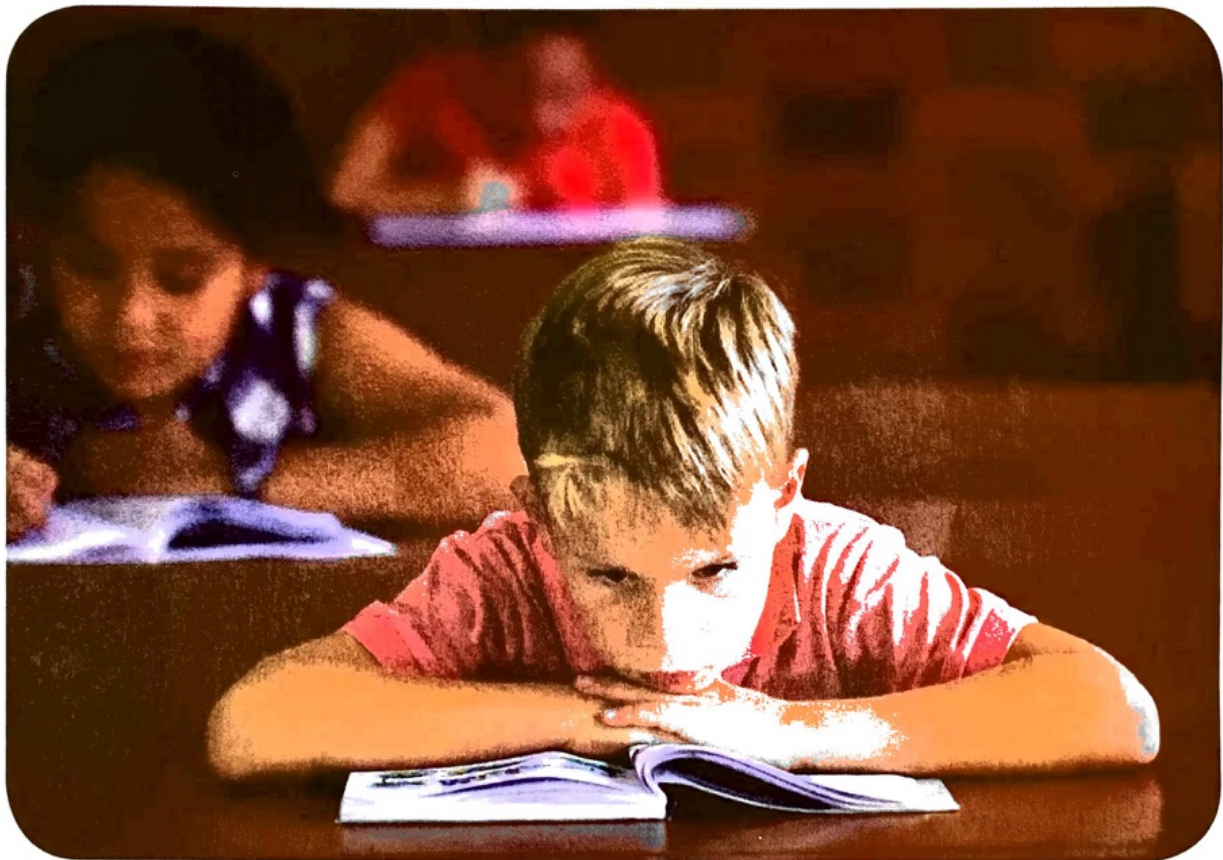


chapter seven

LEARNERS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER



PeopleImages/Digitalvision/Getty Images

LEARNING OUTCOMES

Learning Outcome 7.1: Learn the history of, the clinical definition of, and the prevalence of attention deficit hyperactivity disorder.

Learning Outcome 7.2: Understand how attention deficit hyperactivity disorder is identified and the causes of attention deficit hyperactivity disorder.

Learning Outcome 7.3: Learn about the psychological and behavioral characteristics of learners with attention deficit hyperactivity disorder.

Learning Outcome 7.4: Understand educational and medication considerations for people with attention deficit hyperactivity disorder and how professionals assess progress to help plan educational strategies.

Learning Outcome 7.5: Learn about issues that should be considered with respect to early intervention and transition to adulthood for individuals with attention deficit hyperactivity disorder.

MISCONCEPTIONS ABOUT

Learners with Attention Deficit Hyperactivity Disorder

- MYTH** All children with ADHD are hyperactive.
- FACT** Psychiatric classification of ADHD attempts to account for the fact that some persons display only inattention, or only hyperactivity/impulsivity, or both.
- MYTH** The primary symptom of ADHD is inattention.
- FACT** Recent conceptualizations of ADHD place problems with executive functioning and behavioral inhibition as the primary behavioral problems of ADHD.
- MYTH** ADHD is a fad, a trendy diagnosis of recent times in the United States with little research to support its existence.
- FACT** Literature indicates that physicians recognized the existence of attention problems and hyperactivity in the 18th, mid-19th, and early 20th centuries. Serious scientific study of attention problems began in the early and mid-20th century. A firmly established research base now supports its existence. And the prevalence of ADHD in several other countries is at least as high as it is in the United States.
- MYTH** ADHD is primarily the result of minimal brain injury.
- FACT** In most cases of ADHD, no evidence of actual damage to the brain exists. Most authorities believe that ADHD is the result of neurological dysfunction, which is often linked to hereditary factors.
- MYTH** African American children are more frequently identified as having ADHD than White children.
- FACT** National surveys indicate that the rate of identification of African American children and White children is the same. However, Latino/Hispanic children are less likely to be identified as having ADHD than African American and White children.
- MYTH** The social problems of students with ADHD are due to their not knowing how to interact socially.
- FACT** Most people with ADHD know how to interact, but their problems with behavioral inhibition make it difficult for them to implement socially appropriate behaviors.
- MYTH** Using psychostimulants, such as Ritalin, can easily turn children into abusers of other substances, such as cocaine and marijuana.
- FACT** No evidence shows that using psychostimulants for ADHD leads directly to drug abuse. In fact, evidence shows that those who are prescribed Ritalin as children are less likely to turn to illicit drugs as teenagers. However, care should be taken to make sure that children or others do not misuse the psychostimulants prescribed for them.
- MYTH** Because students with ADHD react strongly to stimulation, their learning environments should be highly unstructured in order to take advantage of their natural learning styles.
- FACT** Most authorities recommend a highly structured classroom for students with ADHD, especially in the early stages of instruction.

GUIDING QUESTIONS

- What are the historical origins of attention deficit hyperactivity disorder (ADHD)?
- What is the current definition of ADHD?
- What is the prevalence of ADHD?
- What methods of assessment do professionals use to identify individuals with ADHD?
- What causes ADHD?
- What are some of the psychological and behavioral characteristics of learners with ADHD?
- What are some educational considerations for learners with ADHD?
- What are some medication considerations for learners with ADHD?
- How do professionals assess the academic, attention, and behavioral progress of students with ADHD?
- What are some important considerations with respect to early intervention for learners with ADHD?
- What are some important considerations with respect to transition to adulthood for learners with ADHD?

Fidgety Phil, the character in the poem (https://www.youtube.com/watch?v=LqmGK_NwGH4&list=RDLqmGK_NwGH4) by the German physician Heinrich Hoffmann (1865) is generally considered one of the first allusions in Western literature to what today is referred to as attention deficit hyperactivity disorder (ADHD) (Barkley, 2006c). Phil's lack of impulse control bears an uncanny similarity to today's conceptualization of ADHD as less a matter of inattention than a matter of regulating one's behavior. We discuss this conceptualization more fully later, but it's also important to point out here that Phil's excessive motor activity, or hyperactivity, may be characteristic of many children with ADHD but not all. Interestingly, Hoffmann also wrote another poem, "The Story of Johnny Head-in-Air," (http://www.youtube.com/watch?v=K_Qae-OE3f10) about a child who closely resembles children with ADHD who do not have problems with hyperactivity.

In addition to Hoffman's "poetic case studies," three early and scientifically oriented references to attention disorders are of interest; two pre-date Hoffmann, and one follows by about 40 years.

BRIEF HISTORY

The fact that there's a substantial history to the recognition of attention deficits is important. Today, ADHD is often the subject of criticism, being referred to as a phantom or bogus condition—sort of a fashionable, trendy diagnosis for people who are basically lazy and unmotivated. Although undoubtedly a few people hide behind an inappropriate diagnosis of ADHD, evidence indicates that the condition is extremely real for those who have it. And, as we point out in the next section, ADHD is not a recently "discovered," trendy diagnosis. An example of how ADHD is considered trendy is the following parody of "The Twilight Saga": <http://www.youtube.com/watch?v=kuphC8lVa4A>.

Dr. Melchior Adam Weikard's Textbook, "Der Philosophische Arzt"

The individual who is currently credited as the first to address the issue of attention deficits in the scientific literature is Dr. Melchior Weikard, a highly respected German physician, who served in numerous prestigious government positions, such as the court

physician to an Empress, and the physician to a Prince-Bishop and a Tsar (Barkley & Peters, 2012). In his textbook published in 1775 (Weikard, 1775), he devoted a chapter to “Lack of Attention,” in which he described the inattentive person as having deficits in concentration, being distracted by “every humming fly, every shadow, every sound, the memory of old stories [drawing] him off task to other imaginations. . . . [hearing] only half of everything. . . . (Barkley & Peters, 2012, p. 5).

Sir Alexander Crichton’s Treatise “On Attention and Its Diseases”

About 20 years later, the treatise by the Scottish-born physician, Sir Alexander Crichton (1798), garnered even more attention than Weikard’s publication (Palmer & Finger, 2001). Many of Crichton’s notions regarding attention deficits are consistent with today’s ideas. He noted that the ability to attend was not automatic but required active effort. And he theorized that a person could be born with attention disorders or could acquire them through diseases affecting the brain.

Dr. George F. Still’s Children with “Defective Moral Control”

Writing much later than Crichton but more than a century ago, Dr. George F. Still, a physician, provided an even more scientific account to the medical profession of what we now call ADHD. Still delivered three lectures to the Royal College of Physicians of London in 1902 in which he described cases of children who displayed spitefulness, cruelty, disobedience, impulsivity, and problems of attention and hyperactivity. He referred to them as having “defective moral control” (Still, 1902, p. 1008). In the language of his day, Still was essentially saying that these children lacked the ability to inhibit or refrain from engaging impulsively in inappropriate behavior. (See Figure 7.1.)

Although Still’s words are more than a century old, they continue to have relevance; one of the most influential current psychological theories is based on the notion that an essential impairment in ADHD is a deficit involving behavioral inhibition (Barkley, 1997, 2000a, 2000b, 2006e). Still’s cases were also similar to discussions of today’s population of persons with ADHD in at least five ways:

1. Still speculated that many of these children had mild brain pathology.
2. Many of the children had normal intelligence.
3. The condition was more prevalent in males than females.
4. There was evidence that the condition had a hereditary basis.
5. Many of the children and their relatives also had other physical or psychological problems, such as depression and tics.

