

## More Praise for *Smart but Stuck*

“*Smart but Stuck* will help you get unstuck! Drawing upon a lifetime of clinical experience, Tom Brown once again strikes gold in this practical, authoritative, and, above all, helpful book. No matter where you are in your journey to success, if you have ADHD this book will help to speed you on your way. I could not recommend it more highly.”

— **Edward (Ned) Hallowell, M.D.**, author, *Driven to Distraction* and *Delivered from Distraction*

“This is an exceptionally important book for those coping with ADHD and family members who care about them. It addresses a much overlooked component of the disorder — the importance of emotions. Clearly written, rich in detail, and full of helpful advice, this book will be beneficial to anyone with ADHD and to those who struggle to live with, understand, and help them.”

— **Russell A. Barkley, Ph.D.**, clinical professor, psychiatry and pediatrics, Medical University of South Carolina; author, *Taking Charge of ADHD* and *Taking Charge of Adult ADHD*

“This book, reflecting Dr. Brown’s 35 years of clinical practice combined with the latest findings from affective neuroscience, is a must-read for anyone who is interested in ADHD.”

— **James J. Gross, Ph.D.**, professor, psychology, Stanford University; editor, *Handbook of Emotion Regulation*

“Dr. Brown introduces a forgotten piece in the life of those suffering from ADHD: the role of emotions. He provides an integrative and easy-to-understand view of how executive functioning impairments interact with emotional control in ADHD. He also offers thoughtful strategies to minimize the impact of these impairments.”

— **Luis Augusto Rohde, M.D., Ph.D.**, president, World Federation of ADHD; professor, psychiatry, Federal University of Rio Grande do Sul, Brazil

“These engaging vignettes vividly bring to life emotional difficulties that, even for very intelligent teens and adults, can lead to frustration and failure in efforts to overcome their deficits in attention, organization, and motivation. Here Tom Brown combines a reader-friendly summary of relevant research with his clinical expertise in helping people with ADHD to get on track to success.”

— **Mina K. Dulcan, M.D.**, professor of psychiatry, behavioral sciences and pediatrics, Ann & Robert H. Lurie Children’s Hospital of Chicago and Northwestern University Feinberg School of Medicine

# smart but stuck

emotions in teens and adults  
with ADHD

thomas e. brown, ph.d.

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## the author

**Thomas E. Brown, Ph.D.**, is a clinical psychologist, assistant clinical professor of psychiatry at Yale University School of Medicine, and associate director of the Yale Clinic for Attention and Related Disorders. His award-winning book *Attention Deficit Disorder: The Unfocused Mind in Children and Adults* (Yale University Press, 2005) has been published in seven languages. He developed the Brown Attention Deficit Disorder Scales (PsychCorp/Pearson) and has published numerous articles in professional journals. His past books include *ADHD Comorbidities: Handbook of ADHD Complications in Children and Adults* (American Psychiatric Press, 2009) and *A New Understanding of ADHD in Children and Adults: Executive Function Impairments* (Routledge, 2013). To learn more, go to [www.drthomasebrown.com](http://www.drthomasebrown.com).



# acknowledgments

Impetus for this book was sparked in a conversation I had several years ago with my son, Dave, while we were hiking a small mountain called Sleeping Giant. He asked what I considered to be the biggest missing piece in the current understanding of ADHD. My answer was “the importance of emotions.” After I explained what I meant, Dave insisted: “You’ve got to make that your next book, and you have to explain it with real-life stories of patients so people will catch on!” Dave read and offered helpful comments on my initial draft of each chapter. I am deeply grateful for his nudging encouragement and love.

My administrative assistant, Lisa Dziuba, and my research assistant, Ryan Kennedy, have both contributed by assisting with countless details of organizing, checking, and preparing the manuscript as well as by helping me remain organized throughout the process of working on this project while I was also attending each day to a full schedule of caring for patients.

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Thomas E. Brown  
January 2014

# introduction

*All information processing is emotional . . . emotion is the energy level that drives, organizes, amplifies and attenuates cognitive activity.*

—KENNETH DODGE, NEUROSCIENTIST

Although the scientific understanding of ADHD has changed dramatically over the past decade, most people affected by this disorder—and many who diagnose and treat them—have not yet had the opportunity to gain a clear, up-to-date understanding of this complex condition. As you’ll read in the chapters that follow, ADHD is not a simple problem of misbehavior, lack of willpower, or inability to focus attention. In this collection of true stories about extremely bright teenagers and adults, you’ll find multiple examples of the ways that ADHD can cause even very intelligent individuals to experience chronic frustration and failure, which gets them “stuck” in their schooling or work and many other aspects of daily life. Fortunately, in most cases it’s possible for a person with ADHD to get unstuck, and in these pages you’ll find numerous examples showing how effective treatment has helped those suffering from ADHD to get back on track.

NOTE: Throughout this book, the term *ADHD* is used to refer to the disorder currently understood as Attention Deficit/Hyperactivity Disorder (ADHD) and/or Attention Deficit Disorder (ADD).

Clinical and neuroscience research has revealed that ADHD is essentially a complex set of dynamically interacting impairments of the brain's management system, otherwise known as its "executive functions." These functions involve a number of critical operations of the brain, including the abilities to

- Get organized and get started on tasks
- Focus on tasks and shift focus from one task to another when needed
- Regulate sleep and alertness, sustain effort, and process information efficiently
- Manage frustration and modulate emotions
- Utilize working memory and access recall
- Monitor and self-regulate action

Everyone has trouble with these functions from time to time, but people with ADHD have much more difficulty with them than do their same-age peers. (I offer more detailed descriptions of these various executive functions in Chapter One.)

◦ the missing link: emotions

Despite progress made in ADHD research, one element has been lacking in most current descriptions of the disorder: the critical role played by emotions in every one of the executive functions. This book describes that missing piece. In 1996, neuroscientist Joseph LeDoux published *The Emotional Brain*, a book highlighting evidence of the central importance of emotion in the brain's cognitive functioning. He emphasized that emotions—mostly unconscious emotions—are powerful and critically important motivators of human thought and actions.<sup>1</sup> This understanding of the essential role of emotion in all aspects of human behavior has not yet been integrated into current thinking about ADHD.



We must recognize the critical role of emotions, both positive and negative, in initiating and prioritizing tasks, sustaining or shifting interest and effort, holding thoughts in active memory, and choosing to engage in or avoid a task or situation.

To fully understand the role of emotions in ADHD, we must not only recognize that those with the disorder often have a hard time managing how they express their emotions but also acknowledge the critical role that emotions, both positive and negative, play in the executive functions: initiating and prioritizing tasks, sustaining or shifting interest and effort, holding thoughts in active memory, choosing to engage in or avoid a task or situation. As was observed by neuroscientist Kenneth Dodge, “All information processing is emotional . . . emotion is the energy level that drives, organizes, amplifies and attenuates cognitive activity.”<sup>2</sup>

Emotions—sometimes conscious, more often unconscious—serve to motivate cognitive activity that shapes a person’s experience and action. For those with ADHD, chronic problems with recognizing and responding to various emotions tend to be a primary factor in their difficulties with managing daily life.

The stories in this book highlight the role that various emotions, positive and negative, played in the struggles of some of my patients with ADHD. Some readers of these stories might think, “Oh, this is a person with ADHD and several other disorders— anxiety, depression, or OCD. Their emotional struggles are just part of those additional disorders, not ADHD.” My response is that ADHD is not one silo of cognitive problems with another silo of emotional difficulties beside it. Problems with responding to and managing emotions are intimately, dynamically, and inextricably involved in ADHD.



