ADHD) making it among the most well-studied psychological disorders of children. Research on adults with ADHD is also rapidly increasing giving us a clearer picture of the adult stage of the disorder that is both consistent with what has been found in children with ADHD while differing from it in some important ways. As a consequence of this growing literature, numerous books have appeared on ADHD which raises an obvious question, “why write another one?” The answer is that either these books are exceptionally large handbooks or compendiums of this vast literature that are arduous and time-consuming to plow through if one wishes to understand this literature. Or they are relatively brief and in many cases superficial renderings in trade book format for the lay-reader that give but a cursory sense of what our science has to say about the disorder. For the intelligent reader who hungers for more than a mere anecdote-filled trade book based chiefly on clinical or lay observations but has not the time to wrestle with the Sumo-sized handbooks on the disorder that contain more scientifically based information, there are few if any “executive summaries” in book form like the one you hold in your hand at this moment. Lucky for you and fortunate for us all, Dr. Weyandt has wisely addressed this need with her exceptionally well-written, pithy, efficient, and economical book aimed at this largely neglected market for the time-harried, educated public.

Here you will find, in short order, the facts of the matter with regard to the nature, diagnosis, associated risks, causes, assessment, and treatment of the disorder, expertly conveyed yet down-right stingy with your time—our field at an educated glance, as it were. Here is what you need to know about this disorder just when you needed to know it. It is shorn of time-wasting, lengthy clinical cases and anecdotes. It is also free of obscurantist clinical opinions loosely anchored, if at all, to the science of the matter and conveyed with such condescension or circumlocution as to long for some version of a “time out” for clinician-writers who cannot possibly get to their point. Not here. Dr. Weyandt is just the professional to convey what we know about ADHD with great clarity and respect for your time and intelligence. As I discerned over the years I have known her, she is a clinical scientist with an incisive intellect who can get to the meat of matters in a heart beat, conveying the essence of a complex literature with great ease and simplicity while still respecting the controversies and limitations that abound in the clinical science on ADHD. As one who is known to be a stickler for time management, I admire this among the many qualities I most appreciate about her work. If you like your bourbon or scotch straight and unadulterated, your red wines seductively bold, deeply complex, and lasting in a finish that commands yet another sip, and your conversations respectfully direct, challenging, well-crafted, and eye-openingly educational, then you are going to love this tidy little book.
As Dr. Weyandt notes here, ADHD is more than just a problem with attention, impulsive control, or activity levels. Those with the disorder have considerable problems with greater variation in their performance of various tasks, with holding information in mind that is needed to remember goals and guide behavior toward them, with manipulating such information, with organizing their actions and various sub-routines in their pursuit of their goals, with managing their emotions or motivations as well as others, and with planning for the future or problem-solving along the way when confronted with unexpected obstacles to their goals. And their ability to organize their behavior relative to time's passage, deadlines, appointments with others, and numerous other instances of temporal responsibilities are consistently inadequate. All of this suggests a broader cognitive impairment associated with the disorder than the term attention deficits and a broader behavioral difficulty than the term hyperactivity seem to convey.

Modern theorists and researchers working in the field of ADHD have taken considerable notice of these facts and have identified working memory, the larger domain of executive functioning (of which working memory is a component), and self-regulation (which the executive functions appear to provide to humans) as areas of deficiencies in the disorder. They are constructs that also better explain the myriad symptoms and impairments associated with its life course. Contrary to the public's opinion that this is just some disorder-de-jour comprised mostly of inattentiveness, the real science being done in this field shows ADHD to be as serious and complex in its own way as are disorders like autism, bipolar disorder, or schizophrenia. For among our many psychological abilities that distinguish humans from primates or other mammals is our unique gift for self-regulation—ADHD is its nemesis. As a developmental disorder of self-regulation and its hand-maiden, executive functioning, ADHD is complex and adversely affects a wide swath of major life activities, increasingly so from childhood to adulthood. This complexity and seriousness are nicely captured here and are followed up with numerous recommendations for how best to manage the disorder, all scientifically based.

If you would know something well, teach it to others. My congratulations to Dr. Weyandt for obeying E. Tryon's admonition while producing this book with skill and effort. And my thanks to her for providing us a timely and tightly written statement of what we know about ADHD and what we can do about it. Thank you, Lisa.

—Russell A. Barkley, Ph.D.
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and
Clinical Professor of Psychiatry
Medical University of South Carolina (Charleston, SC)
Attention-Deficit/Hyperactivity Disorder is one of the most well-known and controversial disorders of childhood. ADHD is characterized by developmentally inappropriate level of inattention, hyperactivity, and impulsivity, and affects approximately 3% to 7% of the school-age population and 2% to 4% of the adult population. Outspoken critics claim that the disorder is fraudulent, while the scientific evidence clearly supports the validity of the disorder, as do professional groups such as the American Academy of Pediatrics, American Psychological Association, American Medical Association, National Association of School Psychologists, and the U.S. Surgeon General. Research across genetic, behavioral, neuroanatomical, neuropsychological, and neuroimaging disciplines support the existence of ADHD. Long-term studies have found that children, adolescents, and adults with ADHD are at significantly greater risk for academic, behavioral, occupational, and psychological problems compared to those without the disorder. Numerous types of treatments are available for ADHD, with some more supported by research than others. Identification and diagnosis of ADHD is not simple and requires a thorough assessment process. Misconceptions and questions abound in the media as well as in the scientific community concerning the etiology, diagnosis and treatment of ADHD. An ADHD Primer addresses each of these areas from a scientific perspective.

An ADHD Primer is intended for students enrolled in teacher certification programs, graduate students enrolled in research and applied training programs, and educators, counselors, psychologists, physicians, parents, and individuals with ADHD. This revised text summarizes the literature concerning ADHD across the lifespan with regard to assessment, diagnosis, etiology, and treatment. It is packed with current, practical, and useful information that will help professionals as well as individuals with the disorder better understand and respond to ADHD. One of the greatest strengths of An ADHD Primer is that it contains tables and appendixes many that can be photocopied, as well as numerous up-to-date references and resources for the reader who desires more information about ADHD. Although many books have been written about ADHD, most of the texts have been written from a clinical perspective or for a select audience (i.e., parents, teachers, clinicians, researchers, or individuals with ADHD). Many of the available texts are either non-research based or are heavily researched based and time-consuming to digest. As a university professor with both clinical and research experience, I am frequently called upon to share the ‘facts’ about ADHD in children, adolescents, college students, and adults. An ADHD Primer is intended to capture what is known about ADHD from a scientific perspective and to convey this knowledge in a concise, straightforward, and user-friendly manner.
Acknowledgments

I wish to acknowledge and thank the many authors, researchers, and publishers who gave permission for their work to be included in this book. I would also like to express my appreciation of CWU undergraduate student Sarah Dunkin, and CWU graduate students Michelle Lillard and Teresa Vance, for their research skills and organizational assistance. Michelle Lillard’s assistance with the permissions process and development of the index was invaluable. Special thanks are owed to the children, adolescents, college students, and adults with ADHD, as well as their families, who inspired me to write this primer. I would like to extend my gratitude to Dr. Russell Barkley for writing the foreword for An ADHD Primer, and for his unwavering dedication to the scientific study of ADHD. Lastly, I would like to thank my editor Steve Rutter at LEA, for his support and encouragement throughout the publication process.
He never sits still; he is constantly in motion.
She never pays attention, and she talks incessantly.
He cannot hold down a job.
She is not doing well in school. The teachers say she is lazy.
He does not follow through on anything, and he loses everything.
He is so disorganized!
She has been this way as long as I can remember.

Description

Although these statements can be true of most children, adolescents, and adults at some point in their lives, they are typical concerns expressed by parents, teachers, spouses, and siblings about individuals with attention-deficit/hyperactivity disorder (ADHD). ADHD, as it is currently defined by the American Psychiatric Association (2000), is characterized by persistent and developmentally inappropriate problems with attention, impulsivity, and hyperactivity that cause impairment in one's life. The presence, absence, or combination of these three symptoms reflects the severity and subtype of ADHD. Research findings indicate that ADHD is a lifelong condition that impacts an individual's educational, social, and occupational life.

Does ADHD Exist?

In the year 2000, the National Institutes of Health (NIH) released a consensus statement concerning the diagnosis and treatment of ADHD (National Institutes of Health, 2000) and indicated that "despite the progress in assessment, diagnosis and treatment of children and adults with ADHD, the disorder has remained controversial... The controversy raises questions concerning the literal existence of the disorder" (p. 182). This concern mirrors the views expressed by others such as Armstrong (1995), who has questioned the authenticity of ADHD, and Baughman (2004), a neurologist, who is the author of a video entitled "ADHD—Total 100% Fraud." Although the concern may be well intended, research across behavioral, genetic, neuropsychological, and neurophysiological disciplines supports the existence of ADHD; and a diagnosis of ADHD can be made reliably using various assessment methods discussed in
later chapters. In fact, the NIH consensus statement after thorough review of the scientific evidence concludes that ADHD is a valid disorder and this perspective is endorsed by the American Academy of Pediatrics, the American Medical Association, the American Psychiatric Association, the American Psychological Association, the National Association of School Psychologists, the U.S. Surgeon General, and others. In 2002, a consortium of international scientists addressed the assertion that ADHD is a fraud by reviewing the scientific evidence to the contrary and issued the International Consensus Statement on ADHD (2002).

Admittedly, there is not an objective, conclusive “test” for the disorder, but nor is there an objective test for the common cold or many clinical conditions such as autistic disorder, depression, Tourette’s disorder, and obsessive-compulsive disorder. Like the common cold, depression, and other disorders, a diagnosis of ADHD is based on the presence and severity of symptoms. In the case of ADHD, the symptoms have an early onset; are chronic, pervasive, and developmentally inappropriate; and cause significant impairment in an individual’s life.

ADHD is the most frequently studied disorder of childhood, and volumes of scientific evidence attest to the existence of the disorder (e.g., Asherson, 2004; Brown et al., 2005; Wolraich et al., 2005). To deny the existence of ADHD can do far more harm than good. Long-term studies, for example, have found that children, adolescents, and adults with ADHD—compared to those without the disorder—are at significantly greater risk for academic, behavioral, and social problems (see Developmental Information later in this chapter). Early identification and intervention are essential to improving the outcome of individuals with the disorder, and educators often play a key part in both of these tasks. As Satterfield, Satterfield, and Cantwell (1981) noted, and more recently Foy and Earls (2005), the classroom teacher is a major determining factor in whether a student is correctly diagnosed with ADHD and whether they succeed or fail in the classroom.