We return later to Barkley’s theory and to these five points. Suffice it to say here that Still’s children with “defective moral control” today would very likely be diagnosed as having ADHD by itself or ADHD with **conduct disorder**, which is characterized by a pattern of aggressive, disruptive behavior (see Chapter 8).

Kurt Goldstein’s Brain-Injured Soldiers of World War I

Kurt Goldstein reported on the psychological effects of brain injury in soldiers who had suffered head wounds in combat in World War I. Among other things, he observed in his patients the psychological characteristics of disorganized behavior, hyperactivity, **perseveration**, and a “forced responsiveness to stimuli” (1936, 1939). Perseveration, the tendency to repeatedly engage in the same behaviors, is often cited by clinicians as a characteristic of persons with ADHD. And their forced responsiveness to stimuli is akin to distractibility.

The Strauss Syndrome

Goldstein’s work laid the foundation for the investigations of Heinz Werner and Alfred Strauss in the 1930s and 1940s (e.g., Werner & Strauss, 1939, 1941). Having emigrated from Germany to the United States after Hitler’s rise to power, Werner and Strauss teamed

FIGURE 7.1

A REPRODUCTION OF DR. GEORGE STILL'S OPENING REMARKS FOR HIS CLASSIC LECTURES ON CHILDREN WITH "DEFECTIVE MORAL CONTROL."

1008 THE LANCET,] DR. G. F. STILL: ABNORMAL PSY

The Goulstonian Lectures

ON

SOME ABNORMAL PSYCHICAL CONDITIONS
IN CHILDREN.

*Delivered before the Royal College of Physicians of
London on March 4th, 6th, and 11th, 1902,*

BY GEORGE F. STILL, M.A., M.D. CANTAB.,
F.R.C.P. LOND.,

ASSISTANT PHYSICIAN FOR DISEASES OF CHILDREN, KING'S
COLLEGE HOSPITAL; ASSISTANT PHYSICIAN TO THE
HOSPITAL FOR SICK CHILDREN, GREAT
ORMOND-STREET.

LECTURE I.

Delivered on March 4th.

MR. PRESIDENT AND GENTLEMEN,—The particular psychical conditions with which I propose to deal in these lectures are those which are concerned with an abnormal defect of moral control in children. Interesting as these disorders may be as an abstruse problem for the professed psychologist to puzzle over, they have a very real practical—shall I say social?—importance which I venture to think has been hardly sufficiently recognised. For some years past I have been collecting observations with a view to investigating the occurrence of defective moral control as a morbid condition in children, a subject which I cannot but think calls urgently for scientific investigation. It has long

Source: Still, G. F. (1902). Some abnormal psychical conditions in children. *The Lancet*, 1, 1008–1012. From the National Institute of Mental Health.

up to try to replicate Goldstein's findings. They noted the same behaviors of distractibility and hyperactivity in some children with mental retardation (intellectual disabilities).

In addition to clinical observations, Werner and Strauss used an experimental task consisting of figure/background slides that were presented at very brief exposure times. The slides depicted figures (e.g., a hat) embedded in a background (e.g., wavy lines). Werner and Strauss found that, when asked what they saw, the children with supposed brain damage were more likely than those without brain damage to say that they had seen the background (e.g., "wavy lines") rather than the figure (e.g., "a hat") (Strauss & Werner, 1942; Werner & Strauss, 1939, 1941). After these studies, professionals came to refer to children who were apparently hyperactive and distractible as exhibiting the **Strauss syndrome**.

William Cruickshank's Work

William Cruickshank and colleagues, using Werner and Strauss's figure/background task, found that children with cerebral palsy were also more likely to respond to the background than to the figure (Cruickshank, Bice, & Wallen, 1957). This research extended the work of Werner and Strauss in two important ways. First, whereas Werner and Strauss had largely assumed that the children they studied were brain damaged, the children Cruickshank studied all had **cerebral palsy**, a condition that's relatively easy to diagnose. Cerebral palsy is characterized by brain damage that results in impairments in movement (see Chapter 14). Second, the children Cruickshank studied were largely of normal intelligence, thus demonstrating that children without intellectual disabilities



MyLab Education Video Example 7.1

In the 1950s, William Cruickshank recommended that students with attention problems do their seatwork in 3-sided cubicles. Today, authorities still uphold his basic educational principle of reducing environmental distractions.

could display distractibility. Cruickshank was also one of the first to establish an educational program for children who today would meet the criteria for ADHD. At the time (the late 1950s), however, many of these children were referred to as “minimally brain injured.” An important element of Cruickshank’s program, which has stood the test of time, is to provide classroom structure and to minimize distractions.

Minimal Brain Injury and Hyperactive Child Syndrome

At about the same time as Cruickshank’s extension of Werner and Strauss’s work with children of normal intelligence, the results of a now classic study were published (Pasanick, Lilienfeld, & Rogers, 1956). This study of the aftereffects of birth complications revived Still’s (1902) notion that subtle brain pathology could result in behavior problems, such as hyperactivity and distractibility. Professionals began to apply the label of **minimal brain injury** to children of normal intelligence who were inattentive, impulsive, and/or hyperactive. Although popular in the 1950s and 1960s, the “minimal brain injury” label fell out of favor as professionals pointed out that it was difficult to document actual tissue damage to the brain (Birch, 1964).

“Minimal brain injury” was replaced in the 1960s by the label “hyperactive child syndrome” (Barkley, 2006c). **Hyperactive child syndrome** was preferred because it was descriptive of behavior and didn’t rely on vague and unreliable diagnoses of subtle brain damage. This label’s popularity extended into the 1970s. By the 1980s, however, it too had fallen out of favor as research began to point to inattention, not hyperactivity, as a major behavioral problem experienced by these children. In fact, some children exhibited attention problems without excessive movement.

This recognition of inattention as more important than hyperactivity is reflected in the current definition of ADHD and its immediate predecessors. However, as we discuss later, some authorities are now recommending that deficits in behavioral inhibition replace inattention as the primary deficit in ADHD. In any case, most authorities do not view hyperactivity as the primary deficit in ADHD.

DEFINITION

Most professionals rely on the American Psychiatric Association’s (APA’s) *Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5)* criteria to determine whether an individual has ADHD (American Psychiatric Association, 2013). The *DSM-5* recognizes three subtypes of ADHD: (1) ADHD, Predominantly Inattentive Type; (2) ADHD, Predominantly Hyperactive-Impulsive Type; and (3) ADHD, Combined Type. Examples of criteria used to determine these subtypes include: (1) for inattention: trouble paying attention to details, difficulty sustaining attention, problems with organization, distractible; (2) for hyperactivity: fidgeting, leaving seat at inappropriate times, talking excessively; (3) for impulsivity: problems awaiting one’s turn, interrupting others.

ADHD is widely recognized as one of the most frequent reasons, if not the most frequent reason, children with behavioral problems are referred to guidance clinics. The Centers for Disease Control and Prevention (CDCP) reports that between 7% and 9% of the school-age population has ADHD (CDCP, 2010). However, because the U.S. Department of Education does not recognize ADHD as a separate category of special education, it’s difficult to estimate how many students with ADHD are served in special education. When the federal government began tracking the prevalence of students in all the major special education categories in the mid-1970s, ADHD was not included. This was due in part to two interrelated factors: (1) the research on this condition was still in its infancy, and (2) the advocacy base for children with ADHD was not yet well developed. In the early 1990s, advocacy groups lobbied for the inclusion of ADHD in these counts, but the U.S. Department of Education did not agree to add ADHD as a separate category. However, in 1991, it did determine that students with ADHD would be eligible for special education under the category “other health impaired” (OHI) “in instances where the ADD is a chronic or acute health problem that results in limited alertness,

which adversely affects educational performance.” Students with ADHD can also qualify for accommodations under another law: Section 504 of the Rehabilitation Act of 1973.

The growth of the OHI category since 1991 suggests that more and more students with ADHD are being identified as OHI. For example, since the mid-1990s the prevalence of students aged 6 to 17 years in the OHI category has quadrupled. However, the most recent published count of 1.07% for 2007–2008 (IDEA Data Tables, 2013) is still well below the prevalence estimates of 7% to 9% by the Centers for Disease Control and Prevention (CDCP, 2010). Many authorities think that fewer than half of students with ADHD who need special education services are receiving them.

ADHD occurs much more frequently in boys than in girls, with estimates of at least 2 to 1 (CDCP, 2010). Some have speculated that boys are identified more often than girls because boys tend to exhibit the highly noticeable hyperactive or impulsive type of ADHD, whereas girls are more likely to exhibit the inattentive type. Some gender bias in referral may exist, but our best research evidence suggests that it’s not enough to account for the wide disparity in prevalence rates between boys and girls. Gender differences are likely due to constitutional, or biological, differences.

Some critics have asserted that ADHD is primarily a U.S. phenomenon, a result of our society’s emphasis on achievement and conformity. However, statistics do not bear this out. Although it’s difficult to compare prevalence rates cross-culturally because of differing diagnostic criteria, sampling techniques, and cultural expectations, the evidence strongly suggests that prevalence rates at least as high as those in the United States are found in several other countries. For example, a survey of the worldwide prevalence of ADHD that included Africa, the Middle East, Oceania, South America, Asia, North America, and Europe, indicated a worldwide prevalence of 3.4% to 5.29% (Polanczyk, Salum, Sugaya, & Rohde, 2015; Polanczyk, Silva de Lima, Horta, Biederman, & Rohde, 2007). Actually, some of the highest rates are for South America, Africa, China—6.26% (Wang et al., 2017) and Qatar—8.3% (Bradshaw & Kamal, 2017), not North America. Furthermore, research on the behavioral characteristics of persons identified as having ADHD in different countries indicates that they share the same core symptoms, which argues against ADHD being determined by cultural factors (Bauermeister, Canino, Polanczyk, & Rohde, 2010).

Some critics have also claimed that African American children, especially boys, are diagnosed disproportionately as having ADHD. However, research suggests that the rates of African American children identified as having ADHD are similar to those of White children (CDCP, 2010; Rowland et al., 2001). In fact, the CDCP (2010) found the only ethnic difference in rates is that Hispanic/Latino children are diagnosed with ADHD less frequently than other ethnicities.

MyLab Education Self-Check 7.1

MyLab Education Application Exercise 7.1: Types of ADHD

Read a case study about encouraging appropriate behaviors and answer the questions that follow.

MyLab Education Application Exercise 7.2: Interpreting Data

Consider data about students with ADHD who qualify for special education services and why the U.S. Department of Education determined they could be eligible under the category.

IDENTIFICATION

Findings like the preceding show that teachers and other professionals may not always be accurate in their ratings of attention and hyperactivity. Authorities therefore stress the importance of using several sources of information before arriving at a determination that an individual has ADHD. Most agree that there are four important components to assessing whether a student has ADHD: a medical examination, a clinical interview, teacher and parent rating scales, and behavioral observations. The medical examination is necessary

to rule out medical conditions such as brain tumors, thyroid problems, or seizure disorders as the cause of the inattention and/or hyperactivity (Barkley & Edwards, 2006).