Problems with responding to and managing emotions are intimately, dynamically, and inextricably involved in ADHD.

- learning from patients and research

I am a clinical psychologist. For more than thirty-five years, I have spent most of my working hours talking with and listening to children, adolescents, and adults, most seeking help for problems related to ADHD. Many also have had additional difficulties with other problems involving emotions, learning, or behavior. My primary source of learning about ADHD has been the countless conversations with these patients— young and old alike—who shared with me ongoing stories of their struggles to recognize and overcome their attention impairments and to extricate themselves from feeling stuck in patterns of demoralizing frustration and failure. The stories in this book are based on my notes from conversations with some of these patients. All have been modified to protect the privacy of those involved, but the essential details of all are true.

Recently expanding research in neuroscience, psychology, and psychiatry has helped explain many puzzling facts reported by patients with ADHD, such as how they can focus and work energetically on a few favored activities, but simply can't get started or sustain enough effort for other activities that they know are important and want to do. In these pages, true stories of patients are intermingled with accessible explanations of research that will help you better understand each patient's struggles and the fuller nature of the relationship between ADHD and emotions.

One of my special interests over the years has been adolescents and adults who are especially bright. They have taught me that being smart is no protection from attention impairments. Not only is it possible for people with a high IQ to suffer from ADHD, but it's likely that they'll suffer longer without adequate support or treatment because the people in their lives assume, quite mistakenly, that anyone who is really smart can't suffer from ADHD.



Not only is it possible for people with a high IQ to suffer from ADHD, but it's likely that they'll suffer longer without adequate support or treatment because the people in their lives assume, quite mistakenly, that anyone who is really smart can't suffer from ADHD.

The patients I write about in this book are all extremely bright. They scored within the top 9 percent of the population on IQ tests, but they were stuck. They sought treatment because they were unable to get themselves out of chronically unproductive, self-defeating patterns of emotions, thought, and action. They felt trapped in their daily dealings with their education, their job, their relationships with others, or a combination of these. Their stories illustrate the persistent difficulties those with ADHD have in managing themselves and their emotions. Some are stories of amazing successes and impressive accomplishments; others are tales of ongoing frustration and tragic disappointment. Most are a mixed bag. Yet each story illuminates the complex role that emotions play in ADHD.

- o what you'll find in this book

Chapter One describes this new understanding of ADHD, drawing on the latest research findings by clinicians, researchers, and neuroscientists. Chapters Two through Twelve offer stories of real teenagers and adults with ADHD, highlighting their particular struggles with the disorder, with their emotions, and with related problems in their family or various other contexts. The final chapter summarizes some of the ways that emotions affect the life experiences of those with ADHD and what can be offered to appropriately support and treat those affected.

The stories that follow illustrate the limitations of diagnostic “pigeonholes.” The individuals you’ll read about in these pages can’t be neatly categorized under one or several diagnoses. Each person is a unique and complex combination of interacting strengths and difficulties in each of the shifting contexts in which he or she lives. There is great diversity among people with ADHD as well as in the varied settings in which they encounter daily life.

In telling stories of these adolescents and adults, I have also shared some of my own reactions and challenges as I tried to provide the help they sought from me. Many of the stories are success stories. I share the resources and strategies that contributed to these successes. Several stories also illustrate the significant obstacles and struggles that some people with ADHD may experience.

Stories in this book also illustrate what we currently know about how ADHD changes—sometimes for the better, sometimes for the worse—as a person progresses into the increasing challenges of adolescence and adulthood. Each story describes medications and other treatments provided to these individuals to help in alleviating their ADHD impairments.

In none of these cases were medications alone sufficient to resolve the complex difficulties. For each of these patients, therapeutic success also depended on a therapeutic relationship with many therapeutic conversations. These were essential for assessing and understanding the nature and emotional complexities of his or her difficulties. The therapeutic relationship also was the vehicle for close collaboration to develop effective treatments, help the patient to make necessary changes in environment and lifestyle, repair damaged self-esteem, and work through the frustrations, stresses, and puzzlement that inevitably arise in interactions among patients, their family members, and their doctors.

The emotional conflicts and struggles these patients experience aren't unique to those with ADHD—nor are they unique to those who are exceptionally intelligent. You will probably recognize emotional pressures, conflicts, and struggles that aren't so different from your own or from those of your family and friends.

Throughout this book, I've tried to illustrate not only the weaknesses and struggles of those with ADHD and their families but also their impressive strengths and diverse talents. There is much to respect and admire in each of the people described in these pages.

# 1

## ADHD and the emotional brain

Emotions, and struggles with and between various emotions, play a central role in the daily life of all children, adolescents, and adults. Emotions guide what we notice and what we ignore, what we focus on intently and what we carefully avoid. Conflicting emotions can cause us to disrupt engagement with a task we want to accomplish, or lead us repeatedly to do what we consciously intend never to do again. In many ways—sometimes recognized, sometimes not, subtly and powerfully—we are pushed and pulled by our emotions. Yet we also exercise some control over them: we try to distract ourselves from uncomfortable emotions; we choose how much we want our emotions to show in our words or actions; we talk to ourselves to try to tone down or jack up how noticeable our emotions are to others and to ourselves. We manage and are managed by the complexity of our emotions.

In my work as a clinical psychologist, I've seen that emotional struggles play an especially large role in the daily life of people with attention deficit disorders. The same chronic impairments that interfere with other aspects of their cognitive functioning also tend to interfere with their ability to manage and be adequately guided by their emotions. People with ADHD often suffer chronic difficulties in responding to and sustaining emotions that motivate them for important tasks.

Most people with ADHD experience the same frustrations, fears, sadness, pride, shame, excitement, and so on that spontaneously arise in everyone else in various situations. What is different is the chronic difficulty most people with this disorder experience in managing and responding to their emotions, particularly in the many situations where emotions are mixed and conflicting. As noted earlier, stories in this book illustrate the fact that being very smart does not prevent a person from struggling with these emotional problems, nor does it prevent having ADHD.

This book highlights the idea that emotions are linked to the brain. Often people think of emotion as distinct from the brain, as being “from the heart” or “in the gut,” but these are metaphors that serve simply to suggest that emotions come from the depth of the person. The actual source of emotions is the brain.

The difficulties that people with ADHD have with emotions are similar to the problems they often have in prioritizing tasks, shifting focus, and utilizing working memory. While cleaning a room, they may get interested in some photos they pick up, soon becoming completely diverted from the job they had begun. While searching for some specific information online, they may notice a web page that draws them off the search they started and into a protracted investigation of something totally unrelated, derailing their original task. They may abandon a task they find boring, overlooking the fact that adequate and timely completion of this task is essential to gaining something they really want, and that failure to complete the task will inevitably bite them with a painful payback.



People with ADHD report that momentary emotion often gobbles up all the space in their head, as a computer virus can gobble up all the space on a hard drive, crowding out other important feelings and thoughts.

In a similar way, many people with ADHD tend to get quickly flooded with frustration, enthusiasm, anger, affection, worry, boredom, discouragement, or other emotions, not keeping in mind and

responding to related emotions also important to them. They may vent their momentary anger on a friend or family member with hurtful intensity that does not take into account that this is a person whom they love and do not want to hurt. People with ADHD report that momentary emotion often gobbles up all the space in their head, as a computer virus can gobble up all the space on a hard drive, crowding out other important feelings and thoughts.