Background Information

According to Dr. Roscoe Dykman (2005) the symptoms now associated with ADHD have been recognized in children since the 1800s and, in fact, appeared in a nursery rhyme written by Heinrich Hoffman in 1863. George Still (1902), a physician who presented a series of papers to the Royal College of Physicians, is typically credited for formally identifying ADHD symptoms in children, although others have also been recognized as pioneers in the field (see Dykman, 2005, for a review of the historical information). Following Still’s work, clinicians and researchers asserted that these symptoms were likely due to brain damage, and, despite lack of physiological evidence for this claim, the term minimal brain dysfunction (MBD) emerged during the late 1940s and the 1950s (e.g., Brown et al., 1962; Clements & Peters, 1962; Strauss & Lehtinen, 1947). During the 1960s, the research focus shifted to the overt, hyperactivity symptoms. In 1968, the second edition of the Diagnostic and Statistical Manual (DSM-II) was published (American Psychiatric Association, 1968) and for the first time included the diagnostic category hyperkinetic reaction disorder of childhood. Ac-
TABLE 1.1 Historical Information

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<thead>
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<tr>
<td>1902</td>
<td>Symptoms Described by Dr. George Still</td>
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<td>1950</td>
<td>Minimal Brain Dysfunction (MBD) Focus on Hyperactivity Symptoms</td>
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<tr>
<td>1968</td>
<td>DSM-II; Hyperkinetic Reaction Disorder of Childhood Focus Remained on Hyperactivity Symptoms</td>
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<tr>
<td>1980</td>
<td>DSM-III; Attention-Deficit Disorder (ADD)</td>
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<td>ADD With Hyperactivity</td>
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<td>ADD Without Hyperactivity</td>
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<tr>
<td>1987</td>
<td>DSM-III-R; Attention-Deficit Hyperactivity Disorder</td>
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<td>ADHD With Levels of Severity Noted</td>
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<td></td>
<td>Mild, Moderate, and Severe</td>
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<td>Undifferentiated ADD</td>
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<td>1994</td>
<td>DSM-IV; Attention-Deficit/Hyperactivity Disorder</td>
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<td>ADHD: Combined Type</td>
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<td></td>
<td>ADHD: Predominately Inattentive Type</td>
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<td></td>
<td>ADHD: Predominately Hyperactive-Impulsive Type</td>
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Note: From Weyandt (2001).

According to the DSM-II, the central hallmarks of the disorder were hyperactivity, distractibility, and attention problems. It was believed at this time that children would outgrow the disorder by adolescence.

During the 1970s, the research emphasis shifted from hyperactivity to attention problems. This focus was reflected in the new diagnostic label, attention deficit disorder (ADD), published in the third edition of the DSM (American Psychiatric Association, 1980). According to DSM-III, two subtypes of ADD existed—ADD with or without hyperactivity. In 1987, the DSM-III was revised (DSM-III-R), and, although the label remained the same (i.e., ADD), the emphasis was now on the presence and pervasiveness of three core symptoms—inattention, impulsivity, and hyperactivity (American Psychiatric Association, 1987). ADD without hyperactivity was no longer recognized as a specific subtype of ADD and was instead categorized as undifferentiated ADD. In 1994, the fourth edition of the DSM was released, and the diagnostic category ADD was changed to ADHD (attention-deficit/hyperactivity disorder). Three new subtypes were delineated—ADHD, predominantly inattentive type; ADHD, predominantly hyperactive-impulsive type; and ADHD, combined type (see Table 1.1 for a summary of this information).

Differences in Subtypes

Research indicates that the three ADHD subtypes can be reliably diagnosed (see Table 1.2) and may have clinically meaningful differences. For example, a study by Morgan, Hynd, Riccio, and Hall (1996) found that children with ADHD, combined type, have more behavioral and acting out problems, while
TABLE 1.2 Diagnostic Criteria for Attention-Deficit/Hyperactivity Disorder

A. Either (1) or (2):

(1) six (or more) of the following symptoms of inattention have persisted for at least 6 months to a degree that is maladaptive and inconsistent with the developmental level:

Inattention
(a) Often fails to give close attention to details or makes careless mistaken in school work, work, or other activities
(b) often has difficulty sustaining attention in tasks or play activities
(c) often does not seem to listen when spoken to directly
(d) often does not follow through on instructions and fails to finish school work, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
(e) often has difficulty organizing tasks and activities
(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as school work or homework)
(g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
(h) is often easily distracted by extraneous stimuli
(i) is often forgetful in daily activities

(2) six (or more) of the following symptoms of hyperactivity-impulsivity have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity
(a) often fidgets with hands or feet or squirms in seat
(b) often leaves seat in classroom or in other situations in which remaining seated is expected
(c) often runs about or climbs excessively in situation in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
(d) often has difficulty playing or engaging in leisure activities quietly
(e) is often “on the go” or often acts as if “driven by a motor”
(f) often talks excessively

Impulsivity
(g) often blurts out answers before questions have been completed
(h) often has difficulty awaiting turn
(i) often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).

D. There must be clear evidence of clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a personality Disorder).
Attention-Deficit/Hyperactivity Disorder—What Is It?

Code based on type:

314.01 Attention-Deficit/Hyperactivity Disorder, Combined Type: if both Criteria A1 and A2 are met for the past 6 months

314.00 Attention-Deficit/Hyperactivity Disorder, Predominately Inattentive Type: if Criterion A1 is met but Criterion A2 is not met for the past 6 months

314.01 Attention-Deficit/Hyperactivity Disorder, Predominately Hyperactive-Impulsive Type: if Criterion A2 is met but Criterion A1 is not met for the past 6 months

Coding note: For individuals (especially adolescents and adults) who currently have symptoms that no longer meet full criteria. “In Partial Remission” should be specified.


children with ADHD, predominately inattentive type, have fewer behavioral but more learning problems. More recently, Carlson and Mann (2002) reported that children with ADHD inattentive subtype were rated by teachers as having fewer behavioral problems but higher levels of anxiety, depression, unhappiness, and withdrawn behavior. Bauermeister, Matos, and Reina (1999) found the family is impacted differently depending on the ADHD subtype a child or adolescent might have. Specifically, Bauermeister and colleagues found that mothers of children with ADHD, combined type, reported (a) more negative feelings such as frustration, and less positive feelings toward their children; and (b) a greater negative impact on family social life and relationship with teachers, compared to mothers of children with ADHD, predominately inattentive type. With regard to age and subtype, studies suggest that the predominately hyperactive-impulsive subtype is most often associated with younger children and the predominately inattentive type is associated with older children in the United States as well as in other countries (McBumett et al., 1999; Nolan, Gadow, & Sprafkin, 2001; Pineda et al., 1999). On behavioral tasks, several studies have found performance differences among children with different subtypes of ADHD. For example, Collings (2003) reported that children with ADHD combined type committed a greater percentage of omission errors on a continuous performance task, and their performance deteriorated more quickly, relative to children with ADHD inattentive type (and children without ADHD). Todd et al. (2002) studied achievement and cognitive performance of a sample of child and adolescent twins with ADHD and found that those with the combined subtype and inattentive subtype made significantly worse grades and achievement testing scores, and had an increased use of special education services compared to those twins with hyperactive/impulsive subtype of ADHD. Clark and colleagues (Clark, Barry, McCarthy, & Selikowitz, 2001) compared EEG recordings of children with ADHD combined type versus inattentive type and reported that those with combined type had an increase in fast-wave activity in the frontal regions of the brain. Although these findings are inconclusive, they do suggest that distinct physiological differences may exist between different subtypes of ADHD. Murphy, Barkley, and Bush (2002) conducted one of the few studies to compare subtype differences among young adults with ADHD (ages 17–27) and found that those with ADHD combined
type were more likely than those with inattentive subtype to have been arrested, attempted suicide, to have oppositional defiant disorder, and hostility problems. These authors as well as others have suggested that the greater impulsivity associated with the combined subtype may increase the likelihood that young adults with ADHD will engage in antisocial behavior. It is important to note, however, that Murphy, Barkley, and Bush found that young adults with ADHD combined and inattentive subtypes did not differ on a number of dimensions such as co-existing psychiatric conditions, psychological distress, use of mental health services, and use of illegal drugs. In addition, a number of studies have failed to find cognitive or behavioral differences between individuals with subtypes of ADHD (e.g., Corkum & Siegel, 1993; Milich, Balentine, & Lynam, 2002) and the majority of studies have been conducted with children. Furthermore, some studies have reported subtype differences on a few but not all neuropsychological tasks (Schmitz et al., 2002). Additional research is needed to determine whether distinct behavioral, cognitive, academic, and neurophysiological differences exist among children, adolescents, and adults with different subtypes of ADHD.

Current Criteria

The DSM-IV was published in 1994 and the DSM-IV Text Revision was released in 2000. The diagnostic criteria for ADHD did not change from the fourth edition to the Text Revision of the DSM and the current diagnostic criteria appear in Table 1.2. The diagnostic criteria for ADHD require that an individual display significant and developmentally inappropriate levels of inattention, hyperactivity, and impulsivity. These symptoms must be present early in life; exist in two or more settings; and cause social, educational, or occupational impairment. It is important to recognize that nearly everyone is inattentive, hyperactive, or impulsive in some situations and that the mere presence of ADHD symptoms does not equal a "disorder." Furthermore, symptoms associated with ADHD, particularly inattention, can also be characteristic of many other disorders such as learning disabilities, sleep disorders, substance use, and emotional problems, to name a few. As Gordon and Barkley (1999) aptly stated, "inattention as a symptom resembles fever or chest pains in that its presence alone does little to narrow the field of diagnostic possibilities" (p. 2). To arrive at a valid ADHD diagnosis, a thorough evaluation is required.