The clinical interview of the parent(s) and the child provides information about the child's physical and psychological characteristics, as well as family dynamics and interaction with peers. Although the interview is essential to the diagnosis of ADHD, clinicians need to recognize the subjective nature of the interview situation. Some children with ADHD can look surprisingly "normal" in their behavior when in the structured and novel setting of a doctor's office.

In an attempt to bring some quantification to the identification process, researchers have developed rating scales to be filled out by teachers, parents, and, in some cases, the child. Raters are asked such things as how often (never or rarely, sometimes, often, very often) the individual doesn't pay attention to details, is easily distracted, interrupts others, fidgets, and so forth. Whenever possible, the clinician should observe the student. This can be done in the classroom; clinicians who specialize in diagnosing and treating children with ADHD sometimes have specially designed observation rooms in which they can observe the child performing tasks that require sustained attention.

CAUSES

Probably because no simple diagnostic test, such as a blood test, is available for ADHD, much controversy has prevailed over what actually causes ADHD, as there have been numerous questionable causal theories put forth over the last century. (See the accompanying Focus on Concepts box, "Controversial Causal Theories of ADHD.") We now know, however, that strong evidence links neurological abnormalities to ADHD.

As we noted earlier, authorities in the early and middle parts of the 20th century attributed problems of inattention and hyperactivity to neurological problems resulting from brain damage. When researchers were unable to verify actual tissue damage in cases of ADHD, many professionals soured on the idea that ADHD was neurologically based. However, as we noted in our discussion of learning disabilities in Chapter 6, the development of neuroimaging techniques such as magnetic resonance imaging (MRI), positron emission tomography (PET) scans, and functional magnetic resonance imaging (fMRI) in the 1980s and 1990s allowed scientists for the first time to obtain more detailed and reliable measures of brain functioning. Using these techniques, researchers have made great strides in documenting the neurological basis of ADHD. As is the case with learning disabilities, research indicates that ADHD most likely results from neurological dysfunction rather than from actual brain damage. Evidence also points to heredity as playing a very strong role in causing the neurological dysfunction, with teratogenic and other medical factors also implicated to a lesser degree.

Areas of the Brain Affected: Frontal Lobes, Basal Ganglia, Cerebellum

Using neuroimaging techniques, several teams of researchers have found relatively consistent abnormalities in several areas of the brain in people with ADHD, most notably the frontal lobes, basal ganglia, and cerebellum (Frodl & Skokauskas, 2012; Hart, Radua, Nakao, Mataix-Cols, & Rubia, 2013).

PREFRONTAL, FRONTAL LOBES Located in the front of the brain, the **frontal lobes**—and especially the very front portion of the frontal lobes, the **prefrontal lobes**—are responsible for *executive functions*. Among other things, executive functions involve the ability to regulate one's own behavior. (We discuss executive functions more fully later.)

BASAL GANGLIA Buried deep within the brain, the **basal ganglia** are responsible for the coordination and control of motor behavior (Pinel, 2006).

CEREBELLUM The **cerebellum** is also responsible for the coordination and control of motor behavior. Although it's relatively small, constituting only about 10% of the mass of the brain, the fact that it contains more than half of all the brain's neurons attests to its complexity (Pinel, 2006).

FOCUS ON

Controversial Causal Theories of ADHD

Over the years, a number of myths have sprung up about what causes hyperactive behavior or ADHD. Most of these have little if any substantial scientific support. A good example is the purported influence of television and video games. Many people in the general public believe that by watching too much television or playing too many video games, children will acquire ADHD. One study did find that children who watch more television as preschoolers are rated as more inattentive at 7 years of age (Christakis, Zimmerman, DiGiuseppe, & McCarty, 2004). However, this isn't proof that watching television causes ADHD or even provokes higher rates of inattention. Attention problems, themselves, might cause children to want to watch more television. Or parents might find that one way to control their child's hyperactive behavior, at least for a short period of time, is to put them in front of a computer. Or parents who let their children watch more television may contribute in some other ways to their children's inattentive behavior. Perhaps they provide less supervision generally.

Another example of a controversial causal theory involves diet. In particular, sugar and food additives and artificial flavorings have been targeted as potential causes of ADHD. Parents and teachers have often complained that young children become more hyperactive when they ingest sugar in the form of soft drinks, cakes, and candies. However, careful research has demonstrated that this is *by and large* not the case (Millichap & Yee, 2012; Wolraich, Wilson, & White, 1995). One needs to consider that sugar often accompanies situations, such as parties, which are often stimulating and unstructured. This probably contributes to the popular notion that sweets cause hyperactivity.

Other environmental agents that some believe cause ADHD are artificial food colorings and additives. The original proponent of this theory was Benjamin Feingold, a pediatric allergist (Feingold, 1975) who proposed a strict diet devoid of these additives. Although substantial research has shown that this diet is not beneficial for *all* children with ADHD, there are studies providing suggestive data that there may be very small subgroups who have food allergies to such things as food colorings and additives (Bateman et al., 2004; Millichap & Yee, 2012).

At this point, the research evidence on these controversial theories (TV, video games, sugar, food additives/colorings) indicates that:

1. It's highly unlikely that too much TV or video games causes ADHD.
2. It's possible that sugar can trigger hyperactivity in a small subgroup of children with ADHD.
3. There is suggestive evidence that food additives and colorings might promote ADHD in a *very small subgroup* of children. If parents decide to try a diet that restricts these items with their child, they should keep a daily, perhaps even hourly, record of their child's behavior when on and off the diet.
4. Evidence does not support automatically placing all children with ADHD on restricted diets. (To do so results in a major disruption to family routine.)
5. Given that refined sugar is associated with several negative health conditions, e.g., obesity, diabetes, and tooth decay, parents might consider restricting it for general health reasons if not for ADHD.

Neurotransmitters Involved: Dopamine and Noradrenaline

Much exciting research is being conducted on neurotransmitter abnormalities that might cause ADHD. **Neurotransmitters** are chemicals that help in the sending of messages between neurons in the brain. Researchers have found that abnormal levels of two neurotransmitters—**dopamine** and **noradrenaline**—are involved in ADHD (Barkley, 2006b; Tripp & Wickens, 2009; Volkow et al., 2007).

Hereditary Factors

Most authorities agree that, in many cases, ADHD has a hereditary basis. Research indicates that no single ADHD-gene exists. Rather, multiple genes (at least 20) are involved. And many of these genes are linked to how neurotransmitters move from neuron to neuron (Floet, Scheiner, & Grossman, 2010; Li, Sham, Owen, & He, 2006; Sanchez-Mora et al., 2013). Evidence for the genetic transmission of ADHD comes from at least three sources: family studies, twin studies, and molecular genetic studies.

FAMILY STUDIES Generally, studies indicate that if a child has ADHD, the chance of his or her sibling or parent having ADHD is 4 to 8 times more likely than is the case for non-ADHD children and their immediate relatives (Willcutt et al., 2010). Furthermore,

parents of children with attention deficit/hyperactivity disorder have 2.85 times the odds of parents of children without attention deficit/hyperactivity disorder of having a mental disorder, such as anxiety disorder (Cheung & Theule, 2016).

TWIN STUDIES Several researchers have compared the prevalence of ADHD in identical (monozygotic, from the same egg) versus fraternal (dizygotic, from two eggs) twins, when one of the members of the pair has ADHD. These studies consistently show that identical twins are almost 2 times more likely to both have ADHD than are fraternal twins (Willcutt et al., 2010)

MOLECULAR GENETIC STUDIES With the mapping of the human genome have come advances in **molecular genetics**, the study of the molecules (DNA, RNA, and protein) that regulate genetic information. Molecular genetic research on ADHD is in its early stages, but the research is consistent with the idea that several genes contribute to ADHD (Vorstman & Ophoff, 2013; Zheng, Lichtenstein, Asherson, & Larsson, 2013).

Toxins and Medical Factors

In Chapters 5 and 6, we discussed **toxins**—agents that can cause malformations in the developing fetus of a pregnant woman—as the cause of some cases of intellectual disabilities or learning disabilities. Although the evidence for toxins is not as strong as that for heredity, some of these same substances have been shown to be related to ADHD. For example, research indicates that some children with ADHD have higher levels of lead in their blood, suggesting a greater exposure than non-ADHD children to this known toxin (Nigg, Nikolas, Knottnerus, Cavanagh, & Friderici, 2010).

Other medical conditions may also place children at risk for having ADHD. Again, the evidence is not as strong as it is for heredity, but complications at birth and low birthweight are associated with ADHD (Levy, Barr, & Sunohara, 1998; Milberger, Biederman, Faraone, Guite, & Tsuang, 1997). Smoking during pregnancy is associated with having babies of low birthweight. Evidence also suggests that smoking by mothers-to-be puts their children who are already genetically predisposed (based on their dopamine-related genes) at an even greater risk of being diagnosed with ADHD (Neuman et al., 2007).

MyLab Education Self-Check 7.2

MyLab Education Application Exercise 7.3: Eric

Watch a video about identifying Eric's ADHD and describe the challenges he faces.



PSYCHOLOGICAL AND BEHAVIORAL CHARACTERISTICS

ADHD is characterized by a multiplicity of cognitive and behavioral deficits (Sjowall, Roth, Lindqvist, & Thorell, 2012). The effects of ADHD on psychological and behavioral functioning can be pervasive, with a major impact on quality of life (Danckaerts et al., 2010). For example, students with ADHD run a higher risk of incurring accidental injuries than their peers who do not have disabilities (Kang, Lin, & Chung, 2012; Shilon, Pollak, Aran, Shaked, & Gross-Tsur, 2011), which is logical given that so many have problems with inattention and impulsivity. And people with ADHD have a higher frequency of sleep disturbances (Hvolby, 2015; Silvestri et al., 2009).

The National Institute of Mental Health has identified several symptoms associated with the major behavioral characteristics identified by the DSM-5: inattention, hyperactivity, and impulsivity. See Table 7.1 for examples.

TABLE 7.1 • Examples of symptoms associated with inattention, hyperactivity, impulsivity

- Children who have symptoms of **inattention** may:
 - Be easily distracted, miss details, forget things, and frequently switch from one activity to another
 - Have difficulty focusing on one thing
 - Become bored with a task after only a few minutes, unless they are doing something enjoyable
 - Have difficulty focusing attention on organizing and completing a task or learning something new
 - Have trouble completing or turning in homework assignments, often losing things (e.g., pencils, toys, assignments) needed to complete tasks or activities
 - Not seem to listen when spoken to
 - Daydream, become easily confused, and move slowly
 - Have difficulty processing information as quickly and accurately as others
 - Struggle to follow instructions.
- Children who have symptoms of **hyperactivity** may:
 - Fidget and squirm in their seats
 - Talk nonstop
 - Dash around, touching or playing with anything and everything in sight
 - Have trouble sitting still during dinner, school, and story time
 - Be constantly in motion
 - Have difficulty doing quiet tasks or activities.
- Children who have symptoms of **impulsivity** may:
 - Be very impatient
 - Blurt out inappropriate comments, show their emotions without restraint, and act without regard for consequences
 - Have difficulty waiting for things they want or waiting their turns in games
 - Often interrupt conversations or others' activities.