- “attentional bias”

Many with ADHD also report that they tend to have a lot of difficulty with *attentional bias*. They tend to be particularly alert and quick to notice any comments or actions that fit with the emotions that preoccupy them, often without paying much attention to the context or to other information that might provide a useful different view. Some seem to be constantly alert for signs of things to worry about; others are excessively alert for any signs of potential frustration or discouragement. They become too easily immersed in one especially salient emotion and tend to have chronic problems in shifting their focus to keep in mind other aspects of the situation that might call for a very different response. For example, someone hearing just a slight uncertainty in a coworker’s reaction to a suggestion may interpret this as stubborn disapproval and quickly start arguing for his or her idea without listening adequately to understand the coworker’s actual response. Attentional bias may fuel feelings of depression, anxiety, or argumentativeness or cause the person to lose interest in a particular goal.<sup>1</sup>

### Watching Basketball Through a Telescope

For those with ADHD, life can be like trying to watch a basketball game through a telescope, which allows them to see only a small fragment of the action at any specific time. Sometimes that telescope stays too long on one part of the court, missing out completely on important events occurring elsewhere at the same time. At other times, the telescope may randomly flit from one

bit of action to another, losing track of where the ball is and what various players are in a position to do. To follow what is going on in a basketball game, a person needs to be able to watch the whole court, noting movements of the ball and rapidly shifting positions of the players as they present multiple risks and opportunities in the game.

- the unacknowledged role of emotions in ADHD

Current diagnostic criteria for ADHD include no mention of problems with emotions, but those who live with this disorder and those who care for them know very well that problems with experiencing and managing emotions—interest, comfort, desire, anxiety, frustration, worry, disappointment, hurt, excitement, anger, pride, sadness, and shame, in various blends and sequences—play a critical role in their daily difficulties. Sometimes people with ADHD are unable to manage expression of these emotions; at other times, they have trouble experiencing and clearly recognizing emotions in themselves that can guide them in social interactions and fuel behaviors important for achieving longer-term goals.

Researchers have recently been challenging the omission of problems with emotional regulation in current diagnostic criteria for ADHD. For example, a team of European researchers studied more than a thousand children with ADHD and found that almost 75 percent demonstrated significantly more intense and frequent problems with low frustration tolerance, irritability, hot temper, sadness, and sudden mood shifts than non-ADHD children of the same age.<sup>2</sup>

A longitudinal study of over a hundred hyperactive children and a matched comparison group followed into young adulthood showed that those whose ADHD persisted into adulthood continued to have significantly more difficulties with low frustration tolerance,

impatience, irritability, hot temper, and emotional excitability than the comparison group.

Such mood problems tend to persist into adulthood for many people with ADHD. A longitudinal study of over a hundred hyperactive children and a matched comparison group followed into young adulthood showed that those whose ADHD persisted into adulthood continued to have significantly more difficulties with low frustration tolerance, impatience, irritability, hot temper, and emotional excitability than the comparison group. Another study demonstrated that deficient self-regulation of these negative feelings is found in a subgroup of adults with ADHD, and also that this type of emotional dysregulation tends to occur with greater frequency among siblings of those affected adults.<sup>3</sup>

These recent studies have explored the role of emotions in ADHD, but most dealt exclusively with the combined type of ADHD, excluding those without hyperactive symptoms. Also, these studies have been focused primarily on difficulties in controlling negative emotions such as irritability and anger; they have neglected the role of emotions that are central to positive motivations, such as interest, enthusiasm, desire, pride, and pleasure. These studies also have not adequately explored anxiety, discouragement, stress, and hopelessness, which often compromise a person's motivation to act.

In a comprehensive review article, Russell Barkley, a leading researcher, has argued that "deficient emotional self-regulation" should be included in diagnostic criteria for ADHD and considered a core component of the disorder, though only for the combined subtype. His emphasis is on insufficient control of more negative, disruptive emotions:

ADHD creates a state in which the normal emotion-generating properties of the limbic system, and particularly the anger, frustration, and aggression-generating properties of the amygdala, are inadequately regulated by higher cortical functions. (p. 10)<sup>4</sup>

- the problem of ignition and motivation

Thus far, researchers and clinicians have focused too much on how people with ADHD demonstrate problems in *putting the brakes* on expression of emotions. There hasn't been sufficient attention given to the emotional problems with *ignition*—chronic difficulties with getting started on necessary tasks and staying motivated to finish what needs to be done.

An important clue to understanding these problems with ignition in ADHD can be found in the most puzzling and frustrating fact about children, adolescents, and adults with attention deficit disorders: their symptoms are not consistent. A person's ADHD symptoms vary considerably from one situation to another, depending on the task or context in which he or she is operating and on the incentives involved. Despite their chronic problems with organizing themselves, getting started on tasks, and staying focused, all people with ADHD have a few activities in which they have no such problems. If you watch them while they engage in those activities, you would swear that they have no problem with attention at all.<sup>5</sup>



Thus far, researchers and clinicians have focused too much on how people with ADHD demonstrate problems in *putting the brakes* on expression of emotions. There hasn't been sufficient attention given to the emotional problems with *ignition*—chronic difficulties with getting started on necessary tasks and staying motivated to finish what needs to be done.

Typically each person with ADHD, young or old, is able to focus very well for a few activities in which he or she has strong personal interest. This might be playing a sport or video games, drawing or painting, repairing a car, playing music, or using Facebook. Yet for virtually all other activities and tasks, people with ADHD have extreme difficulty in achieving and maintaining focus, with the possible exception of

situations where they expect a very immediate unpleasant consequence if they don't attend to the task at hand. If you ask a person with ADHD why he can focus for this and not for that, he will usually respond along the following lines:

I focus well on things that interest me, but if it's not something that really interests me, I just can't keep my focus. If I'm really freaked that something very unpleasant is going to happen quickly unless I take care of this right here, right now, that may help me focus for a while. But unless it feels like there is a gun to my head, I really have to be interested.

Because they can focus well on tasks that interest them, yet often focus very poorly or inconsistently on almost anything else, people with ADHD are often accused of lacking willpower. ADHD clearly looks like a problem with willpower, but it is not. One patient called his chronic difficulty with attaining and sustaining focus "erectile dysfunction of the mind." He said,

If the task is something that really interests me, I can get "up" for it and I can perform. But if it's not a task that "turns me on," I can't get up for it, and I can't perform. Doesn't matter how much I say to myself, "I need to, I ought to, I should." I can't make it happen. It's just not a willpower kind of thing.

- o immediate or delayed "payoffs" in the ADHD brain

Underlying this "can focus for this, but not for that" problem is an important problem with emotion in ADHD: difficulty in mobilizing and sustaining interest for activities that don't offer an immediate "payoff" of pleasure or relief. Most of us may not think of interest as an emotion, but it is in fact a critically important positive emotion. "Passionate interest" represents an intense level of sustained emotional engagement with a task or person, but interest occurs in varying degrees and with varying levels of persistence. Interest reflects the degree of a person's motivation and emotional engagement with a task or relationship. Psychologists

James Gross and Ross Thompson have emphasized that “emotions not only make us feel something, they make us feel like *doing* something.”<sup>6</sup>

PET imaging studies have demonstrated that chemicals which activate reward-recognizing circuits in the brain tend to bind on significantly fewer receptor sites in people with ADHD than do those in a healthy comparison group.