DSM-IV Limitations

The current diagnostic criteria are an improvement over DSM-III-R (1987) criteria as they are based on research studies and they include a requirement of impairment in social, academic, or occupational functioning. Problems remain, however, as some experts in the field argue that ADHD, predominately inattentive type should be a separate, distinct, and independent disorder from ADHD (Barkley, 1998, p. 65). Indeed, results from several studies suggest that, statistically, DSM criteria tend to fall into two, rather than three, categories. For example, Beiser, Dion, and Gotowiec (2000) examined parent and teacher ratings of 1,555 Native and 489 non-Native children from the United States and Canada...
and found a two-factor solution; attention versus hyperactive-impulsive symptoms. Similar findings have been reported with Icelandic children (Magnusson, Smari, Gretarsdottir, & Prandardottir, 1999), Brazilian children (Rohde et al., 2001), and others (e.g., DuPaul, McGoey, Eckert, & Van Brackle, 2001; Wolraich, Lambert, Baumgaertel, et al., 2003). The usefulness and stability of the ADHD, predominately hyperactive-impulsive, subtype has also been questioned. For example, Lahey, Pelham, Loney, Lee, and Willcutt (2005) conducted an 8-year longitudinal study of 4- to 6-year olds who met DSM-IV criteria for ADHD and found that most children, over time, continued to meet diagnostic criteria for the disorder. Of the three subtypes, however, children with the hyperactive-impulsive subtype rarely met the criteria for this subtype over time. An additional problem with the current diagnostic criteria concerns the questionable developmental appropriateness of the items for children, adolescents, and adults. For example, earlier research by Hart, Lahey, Loeber, Applegate, and Frick (1995) indicated that the symptoms of ADHD changed during childhood and adolescence and specifically that problems with attention remain relatively persistent while hyperactivity and impulsivity symptoms appear to decline with age. More recently, Biederman, Mick, and Faraone (2000) followed 128 boys with ADHD for a period of 4 years and also found that ADHD symptoms tended to decline with age, and the most significant decline in symptoms was with hyperactive, impulsive symptoms. Similar age-related changes have been reported by others (e.g., Drechsler, Brandeis, Foldenyi, Imhof, & Steinhausen, 2005; Kato, Nichols, Kerivan, & Huffman, 2001). These findings, however, are likely due in part to the diagnostic criteria which are not age-referenced and are limited in number with regard to hyperactivity and impulsivity relative to inattention (i.e., nine for inattention, six for hyperactivity, and three for impulsivity). Indeed, Spencer, Biederman, Wilens, and Faraone (2002) suggested that the current criteria for ADHD may minimize, or underestimate, the actual rate of persistence of ADHD into adulthood. Given the concerns expressed in the literature and the ongoing research in this area, it is likely that the diagnostic criteria for ADHD will be revised in future editions of the DSM and reflect more age-appropriate items. It is also likely that the subtypes will be revised and may reflect statistical studies that support two primary dimensions (attention, impulsivity/hyperactivity) rather than three.

Prevalence of ADHD and ADHD Symptoms

According to the American Psychiatric Association (2000), ADHD is estimated to affect 3% to 7% of the U.S. school-age population and affects all ethnic and socioeconomic groups. This percentage varies, however, depending on (a) the diagnostic criteria and methods used by clinicians and researchers to define and assess ADHD, and (b) whether researchers actually assess the prevalence of the disorder or merely the presence of ADHD symptoms. Studies differ also with respect to the age and gender of the individuals examined, geographic location, criteria used to define ADHD (e.g., DSM versions), raters (e.g., teachers, parents, pediatricians), settings (e.g., home, school, clinics), assessment tools, cut-off scores indicative of ADHD, as well as other aspects. As Rowland, Lesesne, and Abramowitz (2002) aptly stated, “basic epidemiologic information
about the distribution of ADHD across the population by age, sex, race, and socio-economic status remains inadequately described” (p. 162). With regard to age, for example, the American Psychiatric Association (2000) estimates 3% to 7% of school-age children have ADHD while estimates of ADHD in adults is substantially lower (i.e., 1% to 2%) (Biederman, 2004; Kooij et al., 2005).

The CDC (2005) recently reported that 4.4 million children ages 4 to 17 were reported to have a diagnosis of ADHD in 2003, and of these 2.5 million (56%) were treated with medication. Similar numbers of males and females were prescribed medication (56.8% and 55.0%). Prevalence rates varied by state with the lowest prevalence of ADHD in Colorado (5%) and the highest in Alabama (11%). With regard to ethnicity, ADHD appears in all ethnic groups but as Stevens, Harman, and Kelleher (2004) found, ethnic and regional differences exist in primary care visits for children with ADHD. Specifically, the researchers found that an ADHD diagnosis and a stimulant prescription were less likely to be made with Hispanic American children than White American children. Interestingly, their results also revealed that stimulants were prescribed more frequently for children with ADHD in the south and west than in the northeast. A later study using data from 1997 to 2000 produced similar findings and revealed that African American children with ADHD were less likely to take stimulant medication compared to White-American children (Stevens, Harman, & Kelleher, 2005). Bussing and colleagues (Bussing, Gary, Mills, & Garvan, 2003) reported that African-American parents expressed fewer worries about ADHD-related school problems and were more unsure about the causes and treatments for ADHD compared to Caucasian parents. As Samuel et al. (1999) noted, very little is known about ADHD in African-American children and the same can be said about Hispanic-American and other minority groups with ADHD.

When studies examine the prevalence of ADHD symptoms, the percentages vary and in some cases tend to be higher or lower than the estimates provided by the American Psychiatric Association (Katusic et al., 2005). For example, in 1996 Lavigne and colleagues found that 2% of preschool children in a primary care sample met the DSM-IV (1994) criteria for ADHD. In a recent review of the literature, however, Conner (2002) reported that the prevalence of ADHD symptoms in preschoolers in the United States varies from 2% to 59% depending on whether community or clinic-referred children are studied. Pineda et al. (1999) found a higher rate of ADHD symptoms among 6- to 11-year-old children than 12- to 17-year-old adolescents, and Nolan, Gadow, and Sprafkin (2001) found very few adolescents reported significant problems with hyperactivity and impulsivity (only 0.8%). With regard to the prevalence of ADHD symptoms in young adults Weyandt, Rice, and Linterman (1995) found a substantial percentage of college students reported significant levels of ADHD symptoms (i.e., 7%). This percentage dropped, however, when both childhood symptoms and current symptoms were considered (2.5%). More recently, DuPaul, Schaughency, Weyandt, Tripp, et al. (2001) examined the prevalence of ADHD symptoms in college students from three countries (Italy, New Zealand, and the United States) and found the prevalence rates varied from 0% (Italian females) to 8.1% (New Zealand males).

As mentioned previously, a variety of factors contribute to the discrepant findings among studies including the methods used to identify ADHD symp-
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This is a crucial factor to consider as relying on a single method can result in overidentification and misleading information. For example, using teacher ratings as the only source of information, Werry and Quay (1971) found 30% of the boys and 12% of the girls in their study were rated as overactive, while 43% of the boys and 25% of the girls were rated as having attention span problems! Wolraich, Hannah, Pinnock, Baumgaertel, and Brown (1996), using teacher ratings based on DSM-IV criteria, found a prevalence rate of 11.4% for children in kindergarten through Grade 5. The most common subtype found in their study was ADHD, predominately inattentive type (5.4%), followed by the combined type (3.6%) and hyperactive-impulsive type (2.4%). In 2001, Nolan et al. asked teachers to complete a DSM-IV symptom inventory for 3,006 school children between the ages of 3 and 18 and found an overall prevalence rate of 15.8%. The highest prevalence rate was for the inattentive subtype (9.9%) followed by the hyperactive-impulsive and combined subtypes of ADHD (9.9% and 3.9% respectively). Prevalence rates were higher for African-American students (39.5%) compared to White students (14.2%). Reid and colleagues (2001) also found that African-American boys and girls were two to three times more likely to be rated by teachers as having significantly greater attention and impulsivity problems than European Americans and suggested that African-American children are at greater risk for being inaccurately identified as having ADHD. It is important to note that these studies only assessed the presence of ADHD symptoms and did not conduct clinical evaluations for the disorder. In fact, when additional information is gathered, such as degree of impairment, pervasiveness, onset, and ratings from multiple informants (e.g., teacher and parent), these figures drop substantially to about 1% to 4% (Barkley, 1998), which is more consistent with the 3% to 7% suggested by the American Psychiatric Association. This issue of identification and assessment of ADHD will be thoroughly addressed in chapter 3.

Prevalence of ADHD Symptoms in Other Countries

The prevalence of ADHD in other countries has also been investigated, and, as in the United States, statistics vary depending on factors such as age of the individuals investigated, gender, raters (e.g., parents, teachers) and diagnostic criteria employed. In some countries the prevalence rates are substantially higher than those reported in the United States, while other studies report similar prevalence rates. In Germany, for example, Baumgaertel, Wolraich, and Dietrich (1995) reported a prevalence of 10.9% using teacher ratings and DSM-III-R (1987) criteria. Similar findings were reported in a Canadian study, with an ADHD prevalence rate of 9% in boys and 3.3% in girls (Sztatmari, 1992). In Japan, Kanbayashi, Nakata, Fujii, Kita, and Wada (1994) reported a prevalence rate of 7.7% of children ages 4 to 12, using parent ratings and DSM-III-R criteria, and similar findings were reported by teacher ratings of children age 6 to 12 living in Hong Kong (Luk, Leung, & Lee, 1988). The prevalence of ADHD in Bangkok, Thailand among a sample of 353 students was recently reported to be 6.5% (Benjasuwantep, Ruangdaraganon, & Visudhiphan, 2002). Studies conducted in New Zealand have yielded mixed results, with ADHD prevalence rates ranging from 2% to 6% in school-age children, and 4% to 6% in adolescents (Schaughency, McGee, Raja, Feehan, & Silva, 1994). Studies in Australia
have reported a 7.5% prevalence rate for ADHD among children ages 6 to 17, based on parent ratings (Graetz et al., 2001). In India, Bhatia, Nigam, Bohra, and Malik (1991) reported that 29.2% of adolescents ages 11 and 12 displayed significant ADHD symptoms. The prevalence rate of ADHD in Norway is similar to U.S. statistics, with ADHD occurring in approximately 3% to 4% of school-age children (Kleve, 1989). Rohde and colleagues from Brazil (1999) reported that approximately 5.8% of students ages 12 to 14 have ADHD, with a slightly higher percentage of males than females having the disorder. Pineda and colleagues (1999) reported that of a sample of 540 children living in Manizales, Colombia, 19.8% of boys and 12.3% of girls ages 6 to 11 met DSM-IV (1994) criteria based on parental ratings alone. Disruptive behavior disorders, most commonly ADHD, have been reported to affect 11.1% of a sample of children in Valencia, Spain (Andrés, Catala, & Gómez-Beneyto, 1999). Recently, a study of 600 Ukrainian children reported an overall prevalence rate of 19.8% for ADHD with the highest subtype ratings for ADHD hyperactive-impulsive type (8.5%) followed by the inattentive type (7.2%), and combined type (4.2%) based on parent and teacher ratings (Gadow et al., 2000). The prevalence of ADHD symptoms in Italian children has been investigated as well, and Mugnaini et al. (2005) recently reported an overall prevalence rate of 7.1% in first graders based on teacher reports. The most common subtype of ADHD was the inattentive type (3.5%) followed by the hyperactive-impulsive and combined subtypes (2.3% and 1.3%). In this study, males were more likely to meet DSM-IV criteria for ADHD than females (10.4% vs. 3.8%). Kadesjö, Kadesjö, Hägglöf, and Gillberg (2001) from Sweden also reported gender differences with respect to ADHD symptoms in children ages 3 to 7, and noted that only 6% of the children who met the criteria for ADHD “appeared normal” with regard to attention and activity level at clinical examination (p. 1027). A study conducted in Ethiopia found that living in an urban area was significantly associated with ADHD, and that children between the ages of 10 and 14 were three times more likely to have ADHD compared to younger children (Ashenafi, Kebede, Desta, & Alem, 2000). Perhaps one of the lowest rates of ADHD was reported by Brownell and Yogendran (2001), who investigated physicians’ diagnosis rates for ADHD in the province of Manitoba and found an overall rate of 1.52%.