Source: National Institute of Mental Health (2012). "Attention Deficit Hyperactivity Disorder." National Institutes of Health: NIH Publication No. 12-3572. P. 2. Retrieved from <http://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder/index.shtml>.

Deficits in Executive Functions and Behavioral Inhibition

The behavior symptoms listed in Table 7.1 provide a vivid picture of what the student with ADHD can look and sound like. Researchers have also examined what psychological processes underlie many of these symptoms. This research has pointed to two areas of difficulty, in particular, that appear to account for behavior symptomatic of ADHD: executive functions and behavioral inhibition.

EXECUTIVE FUNCTIONING Executive functioning (EF) is a term used to describe a number of processes involved in controlling and regulating behavior. It's been likened to the role of the conductor of an orchestra, the director of a movie, or the job of an air-traffic controller. Researchers and practitioners have provided several different definitions of EF, but most of them are highly similar, with nuanced differences. The definition generally contains the main skills that comprise EF: working memory (WM), inhibitory control or behavioral inhibition, and mental flexibility. (We discussed WM in Chapter 6, as the ability to hold information in memory for a short period of time so that it's available for further use. Mental flexibility refers to the ability to adjust one's behavior in order to adapt to changes in others' behavior or in the environment. We discuss behavioral inhibition below.)

Overwhelming evidence shows that ADHD results in EF deficits (Barkley, 1997; Goldstein & Kennemer, 2009; Weyandt, 2009b). The fact that a wealth of evidence indicates that EF is controlled by the prefrontal and frontal lobes of the brain fits nicely with the neuroimaging studies pointing to abnormality in these areas of the brain in persons with ADHD.

With diminished self-regulation or executive control abilities, students with ADHD find it exceedingly difficult to stay focused on tasks that require effort or concentration

but that are not inherently exciting (e.g., many school-related activities). Substantial evidence shows that students with ADHD, indeed, have lower academic achievement than those without disabilities (Dittman, 2016; Frazier, Youngstrom, Glutting, & Watkins, 2007; Graham, Fishman, Reid, & Hebert, 2016).

BEHAVIORAL INHIBITION Closely related to executive functioning, **behavioral inhibition** involves the ability to delay a response; interrupt an ongoing response, if the response is deemed inappropriate because of sudden changes in the demands of the task; or protect a response from distracting or competing stimuli (Lawrence et al., 2002). The term *impulsivity* is frequently used to describe problems with behavioral inhibition. Problems in behavioral inhibition can be reflected in the inability to wait one's turn, to refrain from interrupting conversations, to resist potential distractions while working, or to delay immediate gratification to work for larger, long-term rewards (Tripp & Alsop, 2001).

An abundance of research points to problems with behavioral inhibition in people with ADHD (Barkley, 1997, 2000a, 2006e; Schachar, Mota, Logan, Tannock, & Klim, 2000; Semrud-Clikeman et al., 2000; Willcutt, Pennington, et al., 2001). (In fact, some have claimed that lack of behavioral inhibition is perhaps *the* defining characteristic of ADHD, Barkley, 2006e.)

Deficits in behavioral inhibition can also result in individuals having problems controlling emotions and arousal levels. They often overreact to negative or positive experiences. On hearing good news, for example, children with ADHD might scream loudly, unable to keep their emotions to themselves. Likewise, they are often quick to show their temper when confronted with frustrating experiences.

In the classroom, difficulties with behavioral inhibition, or manifestations of impulsivity, can present themselves during task switching or transitions. See the accompanying Responsive Instruction box for a description of research on this topic and how to apply the results to the classroom.

Adaptive Behavior

The concept of **adaptive behavior skills** (e.g., self-help, community use, home use, and so forth) has traditionally been associated with the area of intellectual disabilities. The definition developed by the American Association on Intellectual and Developmental Disabilities, for example, stipulates that intellectual disabilities be defined as impairments in intelligence and adaptive behavior (see Chapter 5). In recent years, authorities in the ADHD field have discovered that many children and adults with ADHD also have difficulties in adaptive behavior (Barkley, 2006a; Whalen et al., 2006). A good example is that people with ADHD have more problems related to driving as adolescents and young adults: more accidents and traffic violations (Cox, Merkel, Kovatchev, & Seward, 2000; Fischer, Barkley, Smallish, & Fletcher, 2007; Woodward, Fergusson, & Horwood, 2000). It's logical to assume that poor behavioral inhibition would lead to driving problems, and evidence shows that these problems may also be related to poor anger control (Richards, Deffenbacher, Rosen, Barkley, & Rodricks, 2007).

Social Behavior Problems

Research suggests that students with ADHD are more disliked by their peers than are students with any other kind of disorder (Mikami, Jack, & Lerner, 2009). In social situations, it often doesn't take long for students with ADHD to be ostracized. Unfortunately, the negative social status experienced by students with ADHD is difficult to overcome and is usually long lasting. And adding to their socialization problems, many students with ADHD also have social difficulties with their parents, siblings, and teachers (Mikami et al., 2009).

The enduring nature of social rejection easily leads to social isolation. The result is that many children and adults with ADHD have few friends, even though they may desperately want to be liked. This can set up a vicious circle in which they attempt to win friends by latching onto any chance for interaction with others. But their frantic need for

RESPONSIVE INSTRUCTION

Meeting the Needs of Students with ADHD

TASK SWITCHING: PREPARING STUDENTS WITH ADHD FOR CHANGE

What the Research Says

Many researchers contend that the primary deficit of students with ADHD is deficient behavioral inhibition (e.g., Barkley, 1997, 2000a, 2006e; Willcutt, Pennington, et al., 2001). In other words, once students with ADHD begin a task, it is difficult for them to mentally switch to a new activity. Researchers hypothesize that the executive controls needed to “inhibit” the current activity and “start up” the next differ for students with ADHD compared to students who do not have ADHD.

Research Study

A group of researchers examined the task-switching ability of students with and without ADHD (Cepeda, Cepeda, & Kramer, 2000). Results from the study indicated that clear performance deficits existed for unmedicated students with ADHD in the first trial after a task switch, even when the tasks were considered compatible, such as both tasks involving numbers. All students with ADHD, unmedicated or medicated, had higher “switch costs”—increased response time—when the new task was incompatible with the old task (e.g., switching from a number-identification task to a word-identification task). This type of task required the inhibition of thinking

about numbers and the preparation for thinking about letters and sounds. The findings suggest that differences do exist between students with and without ADHD in their ability to efficiently and effectively task switch.

Applying the Research to Teaching

Studies such as the one presented here indicate the need to support students with ADHD as they transition from one activity to another. Cognitive support for such transitions can include the following:

- Allow for time between asking a student to do or say something and expecting the response (i.e., increasing wait time).
- Avoid overloading a student’s working memory (Barkley, Murphy, & Kwasnik, 1996) by limiting the number of steps or sequence of procedures a student must keep in working memory or by providing a visual for students to refer to.
- Create routinized procedures for daily transitions.
- Prepare students for the type of response that will be required when answering a question.
- Divide instruction into consistent, predictable sequences throughout the day.

BY KRISTIN L. SAYESKI

FOCUS ON

The Classic “Marshmallow Study”

In the late 1960s and early 1970s, Stanford psychologist Walter Mischel conducted several studies focused on the ability of preschoolers to delay gratification (Mischel & Ebbesen, 1970; Mischel, Ebbesen, & Zeiss, 1972). The original research was tagged the “marshmallow study” because of the innovative way Mischel and his colleagues measured how much the children were able to delay gratification. Generally, the child was brought into a room furnished with just a chair and table. The researcher placed a marshmallow on the table in front of the child and told her or him that the s(he) could eat the marshmallow now, but if s(he) waited until the researcher returned, s(he) could have two marshmallows. The adult then left the room and didn’t return for about 15 minutes. In the meantime, researchers could watch the child via a two-way mirror. (There are several videos on YouTube showing examples of the gyrations some children go through in their attempt to resist the temptation of the marshmallow, e.g., <http://www.youtube.com/watch?list=RD02x3S0xS2hdi4&v=Yo4WF3cSd9Q>.)

The major take-away message from the early set of studies was that, with age, children develop the ability to delay gratification or inhibit their behavior. But the most remarkable findings

came years later when researchers conducted several follow-up studies of the children from the original studies. Here are some examples of their findings. The 4- to 6-year-old children from the original studies who had been the least able to delay gratification:

- In adolescence, continued to display problems with inhibition. Furthermore, their SAT scores were lower (Shoda, Mischel, & Peake, 1990).
- When in their late 20s, they displayed more anxiety about being socially rejected by their significant others (e.g., spouses, partners) (Ayduk et al., 2000).
- When in their 30s, they had higher percentages of (BMI), a measure of body fat, which suggests that they were less able to maintain a healthy diet (Schlam, Wilson, Shoda, Mischel, & Ayduk, 2012).
- When in their 40s, still had difficulties with impulse control (Casey et al., 2011).
- When in their 40s, neuroimaging (Casey et al., 2011) revealed they had abnormalities in the frontal cortex and the basal ganglia—the two areas we discussed earlier in the section focused on causes of ADHD.

friendship, coupled with their deficient impulse control, ends up leading them to bother or pester the very people they are trying to befriend.

Given the problems in behavioral inhibition, it's not surprising that so many children and adults with ADHD end up socially ostracized. Unable to regulate their behavior and emotions, they are viewed as rude by others. It isn't that they don't know how to behave appropriately so much as that they are unable to do so (Landau et al., 1998). In other words, if asked what the appropriate behavior in a given situation should be, they can often give the socially acceptable answer. But when faced with choices in the actual situation, their deficits in behavioral inhibition lead them to make choices impulsively and to overreact emotionally.

Interestingly, researchers have found that, when they do have friends, the friendships tend to be close. And this friendship can be strong even in individuals who have relatively severe ADHD symptoms (Glass, Flory, & Hankin, 2012).

Coexisting Conditions

ADHD often occurs simultaneously with other behavioral and/or learning problems, such as learning disabilities or emotional or behavioral disorders. In addition, persons with ADHD run a higher risk than the general population for substance abuse.

LEARNING DISABILITIES Studies using careful diagnostic criteria have found about half of children with ADHD also have learning disabilities. Some authorities maintain that the relationship is strongest for students who have ADHD, Predominantly Inattentive Type (Marshall, Hynd, Handwerk, & Hall, 1997; Willcutt, Chhabildas, & Pennington, 2001).

EMOTIONAL OR BEHAVIORAL DISORDERS Estimates of the overlap with ADHD vary widely, but it's safe to say that 25% to 50% of people with ADHD also exhibit some form of emotional or behavioral disorder (Forness & Kavale, 2002; Hallahan & Cottone, 1997). Some people with ADHD can exhibit aggressive, acting-out behaviors, whereas others can manifest the types of withdrawn behaviors that accompany anxiety or depression. In fact, anxiety is evident in between 15% to 35% of children with ADHD, and they are especially vulnerable to having multiple anxiety disorders compared with children without disabilities (Schatz & Rostain, 2007).