Emotions motivate action—action to engage or action to avoid. Many people with untreated or inadequately treated ADHD can readily mobilize interest only for activities offering very immediate gratification; they tend to have severe difficulty in activating and sustaining effort for tasks that offer rewards only over the longer term.

Problems of activating and sustaining motivation and effort for necessary tasks—lack of sufficient interest—may have to do with how people with ADHD are “wired”: they may be less sensitive to potential rewards, as opposed to immediately available rewards, than are others of the same age.

PET imaging studies have demonstrated that chemicals which activate reward-recognizing circuits in the brain tend to bind on significantly fewer receptor sites in people with ADHD than do those in a healthy comparison group.<sup>7</sup> These and other imaging studies may help explain why people with ADHD tend to be less able than their peers to anticipate pleasure or register satisfaction with tasks for which the payoff is delayed. An important effect is that often they have great difficulty in activating themselves to get started on tasks that are not especially interesting to them and in sustaining motivation to complete tasks for which the rewards are not imminently available. I discuss implications of this research in Chapter Two.

Problems in activating and sustaining interest (focus) and effort for tasks are two of the multiple cognitive functions included in the complex syndrome currently identified as ADHD. As I noted in the Introduction,

this disorder is no longer seen as simply a problem of young children who misbehave. In fact, misbehavior is something of a red herring in the mystery of ADHD and has eclipsed the truly debilitating aspects of the disability as it often progresses to young adulthood and into middle age, bringing heartbreaking suffering, internal turmoil, and frustration in actualizing life goals. It is in fact now clear that many people with ADHD have never had significant behavioral problems, and even for those who did have such difficulties, problems with misbehavior usually tended to be among the least of their troubles. The primary problem for most individuals with ADHD, especially as they enter adolescence and adulthood, is a wide range of cognitive impairments in the management system of the brain. All of these impairments are linked to various problems with emotion.

- emotions, ADHD, and executive functions

Neuroscience is quickly changing our understanding of the neurological underpinnings of psychological phenomena. Nowhere is this research more salient than in the study of ADHD, where we need better to understand how brain functions are intimately tied to emotional experiences, feelings, and decision-making processes. Here I offer a brief review of the model of executive functions (EFs) impaired in ADHD, as well as a model for how emotional processing has a special relationship to these brain functions.

### *understanding executive functions*

In 2005, I published the book *Attention Deficit Disorder: The Unfocused Mind in Children and Adults*. Eight years later, I updated it with *A New Understanding of ADHD in Children and Adults: Executive Function Impairments*.<sup>8</sup> In those books, I described six clusters of chronic difficulties experienced by most people with ADHD. I explained how these six clusters together constitute a description of problems in the brain's management system, its executive functions. Building on my own research and the work of others, I have suggested the new working definition of ADHD shown here:

### A New Working Definition of ADHD

*ADHD =*

- a complex syndrome of
- developmental impairments of executive functions,
- the self-management system of the brain,
- a system of mostly unconscious operations.
- These impairments are situationally-specific,
- chronic, and significantly interfere with functioning in many aspects of the person's daily life.

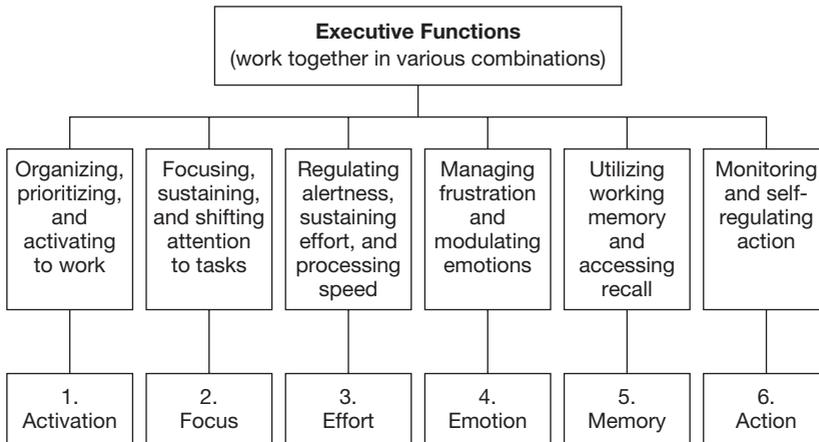
Source: T. E. Brown, 2013, *A New Understanding of ADHD in Children and Adults*, New York: Routledge.

In those earlier books, I also highlighted the puzzling question of why those with ADHD tend to have chronic EF problems in most areas of daily life, yet have almost no difficulty in effectively deploying these same functions in a few specific activities. This book explains how problems with emotion underlie this ability of people with ADHD to focus on some tasks very intently while also being chronically unable to focus on many other tasks that they know are important.

Among the six clusters of this model, illustrated in Figure 1.1, there is one that includes problems in managing frustration and modulating emotions. This book is not focused only on that one aspect of EF; it is not only about emotion management. It is about the multiple and subtle ways in which problems with emotion underlie chronic difficulties in all six clusters of EF: problems of emotion in prioritizing and getting started on tasks, in holding focus and shifting focus appropriately, in regulating alertness and sustaining effort, and in utilizing working memory—all this in addition to problems with managing frustration and emotional expression and experience.

#### *building blocks of the executive functions*

The model in Figure 1.1 provides a way to think about the variety of cognitive functions that make up the executive functions of each



**Figure 1.1** Executive Functions Impaired in ADHD

Source: From *Attention Deficit Disorder: The Unfocused Mind in Children and Adults* (p. 22), by T. E. Brown, 2005, New Haven, CT: Yale University Press.

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person's brain. The six boxes are not unitary variables like height, weight, or blood pressure—all one thing of which you can have more or less. Rather, each of these boxes represents a cluster of related cognitive functions. For most tasks that require self-management, several, if not all, of these six clusters of cognitive functions interact dynamically to do the task. Usually they operate so quickly that they are automatic, faster than lightning, not dependent on step-by-step conscious thought. The following list describes these six clusters in more detail:

1. **ACTIVATION:** organizing tasks and materials, estimating time, prioritizing tasks, and getting started on work tasks. Patients with ADHD describe chronic difficulty with excessive procrastination. Often they will put off getting started on a task, even a task they recognize as very important to them, until the very last minute. It is as though they cannot get themselves started until the point where they perceive the task as an acute emergency.
2. **FOCUS:** focusing, sustaining focus, and shifting focus to tasks. Some people with ADHD describe their difficulty in sustaining focus as similar to trying to listen to the car radio when you drive

too far away from the station and the signal begins fading in and out: you get some of it and lose some of it. They say they are distracted easily not only by things that are going on around them but also by thoughts in their own minds. In addition, focusing on reading poses difficulties for many. They can generally understand the words as they read, but often have to read the material over and over again to fully grasp and remember the meaning.