In summary, ADHD symptoms appear in children, adolescents, and adults from various countries throughout the world. A variety of factors contribute to the inconsistent rates among studies. An important distinction is whether prevalence rates reflect the prevalence of ADHD symptoms or actual diagnosed cases of ADHD. Although estimates vary, the generally accepted rate is 3% to 7% for children in the United States as reported by the American Psychiatric Association (2000). Some have questioned whether ADHD is “on the rise” in the United States and elsewhere in the world.

Increased Incidence of ADHD?

The question of whether the incidence of ADHD is on the rise is difficult to assess for several reasons. First, the diagnostic criteria have changed considerably over the years, making comparison studies extremely problematic. Second, it is difficult to determine whether physicians and clinicians are more knowledgeable and better trained at recognizing and diagnosing the disorder, or whether
they are making faulty diagnoses as claimed by some (e.g., Breggin, 1998a). Third, given the media attention and proliferation of material on the subject available to parents, teachers, and the general public, more referrals for ADHD assessment are likely to occur and, consequently, individuals with ADHD may be identified who otherwise would have remained undiagnosed. However, research comparing the frequency of ADHD diagnoses using DSM-III-R (1987) and DSM-IV (2000) criteria does suggest that more children are diagnosed with ADHD relative to a decade ago (e.g., Wolraich et al., 1996; Wolraich, Hannah, Baumgaertel, & Feurer, 1998). For example, in a study comparing the classification rates of DSM-III-R and DSM-IV among preschoolers, Byrne, Bawden, Beat­tie, and DeWolfe (2000) found that 16% of the preschoolers identified as having ADHD would not have been classified as having ADHD using DSM-III-R criteria. Barbaresi et al. (2004) reported a 7.5% cumulative incidence of ADHD in 19-year-olds living in Rochester, Minnesota. Although it is uncertain whether the incidence of ADHD is increasing or whether it is more accurately being diagnosed, recent findings suggest that teachers are likely to identify children as having ADHD when they do not have the disorder. Specifically, Havey, Olson, McCormick, and Cates (2005) found that nearly 24% of students were identified by teachers as meeting DSM-IV criteria for ADHD, compared to the expected rate of 3% to 7% (APA, 2000). Similar findings were reported by Glass and Wegar (2000) who found teachers overidentified ADHD in students. Glass and Wegar also found that medication was the preferred form of treatment by teachers for students with ADHD.

Studies conducted in clinic settings also support that more children are diagnosed with ADHD compared to a decade or more ago. For example, Robinson, Sclar, Skaer, and Galin (1999; Robinson, Skaer, Sclar, & Galin, 2002) reported that the number of office visits documenting a diagnosis of ADHD increased from nearly 950,000 in 1990 to more than 2 million in 1995, and to more than 3 million by 1998. This study also reported a 2.3-fold increase in office-based visits documenting ADHD, with a 3.9-fold increase in the number of girls diagnosed with ADHD and a 2.2-fold increase in the number of boys diagnosed with ADHD. Critics have used this information to fuel the argument that ADHD does not exist and is simply a way of justifying the control of children with drugs (Breggin, 1998b, 2001). In response to these claims, as well as due to public concern, the American Medical Association’s Council of Scientific Affairs evaluated the diagnosis and treatment of ADHD. The council concluded that ADHD is not overdiagnosed and the actual number of children treated for ADHD falls at the lower end of the prevalence range (Couzin, 2004; Goldman, Genel, Bezman, & Slanetz, 1998). (See chapter 4 for additional information on this topic.)

Developmental Information

Prenatal, Infancy, and Toddlerhood

Leslie, age four, is described by his parents as a “handful and has been that way since day one.” As an infant, Leslie was a difficult baby; he cried frequently, slept irregularly, and was generally a “fussy baby.” During toddlerhood, Leslie had nu-
merous "accidents" and was much more active than other two-year-olds. He be­
gan attending preschool at four years of age, and his teachers frequently com­
plained that he was unruly and "very mischievous." After attending preschool for
one month, Leslie's preschool teachers indicated that he was too disruptive and
did not appear "ready" for preschool.

As indicated by Leslie's case, children with ADHD typically exhibit ADHD
symptoms early in life and sometimes can be identified as early as preschool.
Although DSM-IV-TR (1994) criteria require that the onset of ADHD symptoms
occur before age seven, most children are identified during the school-age years
(i.e., elementary school). Work by Barkley, Fischer, Edelbrock, and Smallish
(1990), however, suggests that the average age of onset of symptoms is three to
four years of age. Several studies have attempted to identify infancy variables
that might be predictive of the development of ADHD in childhood. Although
no "infancy profile" exists, several factors have been associated with the devel­
opment of ADHD, including maternal smoking and alcohol use during preg­
nancy, premature delivery, low birth weight, delayed motor development, and
strong intensity of response during infancy (e.g., Barkley, DuPaul, & Mc­
Murray, 1990; Breslau et al., 1996; Hartsough & Lambert, 1985). Recently,
McGrath et al. (2005) conducted a longitudinal study of low birth weight in­
fants to determine factors that might be predictive of ADHD at a later age (age
four). Results indicated that birth weight, gestational age, and medical and neu­
rological status were all associated with attention problems and hyperactivity
at age four. Bhutta and colleagues (2002) conducted a meta-analysis of preterm
infants and cognitive and behavioral outcomes and found that 81% of preterm
infants had increased risk of cognitive and behavior problems, and more than
twice the risk for ADHD. Other studies have found that infant regulatory prob­
lems at the age of 3 months are predictive of hyperactive symptoms in child­
hood (e.g., Becker, Holtman, Laucht, & Schmidt, 2004), and severe sleep prob­
lems during infancy are highly predictive (1 in 4) of ADHD by age five
(Crabtree, Ivanenko, & Gozal, 2003; Thunstrom, 2002). It is crucial to note that
these findings are only correlational and do not have a direct relationship with
ADHD. In other words, some children with ADHD do not have a history of reg­
ulatory problems during infancy, were not of low birth weight, etc., and by the
same token, many children with these problems during infancy do not develop
ADHD. What can be concluded is that certain characteristics during infancy in­
crease the risk of a child developing ADHD later in life.

During the preschool years, children with ADHD are typically excessively
active, impulsive, accident prone, demanding, and frequently do not adapt well
to environmental changes (Fraser, 2002). Byrne and colleagues (2003) reported
that the most common type of ADHD in preschool children is the hyperactive­
impulsive subtype. In addition, Wilens, Biederman, Brown, et al. (2002) re­
ported that the most common type of psychopathology in preschoolers is
ADHD and that most preschoolers with ADHD have at least one or more addi­
tional disorders (e.g., conduct, oppositional, mood, anxiety disorders). Pre­
school children with ADHD have also been found to be more aggressive,
noncompliant, and defiant and are often described as having a negative tem­
perament (e.g., Campbell & Ewing, 1990). Research also indicates that pre­
school age children with ADHD are more likely to have problems with
oppositional behavior than children without ADHD and to engage in behaviors
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that places them at greater risk for physical injury (Byrne, Bawden, Beattie, & DeWolfe, 2003; Gadow, Sprafkin, & Nolan, 2001). These behaviors are obviously problematic in a preschool setting, and children with ADHD are at greater risk for expulsion from preschool settings, which increases the likelihood that these children will develop social and academic problems. Indeed, DuPaul, McGoey, Eckert, and Van Brakle (2001) found that preschool children with ADHD scored significantly lower on a test of preacademic skills than children without the disorder. DuPaul and colleagues also found that children with ADHD were less socially skilled, exhibited more problem behaviors, and were more noncompliant during school tasks. Kathleen Fraser (2002) recently reviewed public-school administrative records and conducted interviews with educators who worked with preschoolers diagnosed with ADHD and found that certain factors were associated with a better school adjustment for these children (e.g., structure, gentle and consistent adult assistance, acceptance, gross motor activities) while other factors were associated with less favorable outcomes (e.g., multiple caregivers, unreasonable expectations, unavailable and uninvolved parents). Barkley, Shelton, Crosswait, et al. (2002) conducted a 3-year follow-up study of preschool children with ADHD and found that those children with aggressive and oppositional defiant behavior in addition to their ADHD symptoms were at substantially greater risk for academic, social, and behavior problems. In summary, the literature indicates that ADHD symptoms are often present during the preschool years and that children with the disorder are more likely to have social, behavior, and academic difficulties. Preschool children with ADHD and aggressive, defiant behaviors, appear to be at the greatest risk for maladjustment in preschool and later years.