SUBSTANCE ABUSE Adolescents with ADHD are more likely to experiment prematurely with alcohol, tobacco, or illicit drugs. A large-scale, longitudinal study found that the percentage of young adults with ADHD with substance dependence or abuse was high: nicotine (31%), alcohol (13%), cannabis (9%), cocaine (2%) (Pingault et al., 2013). Attention problems are linked with nicotine dependence, and oppositional behavior is linked with cannabis and cocaine dependence.

Some reports in the popular media have claimed that the treatment of ADHD with psychostimulants such as Ritalin leads children to take up the use of illegal substances. However, very little research backs up this claim (Connor, 2006).

Exactly why ADHD co-occurs with so many other learning and behavioral disabilities is unclear. Researchers are just beginning to tease out which of several possibilities are the most likely reasons for the extensive overlap between ADHD and other disabilities. For example, does having ADHD put one at risk for developing another disability, such as learning disabilities or depression? Or do ADHD and the other disability occur independent of each other? Is there a genetic basis to the coexistence of so many of these conditions? Research over the next few years should begin to provide more definitive answers to these questions.

MyLab Education Self-Check 7.3

MyLab Education Application Exercise 7.4: Jake

Read a case study about Jake, a student with ADHD, and answer the questions that follow.

EDUCATIONAL CONSIDERATIONS

In this section, we consider two aspects of effective educational programming for students with ADHD:

- Classroom structure and teacher direction
- Functional behavioral assessment and contingency-based self-management

Classroom Structure and Teacher Direction

As noted earlier, William Cruickshank was one of the first to establish a systematic educational program for children who today would meet the criteria for ADHD. Two hallmarks of Cruickshank's program were reducing stimuli irrelevant to learning and enhancing materials important for learning, and creating a structured program with a strong emphasis on teacher direction.

Because Cruickshank assumed that children with attention problems were susceptible to distraction, he reduced irrelevant stimuli as much as possible. For example, students' work spaces consisted of three-sided cubicles to reduce distractions. On the other hand, teachers were encouraged to use attractive, brightly colored teaching materials. The structure came in the form of a systematic schedule of activities for each child for virtually each minute of each day (Cruickshank, Bentzen, Ratzeburg, & Tannhauser, 1961).

It's rare today to see teachers using all the components of Cruickshank's program, especially the cubicles. For those students who are highly distractible, however, some authorities recommend the use of accommodations such as cubicles to reduce extraneous stimulation.

The degree of classroom structure and teacher direction advocated by Cruickshank is also rarely seen today. First, this intensity of structure could be achieved only in a self-contained classroom; most students with ADHD today are in general education settings. Second, most authorities today believe that a structured program is important in the early stages of working with many students with ADHD but that these students gradually need to learn to be more independent in their learning. For example, the National Institute of Mental Health (2012) has recommended several tips for parents emphasizing structure and routine for students with ADHD, which mirror Cruickshank's recommendations for teachers. See Table 7.2.

Functional Behavioral Assessment and Contingency-Based Self-Management

Functional behavioral assessment (FBA) is an important tool for teachers to use with students with emotional or behavioral disorders (we discuss this more in Chapter 8), as well as for students with many other types of disabilities when they also have behavioral

TABLE 7.2 • Tips to help kids stay organized and follow directions

Schedule Keep the same routine every day, from wake-up time to bedtime; include time for homework, outdoor play, and indoor activities. Keep the schedule on the refrigerator or on a bulletin board in the kitchen. Write changes on the schedule as far in advance as possible.

Organize everyday items Have a place for everything, and keep everything in its place. This includes clothing, backpacks, and toys.

Use homework and notebook organizers Use organizers for school materials and supplies. Stress to your child the importance of writing down assignments and bringing home the necessary books.

Be clear and consistent Children with ADHD need consistent rules they can understand and follow.

Give praise or rewards when rules are followed Children with ADHD often receive and expect criticism. Look for good behavior and praise it.

Source: National Institute of Mental Health (2012). "Attention Deficit Hyperactivity Disorder." National Institutes of Health: NIH Publication No. 12-3572. P. 11. Retrieved from <http://nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder/index.shtml>.



MyLab Education
Video Example 7.2

Author Dan Hallahan discusses his early research on self-monitoring of attention with Paige Pullen.



MyLab Education
Video Example 7.3

Students with ADHD can be taught to monitor, record, analyze, and reinforce their own behavior. As you watch this video, notice how the individual students record their own behaviors, and the system used to reward the whole group when pre-selected target students exhibit appropriate behavior.



MyLab Education
Video Example 7.4

The degree to which students with ADHD can be successful in a general education setting is often dependent on the overall school policies of structure, discipline, and explicit expectations and instructions regarding student behavior. In this video, the teacher describes a school climate conducive to inclusion of students with ADHD.

problems. Therefore, it's often extremely useful in educational programming for students with ADHD. FBA involves determining the consequences, antecedents, and setting events that maintain inappropriate behaviors (Horner & Carr, 1997). Examples of typical functions of inappropriate behavior of students with ADHD are to avoid work and to gain attention from peers or adults (DuPaul & Ervin, 1996). Extensive research evidence is persuasive that FBA can be highly effective for students with ADHD (Miller & Lee, 2013).

Contingency-based self-management approaches usually involve having people keep track of their own behavior and then receive consequences, often in the form of rewards, based on their behavior (Davies & Witte, 2000; DuPaul, Arbolino, & Booster, 2009; Hallahan, Lloyd, Kneedler, & Marshall, 1982; Hallahan, Lloyd, Kosiewicz, Kauffman, & Graves, 1979; Hallahan, Marshall, & Lloyd, 1981; Shapiro, DuPaul, & Bradley-Klug, 1998). For example, the teacher might have students use self-monitoring to record how many times they left their seats during a class period. For directions about how to use self-monitoring in the classroom, see the accompanying Responsive Instruction box.

A combination of FBA and contingency-based self-management techniques has proven successful in increasing appropriate behavior of elementary and secondary students with ADHD (DuPaul, Eckert, & McGoey, 1997; Ervin, DuPaul, Kern, & Friman, 1998; Shapiro et al., 1998). In one study, for instance (Ervin et al., 1998), a combination of FBA and contingency-based self-management increased the on-task behavior of two adolescents with ADHD. For one of the students, the FBA interviews with the teacher and observations in the classroom led the researchers and teachers to conclude that the adolescent boy's disruptive behavior was a function of gaining peer attention. They based this assumption on evidence that the antecedents to his inattentive behavior included peers' looking his way, calling out his name, and making gestures toward him and that the consequences of his inattention included the peers' laughing or returning comments to him.

The contingency-based self-management phase involved the student evaluating his on-task behavior on a 5-point scale (0 = unacceptable to 5 = excellent) at the end of each math class. The teacher also rated the student's behavior and awarded the student points based on how closely the ratings matched. During writing class, the teacher awarded negative or positive points to members of the class depending on whether or not they responded to attention-seeking behaviors from any member of the class. In both classes, the students could use the points for privileges.

THE ROLE OF REINFORCEMENT Authorities have pointed to the crucial role that contingency plays in contingency-based self-management: Reinforcement of some kind, such as social praise or points that can be traded for privileges, is especially important for self-management techniques to be effective. For example, an extensive review of research found that contingency-based self-management strategies were more effective than self-management strategies without contingencies in leading to positive behavioral changes in students with ADHD (DuPaul & Eckert, 1997).

The use of behavioral procedures such as reinforcement is somewhat controversial, and some are opposed to their use (Kohn, 1993). Many authorities, however, consider them almost indispensable in working with students with ADHD. For example, behavioral procedures are an integral part of a set of intervention principles advocated by one team of authorities (Piffner, Barkley, & DuPaul, 2006). They note that, in particular, reinforcements usually need to be more salient and delivered more quickly and frequently for students with ADHD than for their peers who do not have disabilities.

Service Delivery Models

Because the U.S. Department of Education doesn't recognize ADHD as a separate special education category, we don't have statistics on how many of these students are served in different classroom environments. It's safe to assume, however, that one can find students with ADHD across the entire continuum of placements. But because, as we noted earlier, there is reason to believe that fewer than half receive any special education services, it's logical to assume that the majority of students with ADHD spend most of

RESPONSIVE INSTRUCTION

Meeting the Needs of Students with ADHD

THE BENEFITS OF SELF-MONITORING AND GROUP CONTINGENCY

What the Research Says

Many students with ADHD lack the ability to self-monitor. Self-monitoring requires the ability to appraise a situation and consider alternative ways of responding as well as possible outcomes associated with the various forms of responding (Shapiro, DuPaul, & Bradley-Klug, 1998). This inability to think before acting creates problems for students with ADHD in the areas of paying attention in class, responding to social situations appropriately, and finishing assigned tasks. To address these issues, teachers can help students learn to use self-management procedures to monitor, record, analyze, and reinforce their own behavior (Davies & Witte, 2000). Many studies have repeatedly demonstrated the effectiveness of teaching students such strategies (Cobb, Sample, Alwell, & Johns, 2006; Harris, Friedlander, Saddler, Frizzelle, & Graham, 2005; Lloyd, Hallahan, Kauffman, & Keller, 1998; Reid & Lienemann, 2006; Reid, Trout, & Scharz, 2005).

Although teaching self-management to students with ADHD has been proven to be effective, many teachers prefer whole-class or group-contingency plans. Within a group-contingency model, the behavior of one student is tied to the outcome of the whole group. Group-contingency models promote interdependence, as group members must work together to meet a goal (Tankersley, 1995). Under a group contingency, teachers can use the same behavior management approach for all students and don't have to differentiate their treatment of the few students who need help with self-management. Thus, group contingencies can be very effective for general education teachers whose classrooms include students with ADHD.

Research Study

One study examined the effects of a management program with third graders on the behaviors of students with ADHD in a general education classroom (Davies & Witte, 2000). All students—those with ADHD as well as students without

disabilities—were responsible for monitoring their own behavior, and the researchers established contingencies for group performance. Procedures for the group intervention follow:

1. If any student displayed the target behavior [inappropriate verbalizations], she or he moved one dot from his/her group's chart from the green section into the blue section. If the child did not move the dot after about ten seconds, then the teacher moved a dot into the red section of the chart.
2. The rewards a group received were related to how many dots the group had in the green section of their chart at the end of the intervention period. Each group needed to have at least one dot left in the green section at the end of the intervention period to receive the reinforcer. [Each group started with five dots.] (Davies & Witte, 2000, p. 141)

Research Findings

Results from the study demonstrated a decrease in talking out of turn for the four students with ADHD. In addition, no evidence showed possible negative side effects of peer pressure, such as threats or negative verbal comments (Davies & Witte, 2000).

Applying the Research to Teaching

Findings from this study demonstrate the effectiveness of using self-management within the context of a group contingency. Teachers can implement similar management strategies through (1) targeting specific undesirable behaviors to be eliminated or specific desirable behaviors to be reinforced, (2) creating a chart for students to use for self-management, (3) communicating the procedures for recording behaviors on the chart (e.g., "If you do X, mark your chart" or "When the beeper beeps, check to see if you are doing X, then mark your chart accordingly"), or (4) connecting the self-management procedures to a group contingency (e.g., "If all students get over X points during the lesson, all students will get a homework pass").