3. **EFFORT:** regulating alertness, sustaining effort, and working with adequate processing speed. Many with ADHD report that they can perform short-term projects well, but have much more difficulty with sustained effort over longer periods of time. They also find it difficult to complete tasks on time, especially when required to do expository writing. Many also experience chronic difficulty regulating sleep and alertness. Often they stay up too late because they can't shut their head off. Once asleep, they often sleep like dead people and have a big problem getting up in the morning.
4. **EMOTION:** managing frustration and modulating emotions. Although the most current version of the manual used for psychiatric diagnosis does not recognize any symptoms related to the management of emotion as an aspect of ADHD, many with this disorder describe chronic difficulties managing frustration, anger, worry, disappointment, desire, and other emotions. They speak as though these emotions, when experienced, take over their thinking the way that a computer virus invades a computer, making it impossible for them to attend to anything else. They find it very difficult to get the emotion into perspective, to put it to the back of their mind, and to get on with what they need to do.
5. **MEMORY:** utilizing working memory and accessing recall. Very often, people with ADHD will report that they have adequate or exceptional memory for things that happened long ago, but great difficulty in being able to remember where they just put something, what someone just said to them, or what they were about to say. They may describe difficulty holding one or several things "online" while attending to other tasks. In addition, people with ADHD

often complain that they cannot retrieve from memory information they have learned when they need it.

6. **ACTION:** monitoring and regulating self-action. Many people with ADHD, even those without problems of hyperactive behavior, report chronic problems in regulating their actions. They often are too impulsive in what they say or do and in the way they think, jumping too quickly to inaccurate conclusions. People with ADHD also report problems in monitoring the context in which they are interacting. They fail to notice when other people are puzzled, hurt, or annoyed by what they have just said or done and thus fail to modify their behavior in response to specific circumstances. Often they also report chronic difficulty in regulating the pace of their actions, in slowing themselves down or speeding up as needed for specific tasks.

In looking at this model, keep in mind that the capacity of any person to use these executive functions depends on a developmental process that starts in very early childhood and is not fully completed until the late teen years or early twenties. In other words, these cognitive functions mature and come online only gradually over the long course of development from early childhood to early adulthood.

The brain infrastructure needed for these executive functions is very slow to develop. The abilities to organize and start tasks on your own, sustain focus on a task, regulate your alertness and capacity to keep one thing in mind while doing something else—all these abilities and other EFs develop only in very rudimentary form during early childhood. For all humans, it takes almost two decades of gradual development for EFs to reach their mature capacity.

ADHD is essentially a developmental delay or ongoing impairment of these six clusters of EFs. Later in this chapter, I describe our current understanding of causes of ADHD; for additional information about how ADHD impairments appear in various forms at different ages, please refer to my two earlier books.

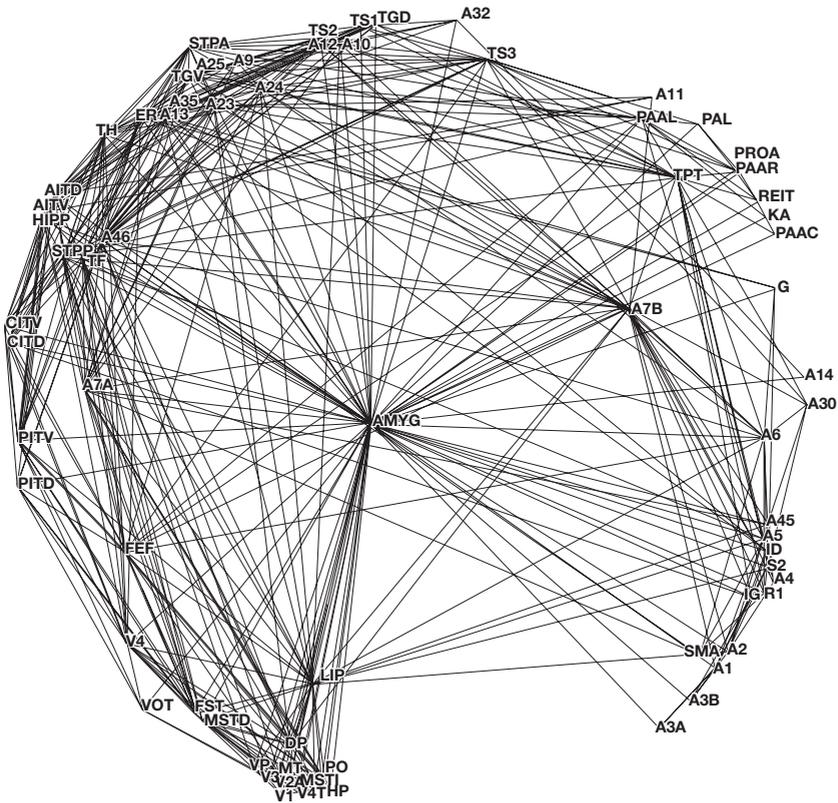
- a critically important hub in the brain

The amygdala, a small region deep inside the brain, is the primary locus of the rapid initial processing of anything perceived, thought about, or imagined. This critically important hub links with almost every other region of the cerebral cortex to facilitate instantaneous emotional assessment—positive and negative—of current perceptions, thoughts, or imaginings. These assessments are then very rapidly communicated to various sections of the brain via the amygdala's output of a variety of neurotransmitter chemicals and hormones that quickly stimulate responses within the brain and throughout the body.<sup>9</sup>

Figure 1.2 illustrates the density of connections between the primate amygdala and other regions of the cerebral cortex. The amygdala, one of the emotional centers of the brain, is like a transit station through which massive amounts of processing take place.

The amygdala, shown in the center of the diagram, is directly linked to sixty of sixty-eight regions of the cortex, including many involved in reasoning and high-level decision making. No other area of brain is so fully and directly connected with the rest of the cortex. Within this matrix of brain connections, emotional reactions are assigned and adjusted moment by moment. There, in an instant, initial appraisals are made of how potentially appealing or dangerous that specific perception or thought seems to be for that person in that moment. These initial assessments may or may not be reconsidered and may or may not be followed by responsive actions, depending on how other areas of brain respond to the amygdala's initial assessment.

Two primary sources shape the brain's appraisal of what we see, hear, or think: instincts, and memories derived from past experiences. Instinctual reactions include quick withdrawal from perceptions associated with danger—for example, blinking and trying to get out of the way when a large, fast-moving object moves closely toward one's face, spitting out foods that smell or taste rotten. Likewise, we feel instinctively drawn toward people or activities that seem to promise comfort or pleasure.



**Figure 1.2** Schematic Graph Showing the Complex and Widespread Output Connections Between the Amygdala and Most Other Areas of the Cortex  
 Source: Figure 9 from “Analysis of Connectivity: Neural Systems in the Cerebral Cortex,” by M. P. Young, J. W. Scannell, G.A.P.C. Burns, and C. Blakemore, 1994, *Reviews in the Neurosciences*, 5, p. 243. Reprinted with permission from Walter de Gruyter GmbH.

With amazing speed, the brain also accesses emotional centers that store and process memories, which have embedded emotions (see the later discussion of memory and emotions). It links whatever the person has seen, heard, thought, or imagined to relevant instincts or to memories that provide clues from past experiences. These memories weight the perception or thought with some degree of emotional significance, and the brain directs or redirects attention accordingly.

- “hot” and “cool” executive function

Links between EF and emotions are complex. Some researchers have proposed that EF might be categorized along a dimension of emotional intensity; they differentiate between “hot” EF for dealing with tasks involving relatively strong emotional involvement, and “cool” EF for dealing with more abstract, less emotionally charged tasks.<sup>10</sup> Others have suggested that hyperactive/impulsive ADHD symptoms involve more impairments of hot EF, whereas the inattention symptoms of ADHD involve more impairments of cool EF.<sup>11</sup> Still others have argued that both hot and cool EF usually work in integrated ways. Stories in this book illustrate the complex and dynamic ways in which hot and cool aspects of EF interact in individuals with ADHD, regardless of subtype.