Childhood

More information is available about ADHD in childhood than any other developmental period. Given that most classrooms contain at least 20 children, it has been estimated that one to two children with ADHD will be found in a typical classroom (DuPaul & Stoner, 1994, 2003). Based on long-term studies, it is clear that ADHD symptoms generally persist during the elementary school years, with additional problems emerging such as poor social skills, problems with peer relationships, and in more severe cases, conduct problems, and aggressive behavior. Hoza and colleagues (2005) recently found that peers of children with ADHD rated those with the disorder as less well liked, more often rejected, and as having fewer friends than comparison children without the disorder. Research has also found that girls with ADHD tend to have fewer friends and greater difficulty maintaining friendships compared to girls without the disorder (Blachman & Hinshaw, 2002). Stroes, Alberts, and van der Meere (2003) found that boys with ADHD demonstrated poor social attention (e.g., less eye contact, talking while adult was talking) during conversation with a nonfamiliar adult compared to boys without ADHD. Lawrence and colleagues (2002) reported that boys with ADHD exhibited more self-talk while playing video games compared to boys without the disorder. Wolraich, Lambert, Baumgaertel, et al. (2003) recently studied teacher ratings of approximately 21,000 children in three countries (United States, Spain, Germany) and found that children with the most inattention problems also had significant academic
problems while those with behavior problems tended to have significant problems across all three core symptoms of ADHD (inattention, impulsivity, hyperactivity). Research has also found that teachers tend to rate boys as having more ADHD symptoms than girls (Hartung et al., 2002; Havey, Olson, McCormick, & Cates, 2005). Hinshaw (2002) studied preadolescent girls with ADHD and found they were more likely to have been retained at least one grade level, had lower academic achievement, and more acting out behaviors than non-ADHD girls. Hinshaw also reported that those with the inattentive subtype of ADHD were more socially isolated than girls without ADHD and those with the combined type were the most socially rejected by their peers. Other studies have reported similar findings with boys with ADHD, and most have also found co-existing problems during the elementary school years such as learning disabilities (e.g., Seidman, Biederman, Monuteaux, Doyle, & Faroone, 2001). Reading disability is the most common type of learning problem with these children, and their mathematical achievement tends to be lower that that of their peers (Riccio, Hynd, Cohen, Hall, & Molt, 1994; Zentall & Smith, 1993; Palacios & Semrud-Clikeman, 2005). Pastor and Reuben (2002) studied national prevalence rates of ADHD in the United States and found 3% of children in the study were diagnosed with ADHD, while 4% were diagnosed with ADHD and learning disability. Due to their academic underachievement and/or learning disabilities, it is not uncommon for children with ADHD to require a tutor or begin receiving special education during elementary school.

In addition to learning difficulties, research has found that children with ADHD tend to have problems organizing and expressing their thoughts in a fluent manner (Barkley, Cunningham, & Karlsson, 1983; Hinshaw, 2002; Purvis & Tannock, 1997). These expressive language problems appear to be related to cognitive processes such as poor planning and organizational skills (i.e., executive functions) rather than to an underlying speech and language disorder (although children with ADHD can have co-existing language impairments). Many studies have found executive function deficits in preschool age children, elementary age children, adolescents, and more recently young adults with ADHD (e.g., Fischer, Barkley, Smallish, & Fletcher, 2005; Mahone et al., 2005; Seidman, Biederman, et al., 2005; Willcutt, Brodsky, et al., 2005). Preliminary studies also suggest that executive function deficits may emerge early in life and persist over time, however, it is important to note that executive function deficits are not unique to ADHD and are characteristic of other disorders such as traumatic brain injury, autistic disorder, and Tourette’s disorder to name a few (Fischer et al., 2005; Levin & Hanten, 2005; Weyandt, 2005a).

With respect to language, research suggests that children with ADHD may have delays in internalized speech (i.e., “self-talk” or self-directed speech), and some argue that internalized speech is essential for children to control and govern their own behavior (Barkley, 1998; Berk & Potts, 1991). In the classroom, teachers often describe children with ADHD as disorganized, distractible, spacey, and restless. Research supports that children with ADHD tend to make more noises and inaudible speech sounds than children without the disorder (Berk & Potts, 1991). They are often criticized for not following through on assignments and being inconsistent and careless in their schoolwork. These problems have led some to question whether children with ADHD have lower intelligence and/or memory deficits. Research concerning intelligence and ADHD
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has found mixed results, with some studies finding that children with ADHD fall below average, while other studies have found their performance to be average or above average on standardized IQ tests. As with non-ADHD children, intelligence is likely to vary greatly among individuals, and group findings can be misleading (Faraone, Biederman, Lehman, Keenen, et al., 1993; Faraone, Biederman, Lehman, Spencer, et al., 1993; Faraone, Biederman, & Monuteaux, 2002; Shaw & Brown, 1990; Webb & Latimer, 1993).

With regard to memory, studies generally have not found short-term and long-term memory deficits with children with ADHD; however, several studies have reported that these children have problems with working memory (i.e., being able to retain information in memory while working on a problem) (e.g., Bauermeister et al., 2005; Martinussen, Hayden, Hogg-Johnson, & Tannock, 2005). In addition, the more complex the tasks and the greater the demands for organizing and remembering information, the more difficulty these children appear to have (Amin, Douglas, Mendelson, & Dufresne, 1993). Jonsdottir, Bouma, Sergeant, and Scherder (2005) recently questioned whether working memory deficits were characteristic of children with ADHD or whether working memory deficits are actually associated with underlying language impairments. Martinussen et al. (2005), however, recently reviewed 26 studies published between 1997 and 2003 (i.e., meta-analysis) and concluded that working memory impairments are characteristic of ADHD and are independent of language problems and intelligence level. In 2000, Lorch et al. compared the comprehension of televised stories in boys with and without ADHD and found that groups showed similar levels of cued recall when queried about the story. However, when recall tasks required more detailed knowledge (e.g., relations among events), children with ADHD performed more poorly.

Although there has been speculation that individuals with ADHD may be more creative than children without ADHD, very few empirical studies have addressed this issue. In 1993, Funk, Chessare, Weaver, and Exley studied the performance of boys with and without ADHD (ages 8 to 11) on a creative thinking task and found no significant difference between the groups. These researchers also found that methylphenidate (Ritalin) did not improve creative thinking performance in boys with ADHD. Recently, Professors Dione Healey and Julia Rucklidge from the University of Canterbury studied 33 children with ADHD compared to those without the disorder on several creativity tests (Healey & Rucklidge, 2005). Results were similar to Funk and colleagues with no measurable difference between the groups on the creativity tasks. Thus, these findings, as with intelligence, suggest that although some individuals with ADHD may be highly creative, as a group, research does not support the idea that individuals with ADHD are more creative than the general public.

In addition to being at greater risk for learning disabilities, children with ADHD often have co-existing psychiatric disorders such as conduct disorder, oppositional defiant disorder, major depression, anxiety disorders, and less frequently, bipolar disorder, obsessive compulsive disorder, and Tourette’s disorder (e.g., Faraone, Biederman, & Monuteaux, 2002; Geller et al., 2003; Kadesjö, Hägglof, Kadesjö, & Gillberg, 2003; Mannuzza, Klein, Abikoff, & Moulton, 2004; Sukhodolsky et al., 2003). Of these disorders, conduct disorder appears to be most common in children with ADHD, which places them at even greater risk for antisocial behavior, peer rejection, and academic failure. Overall, the re-
search clearly indicates that children with ADHD who have co-existing internalizing (e.g., anxiety) and externalizing (e.g., conduct disorder) disorders are at significantly greater risk for social, academic, and behavior problems. In addition, Klassen, Miller, and Fine (2004) recently reported that the problems children with ADHD have significantly impact the overall quality of life of the child with the disorder and also the family. Specifically, Klassen and colleagues found that parents of children with ADHD, especially those with comorbid conduct disorder, had compromised emotional health and the family had poorer cohesion. In other words, in families of children with ADHD, the quality of life of the child, parents, and family as a unit is often compromised compared to families without children with ADHD.

ADHD is the most frequently studied disorder of childhood, and research has examined the performance of children with ADHD on a plethora of measures and a review of these studies is beyond the scope of this book. The studies have ranged, however, from motor skills to reading comprehension of students with ADHD. For example, studies have found that boys with ADHD compared to those without ADHD, demonstrate poorer performance on tasks that assess fine motor skills (Pitcher, Piek, & Hay, 2003). Children with ADHD also tend to overestimate their performance on tasks such as the ability to solve mazes (Ohan & Johnston, 2002). Hoza and colleagues (2002) also found that boys with ADHD tended to overestimate their scholastic competence, social acceptance, and behavioral performance, and they did so in the domains in which they were most impaired. Hoza et al. suggested that these inflated self-perceptions of boys with ADHD may serve a protective role given the likelihood of failure in terms of academic, social, and behavioral functioning. The common theme among studies with children with ADHD is that they are at greater risk for academic, behavioral, and social problems compared to their same-age peers without ADHD. Guevara and colleagues (2003) recently reported that children with behavior disorders, such as ADHD, incurred health services expenditures similar to children with physical conditions, and had greater expenditures for office-based visits and prescription medications.

Adolescence

Tanya, age 14, is in the seventh grade. She was retained in first grade because her teachers thought that she was not achieving to expectations and was “extremely immature.” Tanya continued to have attention problems in second grade and primarily earned letter grades of C. Her second grade teacher described Tanya as “a dreamer” and “very disorganized.” Tanya was diagnosed as having ADD in third grade and began receiving special educational services at that time. Tanya took medication for several years but stopped taking it during the end of the sixth grade because she was concerned that her friends were making fun of her. At the beginning of seventh grade, Tanya was doing well academically and behaviorally, but, after the first quarter, her grades began to slip and she was frequently assigned to detention for inappropriate behavior in the classroom.

Although it was previously believed that children with ADHD would outgrow their symptoms with the onset of puberty, studies suggest that the majority continue to display these symptoms throughout adolescence (Barkley,
Anastopoulos, Guevremont, & Fletcher, 1991; Barkley, Fischer, Edelbrock, & Smallish, 1990; Biederman, Faraone, Milberger, Curtis, et al., 1996). As indicated in Tanya’s case, adolescents with ADHD typically have a history of academic and social problems, and females more often than males are likely to suffer from ADHD, predominately inattentive type. Faraone, Biederman, and Monuteaux (2002) recently compared ADHD symptoms in children and adolescents and concluded “the presentation of a clinically referred ADHD syndrome does not vary dramatically between children and adolescents” (p. 10). However, the manner in which ADHD symptoms are expressed during adolescence compared to childhood appears to change. For example, according to *DSM-IV-TR* (2000) criteria as well as research studies, hyperactivity symptoms tend to decrease in adolescence; however, feelings of internal restlessness may increase (American Psychiatric Association, 2000; Hart, Lahey, Loeber, Applegate, & Frick, 1995; Iwaszuk et al., 1997; Weyandt et al., 2003). In most cases, attention and impulsivity problems persist throughout adolescence, and adolescents with ADHD are at greater risk for social, behavioral, and academic problems. For example, research by Biederman, Faraone, Milberger, Guite, et al. (1996) and others has found that nearly 45% of adolescents with ADHD also have conduct disorder and/or oppositional defiant disorder and engage in deviant behaviors such as stealing and fire setting. In addition, Faraone, Biederman, and Monuteaux (2002) reported that 59% of a sample of adolescents with ADHD had coexisting anxiety disorders, 30% major depression, and 21% suffered from bipolar disorder.