BY KRISTIN L. SAYESKI

their time in general education classrooms. The accompanying How Can I Help? feature describes different ways to use co-teaching to help meet the needs of these students, whether they receive special education services or not.

As with all students with disabilities, the best placement for students with ADHD should be determined on an individual basis. Although full inclusion in a general education classroom might be appropriate for some students with ADHD, for students with severe ADHD problems, one needs to keep in mind that the best research-based practices for students with ADHD—that is, classroom structure, teacher direction, functional behavioral assessment, and contingency-based self-management—can be a challenge to implement in the general education classroom.

HOW CAN I HELP?

Working with Students with ADHD in the General Education Classroom

“How can I get this student focused?!”

What Does It Mean to be a Teacher of Students with ADHD?

Currently, the Council for Exceptional Children doesn't have specific competencies for teachers of students with attention deficit hyperactivity disorder (ADHD). As you read in this chapter, ADHD isn't recognized as a separate special education category by the U.S. Department of Education. These students, however, often have additional disabling conditions and are served by teachers with expertise in those areas. That expertise may include:

1. Understanding educational implications of characteristics of various exceptionalities
2. Understanding the effects of various medications on individuals with exceptional learning needs
3. Using procedures to increase the individual's self-awareness, self-management, self-control, self-reliance, and self-esteem

Successful Strategies for Co-Teaching

Co-teaching classroom configurations come in many forms, and all give teachers “more hands” to meet the needs of students with ADHD. Vaughn, Schumm, and Arguelles (1997) describe five basic models of co-teaching that provide co-teachers with opportunities to use the instructional strategies described in this chapter.

One Teach, One Drift

In this model, one teacher is responsible for instruction, and the other teacher drifts, monitoring students. This model allows the drifting teacher to redirect students who may be off task, to observe and mark student-monitoring forms, to provide feedback on individual students' attention and participation, and to deliver reinforcers or consequences on a frequent basis.

Station Teaching

In station teaching, co-teachers split content into two parts and students into three groups. Each teacher teaches one of the two content pieces at a station to a small group of students, and the other group works independently. The student groups rotate between stations. Teachers can break content down into smaller tasks that maintain the attention of all students. Each teacher can work with a small group of students, making it easier to ensure that they are focused and learning. It is also easier to help students work together and to provide reinforcers and consequences more frequently. The difficulty lies in making sure that students with ADHD can work appropriately in the independent station.

Parallel Teaching

In parallel teaching, the two teachers split the class into two groups and teach the same content to a smaller group of students. This model provides the same opportunities as station teaching, along with the chance to modify the instructional delivery of the same content material to meet the needs of the student.

Alternative Teaching

The alternative teaching model includes content instruction by one teacher to a large group of students and remedial or supplementary instruction by the other teacher to a small group of students. The teacher of the small group can modify delivery of content, control the delivery of consequences and rewards, and closely monitor and observe students. In addition, the teacher of the small group can incorporate instruction in strategies such as self-monitoring.

Team Teaching

In team teaching, co-teachers alternate or “tag team” in delivering instruction to the entire class. In this model, both co-teachers can be on the lookout for misconceptions, confusion, inattention, and disruption. Teachers can then address these issues during the flow of instruction rather than afterward or on an individual basis. In addition, co-teachers can work together to present content and learning strategies in unison to better meet the needs of all students.

In All Models

Teachers working together can discuss and better evaluate whether rules and instructions are clear, brief, and delivered in appropriate formats for students with ADHD. Co-teachers can also work together to better anticipate “rough spots” for students with ADHD, particularly during transition times, changes in routines, or complex tasks. The varying models of co-teaching provide the flexibility for teachers to adjust instructional delivery to meet both the objectives of the teachers and the needs of the students with ADHD.

Cautionary Note

All too often, co-teachers fall into the habit of using one model to the exclusion of others. This is unfortunate in that it may mean that one teacher doesn't participate actively in instruction and/or planning. This nonparticipation can lead to a lack of interest on the teacher's part and a disregard for that teacher on the students' part. The models of co-teaching were developed to match the needs of instruction. Both teachers should participate in instruction in a way that matches their expertise.

BY MARGARET P. WEISS

MEDICATION CONSIDERATIONS

One of the most controversial topics in all of special education is the treatment of ADHD with medication. **Psychostimulants**, which stimulate or activate neurological functioning, are by far the most frequent type of medication prescribed for ADHD. However, promising research is emerging on a number of nonstimulants. **Strattera** is an example of a nonstimulant that is also sometimes prescribed for ADHD (Childress, 2016). The most common stimulant prescribed for ADHD is methylphenidate, or **Ritalin**. **Adderall** and **Vyvanse** are other stimulants that are sometimes prescribed. The fact that physicians would prescribe a psychostimulant for someone who exhibits hyperactivity is, at first blush, counterintuitive. In fact, for years professionals referred to the **paradoxical effect of Ritalin** because its effects appeared to be the opposite of those one would expect in the case of someone who does not have ADHD. Researchers have concluded, however, that Ritalin influences the release of the neurotransmitters dopamine and norepinephrine, thus enabling the brain's executive functions to operate more normally (Arnsten et al., 2009; Connor, 2006; Floet et al., 2010). Responsiveness to stimulants is highly individual, so the dosage level and number of doses per day vary from person to person.

Use of stimulants for ADHD has increased steadily over the last several decades. Interestingly, African American children or children from low socioeconomic status (SES) homes are less likely to be treated with stimulants than white children or children from higher SES homes (Graves & Serpell, 2013). The reason for this discrepancy is debatable. Perhaps it is due to a combination of lack of access to medical/psychological services, cultural aversion to using medication for behavioral problems, and distrust of the medical system by individuals from low SES backgrounds.

Opposition to Ritalin

Not all professionals, parents, and laypeople are in favor of using psychostimulants for ADHD. In fact, Ritalin has been the subject of numerous assaults in the media. Critics have appeared on nationally broadcast television shows such as *Oprah*, *Geraldo*, and *20/20*, as well as on evening and morning news shows. The Church of Scientology's objection to Ritalin has received much publicity due to Hollywood actor and Scientologist, Tom Cruise's criticisms of it. Although some criticisms have been relatively mild, others have ranged from assertions that ADHD is a bogus diagnosis to claims that professionals are trying to control children with medication and make them overly docile.

The Research Evidence

Over the last 30 to 40 years, dozens of research teams around the world have studied the effects of several medications on ADHD. Most of this research has focused on the psychostimulant Ritalin.

EFFECTIVENESS Despite all the negative publicity in the media, most ADHD authorities are in favor of Ritalin's use. After hundreds of studies, the research is overwhelmingly positive on the effectiveness of Ritalin in helping students to have more normalized behavioral inhibition and executive functioning (Connor, 2006; Meszaros et al., 2009; MTA Cooperative Group, 1999; Spencer, Biederman, & Wilens, 2010). Moreover, Ritalin not only leads to better results on parent and teacher rating scales, but also leads to higher academic achievement (Scheffler et al., 2009) as well as improved classroom behavior such as better note taking, on-task behavior, higher quiz scores, homework completion, and better written-language work (Evans et al., 2001).

NONRESPONDERS AND SIDE EFFECTS Even though research has demonstrated the general effectiveness of Ritalin, it's important to point out that it's not effective for everyone. Somewhere around 30% of those who take Ritalin do not have a favorable response (Barbarisi et al., 2006). In addition, some side effects are possible, including insomnia, reduction in appetite, abdominal pain, headaches, and irritability. There has also been speculation on the possibility that in a very small number of cases, Ritalin causes tics or increases their

intensity in those who already have tics (DuPaul, Barkley, & Connor, 1998). There have been many anecdotal reports of a “rebound effect,” in which a child exhibits irritability as the Ritalin wears off. In most cases, these side effects are mild and can be controlled. For example, in the case of the two most common side effects—insomnia and reduction in appetite—care should be taken not to take the Ritalin too close to mealtime or bedtime. In the case of the rebound effect, some physicians recommend using a time-release form of Ritalin.

DRUG ABUSE A popular misconception is that by taking Ritalin, children with ADHD are more likely to become abusers of drugs such as marijuana or cocaine as adolescents or young adults. Little if any documented evidence suggests that this occurs (Connor, 2006). In fact, evidence suggests that individuals with ADHD who are prescribed Ritalin as children are less likely to turn to illicit drugs as teenagers (Katusic et al., 2005). Some have speculated that perhaps those who are not medicated with Ritalin turn to other drugs to try to find “peace of mind” or to “chill out.”

Cautions Regarding Medication

Although the research is overwhelmingly positive on the effectiveness of medication for increasing appropriate behavior, a number of cautions remain:

- Medication should not be prescribed at the first sign of a behavior problem. Only after careful analysis of the student’s behavior and environment should medication be considered. The use of psychostimulants for ADHD in the United States increased approximately eight-fold from the 1970s to the 1990s (Wilens & Biederman, 1992), and in the first 5 years of the 21st century, the rate approximately doubled (Castle, Aubert, Verbrugge, Khalid, & Epstein, 2007). Although much of this increase in recent years can be attributed to an upsurge in prescriptions for females and adults coincident with the increase in diagnosis in these populations, it still should alert us to turning too quickly to medication as *the* answer to ADHD.
- Although research has demonstrated the effectiveness of medication on behavioral inhibition and executive functions, the results for academic outcomes have not been as dramatic. Thus, teachers shouldn’t assume that medication will take care of all the academic problems these students face.
- Parents, teachers, and physicians should monitor dosage levels closely so that the dose used is effective but not too strong. Proper dosage levels vary considerably.
- Teachers and parents shouldn’t lead children to believe that the medication serves as a substitute for self-responsibility and self-initiative.
- Teachers and parents shouldn’t view the medication as a panacea; they, too, must take responsibility and initiative in working with the child.
- Parents and teachers should keep in mind that psychostimulants are a controlled substance. There has been a dramatic increase in persons who do not have ADHD using stimulants as a way of gaining a “high,” or for secondary and college students of improving academic performance, or for athletes of gaining physical performance. Interestingly, research results are mixed on whether stimulants actually improve performance in these domains (Lakhan & Kirchgessner, 2012).
- Unfortunately, there has also been a dramatic increase in stimulant abuse. For example, between 2003 and 2013, national admissions to substance abuse treatment services for methylphenidate as a percentage of admissions for all illicit substances increased 25% (Substance Abuse and Mental Health Services Administration, 2015).
- The final key to the effective use of medication is communication among parents, physicians, teachers, and the child.

ASSESSMENT OF PROGRESS

Assessment of students with ADHD includes procedures for evaluating social and emotional behaviors and academic skills. Many of the procedures described in Chapter 6 on learning disabilities are also appropriate for students with ADHD.

Assessment of Academic Skills

As we discussed earlier, students with ADHD often experience difficulties with academic tasks as a result of inattention, impulsivity, and/or poor executive functioning skills. In addition, they're commonly diagnosed with learning disabilities as a co-existing condition.