- it’s all about context: situational influences

What causes “hot” intense involvement or “cool” disinterested involvement in any given task is not the task itself but how the person perceives the task — which includes his or her emotions related to the task — in any particular moment. One university student may be intensely engaged in trying to complete a term paper long before the deadline set by the professor; another student in the same course may feel only weak interest or not even care about getting the paper in on time.

These emotions can change readily. The student who usually works hard to get every paper in on time may suddenly not care at all about the paper while he is upset because his girlfriend has just broken up with him and is now dating someone else. The student whose interest in completing papers on time is usually just lukewarm may quickly intensify interest and work hard to get a specific paper in before the deadline if he learns that timely submission may make the difference between passing or failing the course and possibly losing eligibility to continue playing on the school football team. Depending on changes in a person’s situation and viewpoint, any given task may suddenly appear far more hot or cold, or he or she may vacillate between extremes of emotional interest.

Emotions don’t exist as independent abstract entities; they are always embedded in perceptions, thoughts, sensations, images, or

imaginings as assessed by a given individual in a particular context at a particular moment in time. Sometimes an emotion is attached to a category of people or perceptions—for example, a special affection or dislike for people of a specific race, ethnic background, or appearance, or a persistent interest in or discomfort with particular erotic images or behaviors. But often even these generalized emotions can be traced back to specific experiences or events. It is true that some people manifest a more limited range of emotions, seeming to specialize in expressions of irritability, guilt, longing, pride, and so on; these are their more salient emotions, the ones most readily elicited and expressed. But most often a wide variety of emotions are attached to or embedded in the details of particular thoughts, sensations, perceptions, or imaginings.

Please note, however, that EF capacities are not primary determinants of emotional experience for people with ADHD or for anyone else. Emotions arise from biological processes that emerge in the temperament in infancy; these are gradually shaped by development and modified by countless life experiences. From his research with infants followed into adolescence, developmental psychologist Jerome Kagan has described and emphasized how

each child is born with a profile of temperamental biases . . . that creates initial tendencies to be vocal or quiet, vigilant or relaxed, irritable or smiling, and energetic or lethargic with regard to particular events or situations. Parental behaviors, sibling rivalries, friendships, teacher attitudes, emotional identifications with family, ethnic class, religious or national categories, and even the size of the community during the childhood years combine with a host of chance events to sustain, or more often to alter, the relative strength and exact form of the traits the early biases produced.<sup>12</sup>

Emotional responses arising within each person, shaped by that person's inborn temperament and modified by his or her ongoing life experiences, are often referred to as the "bottom-up" aspect of emotional experience. This book presents examples of people who vary widely in the bottom-up flow of temperament into their experience. Some, by nature, tend to be much more anxious; others are more

quick to give up in discouragement. However, in these stories, I will emphasize the “top-down” aspect of emotional experience for people with ADHD: their ability or lack of ability to utilize their EF capacities to recognize, modulate, and respond to the complexities of their emotional experience. These top-down processes can guide, shape, and alter the way people perceive and react to situations.<sup>13</sup>

- the profound importance of memory

To understand the role of emotions in ADHD, it is essential to appreciate the intimate connection between emotions and memory. The brain’s emotional reactions are guided by our personal memories linked to what we are seeing, hearing, thinking about, or imagining. Just as a search engine like Google can instantly pull up from the Internet a vast array of sites associated with a few key words, so the brain can far more quickly, in fractions of a second, select specific fragments and clusters of memories associated with any given perception, thought, or imagining, each memory carrying its own “charge” of associated emotion. Some memories derive directly from actual experiences in our remote or recent past that may seem relevant; other memories may emerge less directly from stories we’ve heard or movies we’ve seen or from recall of what happened to others whom we have observed in an apparently comparable situation. Some memories carry a “charge” of fear or shame; others are charged with desire and attraction; many are complicated by multiple layers and blends of emotion.

Without any conscious thought, in just milliseconds, the brain automatically appraises incoming perceptions, thoughts, or imaginings and generates reactions—to jump back or move forward, to pursue or to ignore. Often this initial appraisal leads to no significant reaction; the particular stimulus simply does not seem interesting or important in the moment. In some circumstances, the incoming perception primes us to generate more intensive or sustained reactions, which may arouse conscious awareness, thoughts, and associated memories.

Regardless of the source, within those milliseconds, the brain does its calculus and yields emotionally loaded reactions to signal further

approach and engagement. This process of calculating weights of emotion attached to relevant memories is the amazing mechanism by which the brain assigns valence, positive or negative value, and relative importance to every passing perception and thought. These instantaneous, automated emotional reactions, strong or relatively weak, are the basis on which the brain allocates attention to specific perceptions, thoughts, actions, or situations, and ignores others.<sup>14</sup>

Some emotions are readily recognizable, intense and clear; more often they are subtle and blended, jumbled and conflicting, layered and sequential. Some are brief and transient; others are recurrent or long persisting, but they are all generated by the brain and embedded in our perceptions and thoughts.

Each trace of memory is charged with one or, more often, multiple emotions that may vary in intensity from insignificant to overwhelming. Sometimes these emotions are linked specifically to the initial content of the memory trace—for example, a pleasurable or embarrassing or frightening situation. For other memories, associated emotions may be added later—for example, delayed pride, guilt, or resentment over a past thought or experience. It is the emotional charge attached to our countless strings of associated memories that provides what the neuroscientist Dodge described as “the energy level that drives, amplifies and attenuates cognitive activity.”<sup>15</sup> We depend on working memory to pull up the relevant information and associated emotions to help us size up situations and to guide us in coping with the countless tasks and interactions of daily life. Understanding of these processes is complicated, however, by the fact that emotions do not operate only at the level of consciousness. In fact, most emotional activity goes on outside our conscious awareness.

- the role of unconscious emotions

Many people think of emotions as involving only conscious feelings, limited to sensations of sadness, anger, pleasure, worry, and so on that a person is fully aware of and generally able to identify. Neuroscience research has shown that conscious feelings are only the tip of the massive iceberg of emotion that operates within each person to motivate executive functions.

*emotions at various levels of consciousness*

Much of emotional processing goes on outside of our awareness, and the less conscious emotions are often subtle, contradictory, and complex. Emotions involved in activities or relationships are often difficult to assess because they operate on multiple levels of consciousness. Often a person consciously thinks of a particular task as quite important, honestly believing that she wants to give it immediate attention and full effort, yet she does not act accordingly. She may continue to procrastinate, busying herself with work on other tasks that are not as urgent, or repeatedly interrupting work on the seemingly important task and actually making little progress at all. Or she may actively seek out distractions by initiating contact with friends, surfing the Internet, getting high, or going to sleep. Such contradictions make sense only when we realize that emotions often are not fully conscious and often are conflicting. We may be powerfully influenced by emotions we don't even know we have. For those with ADHD who are seriously stuck, talk therapy is often essential to unraveling their emotions and helping them move toward recovery.