In 1993, Barkley, Guevremont, Anastopolous, DuPaul, and Shelton found that adolescents with ADHD were significantly more likely to be involved in automobile accidents and receive more speeding ticket violations than adolescents without ADHD. In 2002, Barkley, Murphy, DuPaul, and Bush took a more in-depth look at driving knowledge, performance, and accidents in a group of adolescents and young adults with ADHD compared to a group of control subjects from the community. Results indicated that the ADHD group reported more traffic citations for speeding, crashes, and license suspensions. The ADHD group also achieved lower scores on a test of driving decision making and rules compared to the community control group.

With regard to substance use, a number of studies have reported adolescents with ADHD are at greater risk for substance use and abuse including cigarettes, alcohol, and drugs such as marijuana (Barkley, Fischer, Edelbrock, & Smallish, 1990; Chilcoat & Breslau, 1999; Loney, Kramer, & Milich, 1981; Tercyak, Lerman, & Audrain, 2002). In substance abuse treatment settings, it has been estimated that 30% to 50% of adolescents have ADHD (Gordon, Tulak, & Troncale, 2004). Research indicates that severity of ADHD symptoms and presence of conduct and antisocial behavior increases the likelihood that adolescents with ADHD will use and abuse substances (Molina & Pelham, 2003).

Because of this increased risk of substance use and the use of stimulants in the treatment of ADHD, many have questioned whether the use of stimulants in childhood increases the risk of drug use in adolescence (i.e., gateway drug). In this regard studies have produced interesting findings. For example, Barkley, Fischer, Smallish, and Fletcher (2003) studied 147 children with ADHD for 13 years and asked about their use of various drugs during adolescence and young adulthood. Results revealed that children treated with stimulants during...
childhood had no greater risk of trying drugs by adolescence and no greater fre­
quency of drug use during adulthood than those not treated with stimulants. Biederman, Wilins, Mick, et al. (1999) reported an 85% reduction risk for Sub­
stance Abuse Disorder in adolescents with ADHD who had been treated with
stimulants compared to those who had not been treated. Recently, Wilens, Faraone, Biederman, and Gunawardene (2003) conducted a meta-analysis of
studies that investigated the relationship between use of stimulants to treat
ADHD in childhood and later substance abuse. Results revealed a 1.9-fold re­
duced risk of Substance Abuse Disorder in youths who were treated with stimu­
lants earlier in life compared to those with ADHD who did not receive such
treatment.

Academically, adolescents with ADHD are more likely to be underachievers,
retained in one or more grades, or suspended or expelled from school and are at
greater risk for dropping out of school. Adolescents with ADHD who are not
aggressive or defiant and come from families where there is stability, greater
marital satisfaction, and good parenting skills, tend to have fewer social, aca­
demic, and behavior problems in adolescence (Fischer, Barkley, Fletcher, &
Smallish, 1993). Research clearly indicates that adolescents with ADHD who
also have conduct disorder are at significantly greater risk for maladjustment
and antisocial behavior as well as poor academic performance (Jensen et al.,
cents: Diagnosis and Treatment for more information about teenagers with
ADHD.)

Adulthood

Information concerning the prevalence of ADHD in the adult population is lim­
ited relative to what is known about the prevalence of ADHD in children. As
mentioned previously, it was commonly believed that children with ADHD
would outgrow the symptoms by adolescence. Based on well-designed follow­
up studies, it is now clear that the majority (70% to 85%) of children with
ADHD are likely to continue to display ADHD symptoms throughout adoles­
cence (e.g., Barkley, Fischer, Edelbrock, & Smallish, 1990; Biederman, Faraone,
Milberger, Guite, et al., 1996). Fewer follow-up studies have been conducted
with adults, and of those that have been conducted, findings have been variable
with some studies reporting only 6% of cases persist into adulthood, while
other studies have reported that the majority of cases persist into adulthood
(e.g., Barkley, Fischer, Smallish, & Fletcher, 2002; Wilens, Biederman, &
Spencer, 2002). Factors that appear to predict whether ADHD persists into
adulthood include severity of ADHD in childhood and treatment and interven­
tions during childhood, as well as family history of ADHD, co-existing psychi­
atric problems, and psychosocial adversity (Biederman, 2005; Kessler et al.,
2005). If ADHD is a biologically based disorder, it is unclear why ADHD does
not persist into adulthood in all cases. There are several plausible explanations
for these findings including (a) the diagnosis was invalid, (b) a lack of age ap­
propriate diagnostic criteria, (c) the symptoms remit over time, (d) assessment
and diagnostic criteria differ among studies, and (e) early interventions help to
ameliorate the condition by enhancing coping skills and/or altering physio­
logic pathways that contributed to the expression of the initial symptoms.
In contrast to follow-up studies, studies that assess the prevalence of ADHD symptoms in adults consistently find that a 2% to 4% prevalence rate for all subtypes of ADHD in the adult population (e.g., Heiligenstein, Conyers, Berns, & Smith, 1998; Murphy & Barkley, 1996; Weyandt, Rice, & Linterman, 1995). This percentage is more consistent with DSM-IV-TR (2000) estimates and supports findings from follow-up studies that indicate that the majority of children with ADHD continue to display significant symptoms throughout elementary school and into adolescence (e.g., Lahey, Pelham, Loney, Lee, & Willcutt, 2005; Wilens, Biederman, & Spencer, 2002). Relative to what is known about the cognitive, social, and behavioral functioning of children and adolescents with ADHD, less empirical information is available about the disorder in adults. Adults with ADHD typically report problems with attention, impulsivity, and internal feelings of restlessness (Weiss & Hechtman, 1993). As Mick, Faraone, and Biederman (2004) noted, most adults continue to have substantial ADHD symptoms and high levels of dysfunction across social, behavioral, and occupational areas. Several studies suggest that inattention problems are more persistent in adulthood than impulsivity and hyperactivity, although, as discussed previously in this chapter, this finding may be due in part to a lack of age appropriate diagnostic criteria for adults.

McGough, Smalley, et al. (2005) and Mannuzza, Klein, Bessler, Malloy, and Hynes (1997) found that adults with ADHD completed fewer years of education and had lower ranking occupational positions than adults without ADHD. The most common occupation of the adults with ADHD was skilled labor followed by physical labor. Similar outcome findings have been reported by other studies (e.g., Hechtman, Weiss, Perlman, & Amsel, 1984). In addition to lower educational and occupational status, Howell, Huessy, and Hassuk (1985) found that adults with ADHD had poorer social adjustment and antisocial behavior, as was reported by Mannuzza, Gittelman-Klein, Bessler, Malloy, and LaPadula (1993). More recently, Murphy, Barkley, and Bush (2002) found that adults with ADHD were less likely to have graduated from college, achieved fewer years of formal education, were more likely to have received special education services in high school, reported greater levels of psychological distress, and had a higher rate of drug dependence than young adults without the disorder. A number of studies have reported that ADHD is common among the male prison population, and compared to inmates without the disorder, those with ADHD report more emotional and psychiatric problems (e.g., Eyestone & Howell, 1994; Rasmussen, Almvik, & Levander, 2001; Retz et al., 2004; Rosler et al., 2004).

In terms of substance use and abuse, research indicates that adults with ADHD are at greater risk for substance use and abuse and chemical dependency (Shekim, Asarnow, Hess, Zaucha, & Wheeler, 1990; Wilson & Levin, 2001). Pomerleau and colleagues (2003) reported that cigarette smokers are overrepresented among adults with ADHD, and Coger, Moe, and Serafetinides (1996) suggested that adults with ADHD are more likely to use and become addicted to nicotine as a form of self-medication (i.e., trying to treat their own symptoms of ADHD). According to Carroll and Rounsaville (1993), up to 35% of patients seeking treatment for cocaine dependence have a history of ADHD. Schubiner (2005) recently reported that 20% to 40% of adults with ADHD have a history of Substance Abuse Disorder and 20% to 30% of adults seeking treat-
ment for Substance Abuse Disorder have co-existing ADHD. Wilens (2004) noted that adults with ADHD transition more rapidly to dependence than adults without ADHD, and treatment of substance abuse in adults with ADHD is often more difficult and lasts longer.

Similar to adolescence, comorbidity problems such as low self-esteem, major depression, anxiety disorders, and bipolar disorders have also been found in adults with ADHD (Biederman, Faraone, Milberger, Guite, Mick, et al., 1996; Kennemer & Goldstein, 2005; Nierenberg et al., 2005). McGough, Smalley, et al. (2005) recently found that 87% of adults with ADHD had at least one co-existing disorder and 56% had two or more co-existing disorders (e.g., depression, anxiety, substance use). Other studies have reported that adults with ADHD are more likely to be fired from jobs, have greater difficulty getting along with co-workers, and are more likely to experience relationship and intimacy problems than adults without ADHD (Barkley, 2002). Lomas and Gartside (1997) studied ADHD among homeless veterans and found that an alarming 62% of their sample met clinical criteria for ADHD. Collectively these studies indicate that ADHD can be a life-long condition and adults with ADHD are at risk for occupational, social, and interpersonal problems.