Curriculum-based measurement (CBM), described in Chapter 6, is an appropriate method for monitoring academic progress for students with ADHD. An advantage of CBM for students with ADHD is that the measures take very little time to administer and they are focused on a particular task. CBM should be implemented with students with ADHD to ensure that academic progress is adequate.

Assessment of Attention and Behavior

Two methods are commonly used to assess a student's attention to tasks and social/emotional behavior: rating scales and direct observation. An example of a rating scale that can be used to measure student outcomes or to monitor student progress is the Conners-3 (Conners, 2007). The Conners-3 includes measures of oppositional behavior, inattention, anxiety, and social problems.

Teachers should also directly observe students on a regular schedule to monitor attention, academic engaged time, and disruptive behavior. Behavioral recording systems provide a framework to conduct systematic observations. For example, **momentary time sampling** allows the teacher to conduct brief observations and collect data on a specific set of behaviors. In momentary time sampling, the observer determines the length of the observation and divides it into intervals (e.g., 15 minutes may be divided into 15 intervals of 1 minute each). At the beginning of each interval, the observer records whether the student is exhibiting the behavior of interest and then does not observe the student until the beginning of the next interval.

Figure 7.2 provides an example of a momentary time-sampling chart for a student, Susie, who is working to increase her time on task. The observation lasted for 15 minutes. Glancing at Susie at the beginning of each minute, the observer placed a check mark in the box if Susie was attending to the task at the time sampled, and an X if she was not attending. At the end of the observation period, the teacher calculated the number of intervals Susie was on task to determine a percentage of on-task behavior for the 15-minute period. Susie was on task for 10 of the 15 intervals, or 67% of the time. Susie's teacher may use the momentary time-sampling procedure at regular intervals to monitor Susie's attention to tasks and modify interventions as needed.

A unique measure of student outcomes is the Telephone Interview Probe (TIP) (Corkum, Andreou, Schachar, Tannock, & Cunningham, 2007). This instrument uses brief telephone interviews of parents and teachers to determine the effects of interventions

FIGURE 7.2

MOMENTARY TIME SAMPLING—AN INTERVAL RECORDING PROCEDURE TO CAPTURE A REPRESENTATIVE SAMPLE OF A TARGET BEHAVIOR OVER A SPECIFIED PERIOD OF TIME.

Student Name: Susie
 Date: 3/10/2011
 Setting: Small - group reading lesson
 Time of day: 9:30 a.m. - 9:45 a.m.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Attending to Task	✓	X	✓	✓	X	X	✓	✓	X	✓	✓	✓	X	✓	✓

$$\underline{10} / 15 \text{ intervals} = \underline{67\%}$$

for students with ADHD. It's particularly useful for evaluating the effects of psychostimulant medications on an individual at a specific time of day or setting. Many common rating scales are limited to broader time frames and don't provide the specificity required to make decisions in regard to treatment with medications. The TIP provides ratings of inattention, impulsiveness, hyperactivity, oppositional behavior, and problem situations for three time points during the day (i.e., morning, afternoon, evening).

MyLab Education Self-Check 7.4

MyLab Education Application Exercise 7.5: Brandon

Watch a video about Brandon, a boy with ADHD, and two techniques that his teacher has developed to help him stay on task in the classroom.

MyLab Education Application Exercise 7.6: Accommodations

Read a case study about accommodations and then answer the questions that follow.



MyLab Education Video Example 7.5

Diagnosing ADHD in preschoolers is a challenge because children at this age are often very active and impulsive. However, in the case of some children, their ADHD behavior is obvious. For example, watch this video.



MyLab Education Video Example 7.6

Careful observation and testing can help determine whether a preschooler has ADHD or is simply displaying high energy typical for his or her age.

EARLY INTERVENTION

Diagnosis of young children with ADHD is particularly difficult because many young children who don't have ADHD tend to exhibit a great deal of motor activity and a lack of impulse control. However, in recent years the number of preschoolers identified as having ADHD has increased; the prevalence rates of 2% to 6% for preschoolers now rival the rates of 7% to 9% for school-age students. And perhaps maybe even more significant, parents report that ADHD symptoms in their children first begin to appear between the ages of 2 and 4 years (Posner, Pressman, & Grennhill, 2009).

Poor behavioral inhibition and inattention in preschool are predictors of ADHD symptoms and early literacy skills, respectively, in early elementary school (Campbell & von Stauffenberg, 2009; Walcott, Scheemaker, & Bielski, 2009). Therefore, early intervention for preschoolers with ADHD is critically important.

Because excessive activity and impulsivity are relatively normal for young children, pre-schoolers with ADHD can be particularly difficult to manage. Those preschoolers who really do have ADHD are a great challenge to parents and teachers. The importance of the educational principles of classroom structure, teacher direction, functional behavioral assessment, and contingency-based self-management discussed previously in this chapter are all the more important for preschoolers. Given that even young children who don't have ADHD lack fully developed self-management skills, most professionals recommend an even stronger emphasis on the use of contingencies in the form of praise, points, and tangible rewards.

TRANSITION TO ADULTHOOD

Not too long ago, most professionals assumed that ADHD diminished in adolescence and usually disappeared by adulthood. However, authorities now recognize that, although the number of symptoms, especially those connected to hyperactivity (Weyandt, 2009a), may decrease, ADHD persists into adulthood. Research suggests that (1) about 50% of those diagnosed as having ADHD in childhood still persist with major symptoms as adults (Hechtman et al., 2016) and (2) about 4 to 5% of adults have ADHD (Ebejer et al., 2012; Michielsen et al., 2012).

Evidence is strong that working memory remains a problem for many adults with ADHD (Alderson, Kasper, Hudec, & Patros, 2013). Researchers have found that adults with ADHD are poor decision makers. For example, instead of waiting to make a more informed decision, which is likely to result in a better reward, they choose a short-term gain even though they know they would obtain a better reward by waiting (Mowinckel, Pedersen, Eilertsen, & Biele, 2014). Researchers using some clever data

FOCUS ON

Mind-Wandering

We've all experienced it: We're driving on a monotonous stretch of highway and suddenly realize our mind is somewhere else other than driving (an old acquaintance, an upcoming event, and so forth). Or we're reading a book and suddenly realize that our mind has wandered and we have to start reading the last paragraph or two again.

In general, measuring mind-wandering can be done in at least three ways: (1) ask respondents to rate how often their mind wanders; (2) while individuals perform a task, such as reading, ask them to stop and record every time they notice their mind has wandered; (3) give individuals a personal recording device and set it to prompt them randomly to record what they are pay-

ing attention to at that moment. Researchers have documented that adults with ADHD are vulnerable to mind-wandering (Franklin et al., 2014). For example, they've equipped individuals with mobile devices that randomly signal wearers throughout the day to record whether their minds have wandered. And, indeed, those with ADHD are much more likely to report that they were off-task. Likewise, researchers have had individuals perform a task, such as reading narrative text in a lab setting and interrupting them randomly to ask them whether they were paying attention or not. As predicted, people who have ADHD are more likely to report being off-task on these measures than those without ADHD.

collection techniques have also determined that adults with ADHD are likely to exhibit **mind-wandering**. See Focus on Concepts: Mind-Wandering.

Diagnosis in Adulthood

With the greater recognition of ADHD by the scientific community as well as by the popular media, many people are being diagnosed with ADHD in adulthood. In general, the more severe the symptoms in childhood, the more likely that adults with ADHD will be high school dropouts and experience employment problems (Fredricksen et al., 2014). However, the diagnosis of ADHD in adults can sometimes be controversial. In recent years, however, professionals have begun to make progress in identifying and treating ADHD in adults. It is important that a thorough clinical exam be conducted before diagnosing an adult as ADHD, especially if he or she was not previously identified in childhood. Within the history, the clinician looks for symptoms similar to those that children with ADHD display, although as mentioned, adults may have fewer symptoms, especially those related to hyperactivity. In addition, the symptoms may take a somewhat different form because they occur in a different context; for example, related to the work rather than the classroom environment or related to one's role as a spouse or parent rather than as a child in the family environment. For example, adults with ADHD may become bored easily with relatively routine work or have problems organizing their work schedule. Or they may have problems "tuning in" to what their spouse or children are saying, or overcommit themselves to too many household projects, such that many of them remain undone.

Adult Outcomes

Overall, adults with ADHD *tend* to have a number of poorer outcomes with respect to educational attainment, psychiatric problems (e.g., depression and anxiety), marital difficulties, driving infractions, and addictive behaviors, such as substance abuse and gambling addiction (Barkley & Murphy, 2007; Biederman et al., 2010; Fredricksen et al., 2014; Mohr-Jensen, C., & Steinhausen, H.-C., 2016; Mowinckel, Pedersen, Eilertsen & Biele, 2015; Ramsay, 2010; Rucklidge, Brown, Crawford, & Kaplan, 2007; Weyandt & DuPaul, 2006). Many of these outcomes are closely linked to the poor decision making noted above, with immediate gratification being favored over patiently thinking through the consequences of one's choices.

It's important to point out that not all adults with ADHD experience unfavorable outcomes. Many adults with ADHD actually appear to leverage their ADHD symptoms (e.g., high energy, thinking "outside the box") to become highly successful. (Examples of individuals with ADHD, many self-identified, are: Justin Bieber, Richard Branson, Jim

SUCCESS STORIES: **Developing Self-Advocacy Skills to Get Needed Accommodations: Key to Josh's Success in College**

Josh Bishop: "It's not like the work is hard; it's just getting it done!"

High school sophomore Josh Bishop hopes to play football on a team in the National Collegiate Athletic Association's Division I, despite his struggles with organization and time management.

These could be the keys to his success:

- Intensive classroom structure and consistent expectations
- Relentless positive reinforcement and behavioral support
- Specific accommodations and self-advocacy

Josh Bishop doesn't find schoolwork hard to do, but he finds it hard to get done. Special educator Jane Warner coordinates services for college students with disabilities at the university where Josh Bishop hopes to play football. She guides many students like Josh and encourages incoming freshmen with ADHD to begin their self-advocacy early. Although Josh does not receive special education services, his mother, Joni Poff, encourages him to seek out structures and supports so that he can meet his future goals.

- **Intensive Classroom Structure and Consistent Expectations.** Josh is a successful athlete, but in the classroom, he faces challenges. "I never have been very organized. I got by in elementary school, but middle school was a real wake-up call. In sixth grade, I'd get all my homework done in class. In seventh grade, I had homework due for every class."

Josh keeps an assignment book but admits that he doesn't use it faithfully. "When I've missed a deadline, sometimes I don't turn the work in at all. I know I need to do homework and I keep saying I'm going to do it, and then I don't turn it in and I get a zero. I can get work done at school, but I just can't get it done at home." According to his mother, "Josh does better with shorter time segments in a more structured setting. At home, he has trouble following through with sustained work. His pediatrician told me to back off. Josh takes medication during the day, and it's harder for him to concentrate in the evening."

Josh mentioned his medication but did not refer to his difficulties with completing written work, organizational skills, or attentiveness as being out of the ordinary. He would rather not be treated differently from other students, but he says that only a few teachers have provided the classroom structure that he needs. His mother thinks that the most successful teachers for Josh have been those who were very organized and made their expectations very clear. "They weren't wishy-washy. They were sympathetic that some things were difficult for Josh. They understood that he wasn't being purposefully lazy or disrespectful, but they still held high expectations for him."