Neuroscientist Antonio Damasio was describing these unconscious influences of emotions on EF when he wrote that

the emotional signal can operate entirely under the radar of consciousness. It can produce alterations in working memory, attention and reasoning so that the decision-making process is biased toward selecting the action most likely to lead to the best possible outcome, given prior experience. The individual may not ever be cognizant of this covert operation.<sup>16</sup>

Another neuroscientist, Joseph LeDoux, argued that

many of the things we do, including the appraisal of the emotional significance of events in our lives and the expression of emotional behaviors in response to those appraisals, do not depend on consciousness, or even on processes that we necessarily have conscious access to.<sup>17</sup>

Social psychologists have demonstrated that much of our behavior is shaped or primed in a given situation by situational factors that we don't consciously recognize. These situational factors may stir up, accentuate, or diminish various emotions without our being at all aware of their influence. One study showed that university students who completed a short writing task unscrambling sentences that included words referring indirectly to rudeness were significantly more quick to interrupt an experimenter when kept waiting for a long time to hand in their survey forms after completion than were other students whose task forms had had a similar number of words related not to rudeness but to politeness. It appeared that even indirect references to rudeness or politeness activated thoughts and emotions that primed students to act more politely or more rudely when frustrated.<sup>18</sup>

*automaticity, not repression*

These influences tend to be unconscious, not in the psychoanalytic sense of repression, but in the more modern sense of "automaticity," which refers to rapid activation of attitudes, emotions, or behaviors that emerge in that specific context without any conscious thought to direct them.<sup>19</sup>

Sometimes decisions are more conscious and may depend largely on the interpersonal situation. My wife and I were once on a transatlantic flight during which the flight attendants prepared freshly baked chocolate chip cookies. I was dieting to lose some weight, and my wife tended to serve as the food police to remind me of what I should not eat. The cookies smelled delicious as they were being baked, and my wife was asleep beside me as the flight attendant came down the aisle to serve them. If my wife had been awake, I certainly would have declined the delicious cookie and felt proud of my self-restraint. However, she was asleep, and I wanted the cookie. After briefly struggling with the decision, I accepted from the flight attendant not only a cookie for myself but also one for my sleeping wife. I then promptly ate both of them and hastily returned the plate to the galley to dispose of the evidence. Often what we do depends heavily on who is with us and what they are doing!

Psychoanalytic clinicians emphasize the multiple levels of emotion that we may experience simultaneously, only some of which may be in our awareness at any given moment.<sup>20</sup> You might feel strong dislike for a new friend of your old friend, making critical remarks about that new friend's interests, appearance, or abilities, realizing only much later that the intensity of your dislike was fueled by jealousy or worry that this new friend might bring the loss of your own closeness to the old friend. At yet another level, your hostile feelings about the newcomer might also mask feelings of attraction to the new friend. It is not unusual for your feelings about a person or task to be contradictory or shifting between extremes, particularly in close relationships.



Having conflicting or unrecognized emotions about certain people or tasks isn't unusual for anyone, with or without ADHD. But *managing* these complicated emotions and the tasks and relationships they affect is considerably harder for those with ADHD.

The same contradictory emotions may be true in your reactions to a task. You may want very much to work hard on a term paper to earn a good grade, yet this does not rule out the possibility that you may also feel like not putting out much effort for the paper because the teacher who assigned it has been unhelpful or because your parents have been too persistent in reminding you about the importance of doing well on it or because you expect your classmates to hand in papers that will be much better.

Having conflicting or unrecognized emotions about certain people or tasks isn't unusual for anyone, with or without ADHD. However, as illustrated in the stories in this book, *managing* these complicated emotions and the tasks and relationships they affect is considerably harder for those with ADHD than for most others of the same age.

- how do ADHD impairments of the brain affect processing of emotions?

Sometimes the working memory impairments of ADHD allow a momentary emotion to become too strong; the person is flooded with one emotion and unable to attend to other emotions, facts, and memories relevant to that immediate situation.

There are two primary ways in which emotions play a critical role in the chronic difficulties of people with ADHD. Both are related to working memory impairments—the person’s limited capacity to keep in mind and use multiple bits of emotion-laden information at the same time. Sometimes the working memory impairments of ADHD allow a momentary emotion to become too strong; the person is flooded with one emotion and unable to attend to other emotions, facts, and memories relevant to that immediate situation. At other times, the working memory impairments of ADHD leave the person with insufficient sensitivity to the importance of a particular emotion because he or she hasn’t kept other relevant information sufficiently in mind or factored it into his or her assessment of the situation. To understand how and why these problems with emotions become more complicated in persons with ADHD, it is necessary to begin with a brief review of what is now known about the problems of the brain that contribute to the impairments of ADHD.

- structural and chemical brain impairments that underlie ADHD

Over recent years, research in neuroscience has demonstrated four aspects of brain development and functioning that tend to be different in people with ADHD compared to most others of the same age.

These involve impairments in brain connectivity and in coordination of brain rhythms, delays in brain maturation, and differences in the dynamics of brain chemistry. For those with ADHD, any or all of these may be involved in their impairments of executive functions and in the related complexities of emotions.

*impaired brain connectivity*

The networks that carry information related to emotion and other aspects of brain functioning tend to be somewhat more limited in individuals with ADHD compared to most others. Years ago, most scientists thought that impairments of ADHD were due primarily to problems within specific regions of the brain, particularly the prefrontal cortex. New technologies, however, have shown that some of the impairments of people with ADHD may be more related to networks of fibers that support interactive communication between various regions of the brain.<sup>21</sup>

One type of communication between brain regions occurs via connections referred to as “white matter.” Dense networks of these fibers, most buried deep in the brain, rapidly carry messages from one area of the brain to the other. Some are very short, less than an inch; other fibers extend considerably longer. The total volume of white matter in the brain is huge. If all the white matter fibers in the brain of a twenty-year-old male were laid end to end, they would stretch over 109,000 miles (176,000 kilometers).<sup>22</sup>

Imaging studies have shown abnormalities in the structure of white matter in brains of children, adolescents, and adults with ADHD; such abnormalities may explain some of the difficulties these individuals have—for example, with keeping one thing in mind while doing something else.<sup>23</sup> One study has shown that methylphenidate, a medication used to treat ADHD, can normalize the connectivity limitations in the motivation and reward networks of children with ADHD when they are performing some assigned tasks.<sup>24</sup>

*impairments in coordination of brain rhythms*

One of the important ways in which the brain coordinates and synchronizes activities essential to emotional regulation, attention, and memory is through dynamic shifts in the rate and rhythms of oscillations in groups of nerve cells. Recent research has shown that when the mature brain isn't busy with specific tasks, it doesn't shut down; it shifts into a default pattern of relatively slow oscillations that become coordinated across a network of regions within the brain. In this mode, the conscious mind tends to wander, without specific focus, while less conscious aspects of the brain activate in ways that organize and integrate information. When we are faced with a task requiring more attention, this default mind-wandering mode is supposed to be turned down or off. Otherwise, we tend to be less alert; we slow down in responding, intermittently space out, and tend to make more mistakes.<sup>25</sup>

Imaging studies have shown that people with ADHD tend to have more problematic connections between those regions of the brain that support coordinating functions of the default network. Studies have also demonstrated that people with ADHD, compared to peers, tend to have more difficulty in turning down or shutting off the default mode in order to attend to specific tasks that require more active attention.<sup>26</sup> Some studies have also demonstrated that stimulant medication used for ADHD significantly improved the ability of children and adolescents with ADHD to suppress the default mode so that they could more adequately pay attention to assigned tasks.<sup>27</sup>

*delays in brain maturation*

Sometimes EF impairments experienced by those with ADHD are simply delays in development. The cognitive functions we all depend on to manage our emotions and activities in daily life aren't fully developed in childhood; these executive functions are among the slowest developing aspects of the human brain. The brain infrastructure on which EF depends develops very gradually, not reaching mature functioning capacity until late adolescence or early adulthood.