Positive Outcomes. It is important to note that the outcome is not so bleak for all individuals with ADHD. With early identification and treatment, it is possible for individuals with the disorder to lead productive and successful lives. For example, studies suggest that children with ADHD who are medicated during childhood and adolescence are less likely to use substances and engage in deviant behavior than those who are not medicated (Barkley, Fischer, Smallish, & Fletcher, 2003; NIH, 2000). Perwien and colleagues (2004) recently found that children with ADHD treated with medication showed enhanced quality of life based on their ratings on the Child Health Questionnaire, compared to children who received a placebo. Also those with a later onset of symptoms and less severity of symptoms are likely to fair better in adolescence and adulthood (Connor et al., 2003). It is also important to point out that substance use and antisocial behavior are associated with academic and social problems in all students, not just those with ADHD. However, medication and additional interventions such as behavior management, social skills training, and parent training can improve the social and academic difficulties that are characteristic of children and adolescents with ADHD (e.g., Hinshaw et al., 2000). As Spencer (2004) recently noted, ADHD can be effectively treated across the life cycle, and medication can be just as effective with adults with ADHD as it is with children. Hesslinger et al. (2002) found too that a structured skill training program designed specifically for adults with ADHD, resulted in positive outcomes in adults who participated in the program. Also, despite the findings that suggest adults with ADHD are more likely to have employment difficulties, Mannuzza, Gittelman-Klein, Bessler, et al. (1993, 1997) found that most adults with ADHD were employed and were working in manual labor positions such as carpenters, electricians, plumbers, painters, or mechanics. A small percentage had earned a college degree and held professional positions. With regard to job performance, preliminary studies suggest that adults with ADHD are often rated similarly in work adequacy (e.g., Weiss & Hechtman, 1993) although more studies are needed in this area.
Hartmann (1993) and others have even asserted that ADHD symptoms may be advantageous in certain situations (e.g., high-intensity jobs, brainstorming) and were especially useful in the distant past for activities such as hunting and gathering. For example, a recent article by Cohen and Bailer appearing in Fire Chief magazine (1999) suggests that a higher-than-expected percentage of firefighters may have ADHD, yet perform well on the job. Hartmann (1993) claims that adults with ADHD are highly creative, are intrinsically motivated, are insightful, and have a high tolerance for ambiguity. He also argues that the symptoms of individuals with ADHD tend to fit poorly with current cultural and employment expectations such as conformity, passivity, and desk-jobs. Research studies consistently indicate, however, that individuals with ADHD tend to be highly impulsive, be poor planners and problem solvers, and have difficulty sustaining their attention over time. It is difficult to imagine how these qualities would enhance one's hunting or gathering abilities. Linterman and Weyandt (2001) found that adults with ADHD were not superior to adults without ADHD on a computer task designed to measure divided attention skills as Hartmann (1993) may predict. Clearly, scientific studies are needed to determine whether individuals with ADHD are truly drawn to and excel at certain types of jobs as has been touted in the media. Although the idea that some types of employment may be better suited to individuals with ADHD makes intuitive sense, research is needed to properly address this issue.

**College Students With ADHD.** As mentioned previously, high school students with ADHD are at greater risk for dropping out, although some do pursue a college education. For example, Mannuzza et al. (1997) found in their study that 12% of the adults with ADHD had received a bachelor's degree. Although the precise number of college students with ADHD is unknown, it is estimated that ADHD symptoms affect 2% to 4% of the college student population (DuPaul, Schaughency, Weyandt, Tripp, Kiesner, Ota, & Stanish, 2001; Heiligenstein, Conyers, Berns, & Smith, 1998; Weyandt, 1995; Weyandt, Rice, & Linterman, 1995). What is unknown at this time is what percentage of college students actually have ADHD. It has been reported that the number of college students requesting accommodations for ADHD under the Americans with Disabilities Act (ADA) has increased substantially (Wolf, 2001). The actual percentage of college students receiving disability support services for ADHD varies across universities and is likely influenced by factors such as the size of the university and the types of services provided. In general, approximately 25% of students receiving disability support services receive services for ADHD and this percentage has increased substantially since 1975 (Wolf, 2001). To help address this issue, Gordon, Barkley, and Murphy (1997) have prepared documentation guidelines for an ADHD-based accommodations request (see Table 1.3).

**Accommodations for College Students With ADHD.** Accommodations for college students vary across universities but typically include adjustments such as a distraction-free room, increased time for taking exams, altered exam format, note-taking services, recording devices, adaptive technology, and books on tape (Javorsky & Gussin, 1994; Ranseen, 1998; Weyandt & DuPaul, in press). The usefulness of these methods is questionable given that they are mainly based on common sense and not scientific studies. If fact, few scientific studies...
TABLE 1.3 Suggestions for Preparing Documentation Supporting an ADHD-Based Request for Accommodations Under the Americans With Disabilities Act

1. Establish evidence that ADHD-type symptoms arose in childhood.
   a. Indicate you employed DSM-IV criteria retrospectively.
   b. Report approximate age of onset. (Although appearance of symptoms after age 7 is acceptable, there must be some evidence of impairment at least by middle school or early high school. Except in highly unusual circumstances, claims of adult onset are generally unacceptable.)
   c. Provide compelling information beyond the client’s self-report that ADHD symptoms significantly interfered with the individual’s academic and social functioning. If someone experienced serious impairment, there will be a long paper trail of prior referrals, comments on multiple report cards, and past attempts at intervention. In addition to information from parents, you should also attempt to provide corroborating evidence from individuals outside of the family.
   d. Document all prior accommodations and treatments. If there were none, explain why not.

2. Establish evidence that symptoms currently meet DSM-IV criteria in their nature and severity.
   a. Indicate that you employed DSM-IV criteria and report the number of symptoms endorsed for current functioning.
   b. Offer hard evidence (supervisor’s reports, performance reviews, test histories, academic record, statements by disinterested parties, etc.) that the individual suffers significant impairment in comparison to the general population across current educational or occupational settings. Your write-up should be specific about the nature and extent of poor adjustment. Also, keep in mind that problems taking certain kinds of educational tests, like multiple choice formats, are not in themselves sufficient evidence of pervasive impairment.
   c. Remember that the diagnosis of Adult ADHD hinges far more on evidence of childhood history and current impairment than on any particular profile of psychological test scores. While testing may be useful in ruling out alternate explanations for underperformance (particularly insufficient cognitive abilities), it cannot alone justify an ADHD diagnosis. Requests for accommodations based primarily on testing will likely be denied.

3. Establish evidence that current remediation does not lead to sufficient improvement in function.
   a. Provide a history of past treatments and their outcome.
   b. Indicate in which important ways these treatments have not produced relief from symptoms. If current treatments are successful, why are accommodations necessary?

4. Provide a rationale for the kinds of accommodations requested.
   a. Indicate on what basis the accommodations you recommend are sensible. For example, if you suggest additional testing time, explain the scientific basis for this accommodation. You can also provide evidence from your client’s history that certain accommodations have proved successful.

5. If you are not a physician or do not hold a terminal degree in clinical psychology, indicate why you are qualified to render this diagnosis. (Specifically, what training qualifies you to conduct a differential diagnosis of mental illness.)

have been conducted with college students with ADHD, and there is a need for basic research in this area. Questions remain, for example, as to what percentage of college students with ADHD seek accommodations, whether they experience academic, social, or behavioral difficulties; choose certain areas of study more than others; complete a college degree or drop out; develop effective coping strategies; rely on support services; or seek counseling services and so on.

Studies With College Students With ADHD. Compared to other populations with ADHD, a dearth of information exists regarding ADHD in college students. Weyandt and DuPaul (in press) recently reviewed the academic, psychological, and neuropsychological findings with college students with ADHD and concluded, in general, college students with ADHD are at greater risk for academic and psychological difficulties. With regard to neuropsychological functioning, however, college students with ADHD tend to perform similar to their non-ADHD peers on neuropsychological tasks including intelligence tests (e.g., Weyandt, Mitzlaff, & Thomas, 2002; Weyandt, Rice, Linterman, Mitzlaff, & Emert, 1998). Cognitively, studies suggest that these students with ADHD have more intrusive thoughts than college students without ADHD (Shaw & Giambra, 1993), and are internally restless compared to college students without the disorder (Weyandt et al., 2003). Researchers have speculated that college students with ADHD may be physiologically underaroused, have poor inhibitory control, are easily bored and, as a result, they are more susceptible to external as well as internal distractions such as task-unrelated thoughts (Shaw & Giambra, 1993). Hines and Shaw (1993) reported that college students with ADHD are at greater risk for using drugs to escape uncomfortable thoughts.

With regard to emotional expression, Ramirez et al. (1997) found that college students who self-reported ADHD symptoms had higher levels of anger and inappropriate ways of expressing anger compared to college students without significant ADHD symptoms. Weyandt, Rice, Linterman, Mitzlaff, and Emert (1998) found that college students with ADHD reported more adjustment problems than college students without ADHD but did not differ significantly from college students without ADHD on a number of tasks thought to measure attention and impulsivity. Healy (2000) found that college students with ADHD took fewer credits, had lower GPAs, and reported more difficulty paying attention in lecture than college students without the disorder. Healy also found that 88% of the students with ADHD reported significant problems with psychological distress, and these students reported using alcohol significantly more often than students without ADHD. Other studies have also reported that college students with ADHD or ADHD symptomology are more likely to report greater psychological distress compared to students without the disorder (e.g., Heiligenstein & Keeling, 1995; Richards, Deffenbaucher, & Rosen, 2002). Clearly, more research is needed to better understand ADHD in this subpopulation of adults with ADHD. (Table 1.4 summarizes common characteristics of individuals with ADHD.)