- **Relentless Positive Reinforcement and Behavioral Support.** Josh was diagnosed by his pediatrician with

ADHD when he was 7 years old. "Josh always had a high activity level," recalls his mother. "In kindergarten, he was put on a behavior contract with stickers as positive reinforcement, but his first-grade teacher didn't follow through with his behavior management." By second grade, medication was recommended. Josh's family moved to a small school district where the local high school he attends has only 650 students. Contact between home and school has been close. But as he has matured and the academic demands have increased, says his mother, "high school has been difficult for Josh. Recently, I asked him to take advantage of a tutor or some structured support to help reinforce his behavior, but he seems determined to do it alone."

- **Specific Accommodations and Self-Advocacy.** Doing it alone is not always the answer, says Jane Warner. Students with ADHD frequently need support when they move from high school to college. "Study skills and time management are troublesome for students with ADHD. Things can start to fall apart. Students might miss several classes and think they can never go back, so they just sit out and their grades go down, their self-esteem starts to slip, and they hit the wall." Warner encourages students to disclose their learning needs confidently and make the primary contact with the office for disability services on campus. Students with ADHD who have not received special services in high school are advised to get the documentation they need for colleges to provide them with appropriate accommodations. "We prefer comprehensive evaluations that have been done by a qualified professional within the previous 3 years," says Warner. "IEPs are part of the puzzle, but IEPs can't be used as the only documentation for postsecondary accommodations."

Warner points out that current evaluations provide a clear picture of strengths and weaknesses, especially if the evaluator explains what the results mean in lay terms and makes specific educational recommendations. "Sometime between now and high school graduation," she says, "getting a current clinical evaluation will be a very important strategy for developing his self-advocacy and for moving Josh closer to reaching his goals."

Reflecting On Your Own Professional Development

If you were Josh's teacher...

- What are some areas about educating students with ADHD about which you would need to know more?
- What are some specific skills that would help you to address his academic and behavioral challenges?
- What personal dispositions do you think are most important for you to develop in teaching students with challenging behaviors posed by ADHD?

By Jean B. Crockett

Carrey, Ryan Gosling, Paris Hilton, Solange Knowles, Howie Mandel, Michael Phelps, Michelle Rodriguez, Charles Schwab, Will Smith, Justin Timberlake.)

Although we can point to highly successful adults with ADHD, they are the minority. One prestigious team of researchers found that children who persist into adulthood with the same ADHD symptoms that they demonstrated in childhood are at risk for such things as being fired from or quitting jobs, relying on public assistance, and engaging in risky sexual behavior (Hechtman et al., 2016).

COLLEGE If they attend a post-secondary school, students with ADHD tend to have more problems adjusting academically and socially than do their peers without disabilities. This shouldn't be surprising given the behavioral and social skills needed for successfully meeting the academic requirements and social complexities of academic life. Time management, an aspect of executive functioning, is a particular skill found lacking in some students with ADHD (Weyandt & DuPaul, 2013). See, for example, how much Josh Bishop in the Success Stories feature (p. 162) focuses on learning better time management in order to prepare for college. Note, too, that he is learning self-advocacy, something that will serve him well when he attends college.

One highly recommended technique for adults with ADHD, which is especially useful for those in college, is coaching. Coaching involves identifying someone whom the person with ADHD can rely on for support (Hallowell & Ratey, 2006). The coach, who can be a therapist or a friend, is someone who can regularly spend a few minutes to help keep the person with ADHD focused on goals. The coach provides the structure needed to plan for upcoming events and activities and heaps on praise when tasks are accomplished.

EMPLOYMENT One of the keys to successful employment, especially for persons with ADHD, is to select a job or career that maximizes the individual's strengths and minimizes weaknesses. Success often depends on pursuing a job that fits a person's needs for structure versus independence. It's recommended that those who work best with structure look for jobs with organizations that have a clear mission and lines of authority, with an emphasis on oversight from supervisors who have an understanding of ADHD. Those who find formal structures too confining should look for work environments that are flexible, have variety, and allow one to be independent (Hallowell & Ratey, 2006).

MARRIAGE AND FAMILY Given some of the behavioral characteristics of ADHD, it's not surprising that husbands and wives of people with ADHD frequently complain that their spouse is a poor listener, preoccupied, forgetful, unreliable, messy, and so forth. A person's ADHD can have a negative impact on the entire family. Parents who have ADHD may find it difficult to manage the daily lives of their children. As one parent put it, "I couldn't remember to brush my teeth when I was a kid, and now I can't remember to tell my kid to brush his teeth" (Weiss, Hechtman, & Weiss, 2000, p. 1060).

Many authorities recommend that the first step to treatment is to have all family members become educated about the facts associated with ADHD. Because ADHD is a family issue, they also recommend that all members of the family should be partners in its treatment.

In Summary

Even though people with ADHD are at risk for poorer outcomes, it's important to point out that many adults with ADHD have highly successful careers and jobs, and many have happy marriages and families.

There's little doubt that ADHD can be a lifelong struggle. However, with the appropriate combination of medical, educational, and psychological counseling, satisfactory employment and family adjustment are within the reach of most people with ADHD. Now that most authorities recognize that ADHD often continues into adulthood, more and more research will be focused on treatment of ADHD in adults. With this research should come an even more positive outlook for adults with ADHD.

▼ chapter seven SUMMARY

What are the historical origins of attention deficit hyperactivity disorder (ADHD)?

- In the mid-19th century, Dr. Heinrich Hoffmann wrote nursery rhymes about "Fidgety Phillip" and "The Story of Johnny Head-in-Air."
- In his textbook published in 1775, Dr. Melchior Adam Weikard devoted a chapter to "Lack of Attention."
- In 1798, Sir Alexander Crichton wrote a treatise on attention disorders.
- In 1902, Dr. George F. Still reported on children whom he referred to as having "defective moral control."
- In the 1930s, Kurt Goldstein reported on soldiers who had head wounds in World War I.
- In the 1930s and 1940s, Heinz Werner and Alfred Strauss reported on children with mental retardation (intellectual disabilities) who were assumed to be brain injured, referred to as having the "Strauss syndrome."
- In the 1950s, William Cruickshank extended Werner and Strauss's work to children with normal intelligence.
- In the 1950s and 1960s, professionals used the term *minimal brain injury* to refer to children who were of normal intelligence but who were inattentive, impulsive, and/or hyperactive.
- In the 1960s and 1970s, the term *hyperactive child syndrome* was popular.

What is the current definition of ADHD?

- Most professionals rely on the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* for the definition of ADHD. Currently, the manual subdivides individuals into (1) ADHD, Predominantly Inattentive Type; (2) ADHD, Predominantly Hyperactive-Impulsive Type; and (3) ADHD, Combined Type.

What is the prevalence of ADHD?

- The best estimates are that 7% to 9% of the school-age population has ADHD; however, only 1.07% of the school-age population receive special education services.
- Boys with ADHD outnumber girls, most likely owing to biological differences and perhaps some referral bias.

What methods of assessment do professionals use to identify individuals with ADHD?

- Professionals usually use four methods of assessment: (1) a medical examination, (2) a clinical interview, (3) teacher and parent rating scales, and (4) behavioral observations. The behavioral observations can be done in the classroom and/or in the clinician's office.

What causes ADHD?

- Neuroimaging studies have identified four areas of the brain that might be affected in people with ADHD: the pre-

frontal and frontal lobes, the basal ganglia, and the cerebellum.

- The prefrontal and frontal lobes are responsible for executive functions, or the ability to regulate one's behavior.
- The basal ganglia and cerebellum are involved in coordination and control of motor behavior.
- Research has identified an imbalance in each of two neurotransmitters: dopamine and noradrenaline.
- Family studies, twin studies, and molecular genetic studies indicate that heredity may also be a significant cause of ADHD.
- Exposure to toxins such as lead, as well as medical factors such as complications at birth and low birth weight, can also be a cause of ADHD.

What are some of the psychological and behavioral characteristics of learners with ADHD?

- Three of the most common behavioral characteristics are inattention, hyperactivity, and impulsivity.
- Two of the most common psychological characteristics are difficulties in executive functioning and behavioral inhibition.
- People with ADHD also often experience problems in adaptive behavior and in their relationships with peers.
- Several conditions often co-exist with ADHD: learning disabilities and emotional-behavioral problems, such as depression and anxiety; people with ADHD are also at risk for substance abuse problems.

What are some educational considerations for learners with ADHD?

- Good educational programming for students with ADHD involves a high degree of classroom structure and teacher-directed activities.
- Good educational programming for students with ADHD involves functional assessment and contingency-based self-management.
 - Functional behavioral assessment (FBA) involves determining the consequences, antecedents, and setting events that maintain inappropriate behaviors.
 - Such approaches might also include self-monitoring or self-management programs, with students recording their own behaviors.

What are some medication considerations for learners with ADHD?

- Psychostimulants, such as Ritalin, are prescribed most often; Strattera, a nonstimulant, is also often prescribed.
- Scientific studies generally support the effectiveness of medication, and most authorities on ADHD favor its use.



- Some cautions about medication are that some people are nonresponders, dosage levels should be monitored closely, some people experience side effects (although these usually are not serious), children should not be encouraged to see the medication as a replacement for self-initiated behavioral control, and medication should not be the first response to problem behavior.
- Principles of classroom structure, teacher direction, functional behavioral assessment, and contingency-based self-management are important for preschoolers with ADHD.
- Because young children typically do not have strong self-management skills, contingencies in the form of praise, points, and tangible rewards are important.

How do professionals assess the academic, attention, and behavioral progress of students with ADHD?

- Curriculum-based measurement can be used to assess progress in academics and attention and behavior.
 - Momentary time sampling is particularly useful for assessing behavioral progress.
- Testing accommodations often include small-group or individual administration in a quiet location, extended time, and frequent breaks.

What are some important considerations with respect to early intervention for learners with ADHD?

- Diagnosing ADHD in early childhood is difficult, partly because very young children typically have short attention spans and are motorically active.

What are some important considerations with respect to transition to adulthood for learners with ADHD?

- At least 50% of children with ADHD continue to have difficulties in adulthood.
- The difficulties they have can include executive functioning, working memory, and time management.
- A thorough clinical history is critical in diagnosing ADHD in adults.
- Although exceptions exist, adults with ADHD tend to have less positive outcomes than the general population in terms of employment, marriage and family, and general social well-being.
- Coaching is a therapeutic technique often recommended for adults with ADHD.

▼ INTERNET RESOURCES

Professional Organizations

- The oldest organization focused on children and adults with ADHD is Children and Adults with Attention-Deficit Hyperactivity Disorder: www.chadd.org.
- An organization focused on adults with ADHD is the Attention Deficit Disorder Association: www.add.org.
- Totally ADHD (<http://totallyadd.com>) is a website that takes a relatively light and humorous view of ADHD; however, it also offers straightforward advice and does a good job of ensuring that it's accurate and scientifically based.