Gender Information

According to the American Psychiatric Association (2000) boys are more likely to be diagnosed with ADHD than girls, with ratios ranging from 2:1 to 9:1 depending on the subtype of ADHD. Other studies have provided male–female
TABLE 1.4 Common Characteristics of Individuals With ADHD

<table>
<thead>
<tr>
<th>Early Childhood</th>
<th>Middle Childhood</th>
<th>Adolescence</th>
<th>Adulthood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excessive activity level</td>
<td>Excessive fidgeting</td>
<td>Feelings of restlessness</td>
<td>Feelings of restlessness</td>
</tr>
<tr>
<td>Talking incessantly</td>
<td>Difficulty remaining seated</td>
<td>Difficulty engaging in quiet sedentary activities</td>
<td>Difficulty engaging in quiet sedentary activities</td>
</tr>
<tr>
<td>Difficulty paying attention</td>
<td>Messy and careless work</td>
<td>Forgetful and inattentive</td>
<td>Frequent shifts from one uncompleted activity to another</td>
</tr>
<tr>
<td>Difficulty playing quietly</td>
<td>Failure to follow instructions</td>
<td>Impatience</td>
<td>Frequent interrupting or intruding on others</td>
</tr>
<tr>
<td>Impulsive and easily distracted</td>
<td>Failure to follow through on tasks</td>
<td>Engaging in potentially dangerous activities</td>
<td>Avoidance of tasks that allow for little spontaneous movement</td>
</tr>
<tr>
<td>Academic underachievement</td>
<td>Academic underachievement</td>
<td>Academic underachievement</td>
<td>Relationship difficulties</td>
</tr>
<tr>
<td>Poor social skills</td>
<td>Poor peer relationships</td>
<td>Poor peer relationships</td>
<td>Anger management difficulties</td>
</tr>
</tbody>
</table>

Note: From Weyandt (2001).

ratios of 3:1 in the general population, and 6:1 in children referred to clinics (Gaub & Carlson, 1997). Historically, research has supported that girls with ADHD tend to be less hyperactive, have fewer acting out problems, are less likely to have a learning disability, and are more likely than boys to have ADHD predominately inattentive type (Biederman, Mick, Faraone, Bratton, Doyle, et al., 2002). Boys tend to be more hyperactive, have more acting out and aggression problems, and fewer attention and anxiety problems than girls with ADHD (Levy, Hay, Bennett, & McStephen, 2005; Newcorn et al., 2001). These findings have led some to question whether girls with ADHD represent a “silent minority” that is underidentified and underserved compared to boys with ADHD (Berry, Shaywitz, & Shaywitz, 1985). Recently, however, research by Jo-
Joseph Biederman and colleagues at Massachusetts General Hospital, Boston, found that ADHD combined type was predominant in both boys and girls, and girls had the same relative risk for adverse outcomes as boys with ADHD (e.g., Biederman, Kwon, Aleardi, et al., 2005; Biederman & Faraone, 2004). These results also have been substantiated in Taiwanese children with ADHD (Yang, Jong, Chung, & Chen, 2004). Work by Carlson, Tamm, and Gaub (1997) found it was not uncommon for girls with ADHD to also have coexisting disruptive behavior problems. Seidman and colleagues (2005) noted that boys and girls with ADHD demonstrate more neuropsychological deficits than children without the disorder, however, boys and girls with ADHD perform similar to each other on these neuropsychological tasks. Graetz, Sawyer, and Baghurst (2005) studied more than 2,000 children age 6 to 13 who met DSM-IV-TR criteria for ADHD in Australia and found that boys and girls did not differ on core symptoms, comorbidity, or impairment. Girls, however, did report more somatic complaints than boys. Some support that during adolescence and adulthood, females may be more prone to depression and anxiety disorders, while males may have more difficulty with behavior problems and antisocial behaviors, however this finding is not unique to ADHD but is true of males and females in the general population (Biederman et al., 1993; Gershon, 2002; Rucklidge & Tannock, 2001). In addition, Biederman et al. (2004) recently studied 219 adults with ADHD and concluded that higher rates of depression, anxiety, substance use disorders, and antisocial personality disorders were associated with ADHD in both genders. Learning disabilities (e.g., reading, math) appear to be equally prevalent in males and females with ADHD, although they are more common among males than females in the general population. Recent research has found different patterns of cortical activity in adolescent males and females based on EEG recordings (Hermens, Kohn, Clarke, Gordon, & Williams, 2005) although the clinical relevance of these findings is unclear. What is clear is that ADHD affects both males and females, and children, adolescents, and adults with the disorder are at greater risk for academic, behavior, and interpersonal problems. For more information concerning gender and ADHD, see Gaub and Carlson (1997), Rucklidge and Kaplan (1997), and Gershon (2002).

Legal Issues

Three federal laws pertain to the legal rights of individuals with ADHD: (a) the Individuals with Disabilities Education Act (IDEA, 1990, 1997 amendments, 2004); (b) Section 504 of the Rehabilitation Act (1973); and (c) the Americans with Disabilities Act (ADA, 1990). A summary of the implications of these laws follows; however, for more detailed information concerning these laws and entitlements, see Latham and Latham (1992, 1999), Clay (1998), or www.ed.gov.

IDEA

In 1991, the U.S. government (Department of Education) issued an important document outlining the conditions under which individuals with ADHD are eligible for special services under IDEA and Section 504 (Davila, Williams, & MacDonald, 1991). In summary, the document specifies that public schools are
required to provide a free and appropriate education for all children with disabilities (IDEA). Children with ADHD may be eligible for special services under IDEA based on three categories: (a) specific learning disability, (b) serious emotional disturbance, and (c) other health impaired. To qualify for one of these categories, school systems are required to follow federal evaluation guidelines, describe the disability, explain how the disability adversely affects educational performance, develop an individualized educational plan (IEP), and explain how the goals and objectives of the IEP will be achieved and measured. More specifically, to qualify for special services under “specific learning disability” or “serious emotional disturbance,” students with ADHD must meet the federal and state criteria for these handicapping conditions (i.e., they must have a co-existing learning disability or emotional impairment). To qualify for special services under “other health impaired,” IDEA requires that children suffer from chronic or acute impairments that result in limited alertness, which adversely affects educational performance. Given that ADHD is considered a chronic disorder, many individuals could be considered eligible for special services under “other health impaired,” provided that the disorder causes impairment in the child’s educational performance. School systems that follow federal guidelines for evaluation and classification of disabilities receive federal funds to support the special education programs that service these students. According to attorneys Latham and Latham (1999), the number of children who request services under IDEA has grown dramatically. The authors also report that the specific learning disabilities category is the largest category serviced under IDEA; however, the “other health impaired” category is the fastest growing category. On December 3, 2004 President Bush signed into law new IDEA reforms, under the Individuals with Disabilities Improvement Act, now known as Public Law Number 108-446 (IDEA, 2004). Under the new IDEA ADHD is not listed as a separate disability however students will continue to qualify for special educational services under other disabilities as long as the need for services is warranted and impairment is documented according to federal and state guidelines.

Section 504

Unlike IDEA, which outlines disability categories, Section 504 of the Rehabilitation Act defines a disability as a “physical or mental impairment” that limits one or more major life activities (i.e., academic performance) and is not accompanied by federal funding. Section 504 clearly indicates that students with ADHD qualify for a free and appropriate education, which may or may not require special educational services, provided that the disorder interferes significantly with the student’s learning. According to this law, schools are required to conduct a multidisciplinary evaluation of students with a suspected disability, including ADHD, and to create a plan and accommodations to address the student’s needs. As much as possible, schools are encouraged to provide accommodations in regular education classrooms.

According to research by Reid, Maag, Vasa, and Wright (1994) from the University of Nebraska–Lincoln, approximately 50% of students with ADHD receive special education services, and most do not receive services under health impaired (i.e., behavior disordered, learning disabled). The most com-
mon type of special education placement for these students is the general education classroom plus resource support. An IDEA/504 flowchart is depicted in Figure 1.1.

**IDEA/504 Flow Chart**

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**FIGURE 1.1. IDEA/504 Flow Chart.**

ADA

It is important to note that the protections of 504 extend to private schools, but religious schools are exempt from the requirements. At the postsecondary level and in the workplace, individuals with ADHD are protected from discrimination and are entitled to educational or occupational accommodations under the Americans with Disabilities Act (ADA). The ADA (1990) was designed to prevent discrimination against individuals with mental, physical, or learning disabilities. To be eligible for coverage under ADA, individuals with ADHD must inform the proper authority of his or her disability. (For a review of the issues relating to accommodation requests by adults with ADHD, see Gordon, Barkley, & Murphy, 1997; Latham & Latham, 2002; and Dr. John Ranseen’s 1998 article, “Lawyers with ADHD: The special test accommodation controversy.”)

Summary

ADHD is a lifelong disorder characterized by problems with attention, impulsivity, and hyperactivity. It is estimated to affect 3% to 7% of the childhood population, and similar percentages are found in other countries. ADHD can be a debilitating disorder that impacts an individual’s academic, social, and occupational life. It is diagnosed more frequently in males than females, and both sexes are at increased risk for interpersonal and psychiatric problems such as depression, anxiety, and substance use disorders. Relative to what is known about ADHD in children, less information is available concerning ADHD in adolescents and adults. Many students with ADHD require special educational services, and early identification and intervention help these individuals attain a more positive outcome. Despite decades of research, critics continue to question the validity of the disorder. Recent advances in technology are helping researchers to better understand the physiological underpinnings of the disorder, which may ultimately help to identify the cause(s) of ADHD. Chapter 2 discusses theories and research concerning the etiology of ADHD.

TEST YOUR KNOWLEDGE ABOUT ADHD

To help assess your knowledge about ADHD, answer True (T) or False (F) to each of the following questions. It may be useful for you to answer the questions before reading this book and again when you have completed the book. You may also wish to photocopy the quiz and encourage colleagues, family members, students, or individuals with ADHD to take the quiz to help them learn more about ADHD.

1. T or F Females are diagnosed with ADHD more frequently than males.
2. T or F Stimulants have been found to improve ADHD symptoms in children, adolescents, and adults.
3. T or F ADHD is present in other cultures.
4. T or F ADHD is synonymous with learning disability.
5. T or F ADHD is caused by diets rich in food additives and sugar.
6. T or F Most individuals with ADHD are of gifted intelligence.
7. T or F Children with ADHD usually outgrow the disorder by adolescence or early adulthood.
8. T or F According to DSM-IV-TR criteria, all individuals with ADHD have problems with attention, impulsivity, and hyperactivity.
9. T or F Individuals with ADHD often have coexisting learning disabilities.
10. T or F According to DSM-IV-TR criteria, all individuals with ADHD have problems with attention, impulsivity, and hyperactivity.
11. T or F ADHD is caused by poor parenting.
12. T or F Children with ADHD perform best on assignments that are highly detailed and complex.
13. T or F Peer tutoring can improve academic productivity and decrease off-task behavior of children with ADHD.
14. T or F Stimulants have the opposite effect on individuals with ADHD compared to their effect on people without ADHD.
15. T or F ADHD is caused by an imbalance of neurotransmitters in the brain.
16. T or F Most individuals with ADHD are highly creative.
17. T or F Children with ADHD are automatically eligible for special educational services.
18. T or F Ritalin is overprescribed by physicians on a nationwide level.
19. T or F Increasing numbers of college students are requesting special services based on an ADHD diagnosis.
20. T or F Individuals with ADHD can lead successful and productive lives.

Answers: 1(F), 2(T), 3(T), 4(F), 5(F), 6(F), 7(F), 8(F), 9(T), 10(T), 11(F), 12(F), 13(T), 14(F), 15(F), 16(F), 17(F), 18(F), 19(T), 20(T)

Note: From Weyandt (2001).
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