There are many ways in which EF can become impaired—trauma or diseases, for example—but those types of impairment usually occur in people who have had normal EF development and then lose it as a result of damage to brain tissue. ADHD is now understood as a *developmental* impairment of EF whereby the neural networks in the brain that support EF simply do not unfold and “come online” at the time they usually appear in most others of the same age.

An imaging study compared a sample of over two hundred children diagnosed with ADHD and a matched comparison group, conducting repeated brain scans over childhood and adolescence. The study reported that, on average, those with ADHD were about three to five years later than most age mates in reaching maturity of brain networks that support EF. Other structures of the brains of those with ADHD seem to develop at the same rate as most others in the same age group.<sup>28</sup>

This delay causes many with ADHD to function during childhood and adolescence with significantly less maturity in tasks involving EF, and with less ability to manage associated emotions, than do most others of the same age. For many, though not all, with ADHD, this development may catch up later, perhaps in early adulthood. The problem, of course, is that during those years of developmental immaturity of the EFs—critical years of education and preparation for adult life—the person can suffer considerable damage to his or her learning, relationships, and self-esteem. People who experience this delay in the development of these important self-management functions often suffer significant long-term consequences, as do those individuals with ADHD whose EF capacity seems never to develop fully.

### *brain chemistry dynamics*

ADHD is not related only to developmental anomalies in structures and connections of the brain. Another critically important aspect of the EF impairments of ADHD has to do with the dynamics of neurotransmitter chemicals manufactured in the brain. These chemicals facilitate communication within and between networks of neurons, the wiring of the brain. There is considerable evidence that ADHD impairments result from inadequate release and reloading of two critical neurotransmitter

chemicals.<sup>29</sup> Often people say that ADHD is a problem with the “balance” of chemicals in the brain. This makes it sound as though there is a problem with the ratio of one chemical to another in the fluid that is within and around the brain, as though the problem of ADHD were simply like having too much or too little salt in a soup.

In fact, the problem in the brain of a person with ADHD is not a global imbalance of chemicals; it is a problem with the release and reloading of two specific chemicals at the infinitesimal junctions of tiny neurons within complex networks. To help compensate for impairments of EF that characterize ADHD, medication treatments are often, though not always, helpful. There is a large body of research demonstrating effectiveness of stimulant and some nonstimulant medications for alleviating recognized symptoms of ADHD.<sup>30</sup>

Recently, researchers have begun to expand research to assess the impact of these medications on the broader range of EF symptoms implicated in ADHD. Experimental studies have shown that stimulant medication can improve the ability of children with ADHD to utilize working memory and to work for delayed rewards.<sup>31</sup> Self-report data have shown that patients with ADHD report significant improvement in a wide range of EF impairments, including emotional regulation, when receiving medication treatment for ADHD, though few studies of medication treatments for ADHD directly address their impact on emotional expression or on the various ways in which emotions affect EF.<sup>32</sup> Imaging studies employing fMRI have shown that stimulant medication can “normalize” activation and functional connectivity in attention and motivation networks in children with ADHD; these are suggestive, but more research is needed to sort out the impact of these treatments on the emotional aspects of EF.<sup>33</sup>

A recent study using electroencephalograms showed that as an alternative or supplement to medication treatment, reward incentives can also activate and normalize brain activity patterns while motivating improved task performance by children with ADHD. To have this beneficial effect, however, the reward incentive needed to be salient and administered promptly on the spot.<sup>34</sup> A previous study showed that both money incentives and stimulant medication can improve task

performance of children with ADHD on a long, boring task, though the medication had more potent and sustained effects.<sup>35</sup> These studies and others suggest that for people with ADHD, both medication and immediately available incentives, including social rewards, are likely to support improved performance on EF tasks, many of which are substantially affected by emotional factors.<sup>36</sup>

- additional psychiatric difficulties

ADHD is rarely the only significant problem for those who have it. Many who suffer from ADHD also have learning disorders or other psychiatric impairments that emerge in adolescence or adulthood, if not before. I have written two books and edited another that describe how these additional impairments often are severe enough to qualify for diagnosis as one or more co-occurring disorders, including a sleep disorder, anxiety disorder, mood disorder, specific learning disorder, obsessive-compulsive disorder, substance use disorder, disorders on the autism spectrum, or some combination of these. Most of these co-occurring disorders also involve specific bottom-up and top-down problems with managing emotions.<sup>37</sup>

All the individuals described in this book have had to struggle with a complicated mix of such interacting challenges. In most cases, adequate treatment involved interventions not only for their ADHD impairments but also for their co-occurring disorders.

- common problems with emotions in people with ADHD

The stories upcoming in this book offer many examples of conscious and unconscious emotions shaping attitudes and behavior. The next sections describe some of these processes as they occurred in the experiences of these teens and adults who were stuck due to their ADHD.

### *extreme reactions*

An adolescent with ADHD may become flooded with emotion, enraged when his parent refuses him use of the car for a gathering with friends

that the teen considers very important. Many teenagers in this situation might persistently argue, loudly complain, swear, and become sullen, but most would not escalate into throwing things, pushing or hitting the parent, or punching a hole in a wall. A teen without ADHD might momentarily consider such extreme responses, but usually would inhibit them because he is able to keep in mind, despite the momentary intensity of anger, that this is a parent whom he loves and upon whom he depends.

Moreover, most teens would probably be able to maintain awareness that those more extreme reactions would be likely to bring harsher punishments. As the typical teenager sizes up such a situation, his working memory will usually factor these other expectations and emotions into his moment-by-moment calculations—with little or no conscious thought—allowing him to maintain a reasonable perspective to appraise the immediate situation in a broader context, modulate his anger, and regulate his behavior.

In coming chapters, you will see examples of this flooding with one emotion that crowds out other relevant facts and emotional priorities—for example, in Martin's immersion in embarrassment that led to his continuing refusal to approach and talk with the professor he had disappointed (Chapter Four), and in Karen's consuming fear of disappointing her parents, which caused her protracted avoidance of telling them directly about her inability to begin the course she needed to be readmitted to her university (Chapter Three).

*ignoring emotional information: the importance of working memory*

The opposite extreme can be seen in the situation of an adult with ADHD whose alarm clock goes off early in the morning, announcing the need to get up and prepare to leave for work. The initial response of the person may be to awaken briefly and push the snooze button to get a few more minutes of sleep. Perhaps she was up late the night before laboring on a project she had brought home from work or had been engaged in a long argument with a family member or friend. In any case, when the alarm goes off for the second time, she turns the clock off fully, rolls over,

and returns to a deep and protracted sleep, uninterrupted by any alarm and without having in mind a recent warning from her supervisor that she had been coming late to work too often and might be jeopardizing her job if the pattern continues. At the moment when she was awake and turning off the clock, her impaired working memory did not protect her by bringing up recall of that warning from the supervisor. Her past experience and awareness of fear of losing her job was not strong enough to help her overcome her strong wish of the moment to get more sleep.

As you'll see in Chapter Eight, Steve's working memory failed him repeatedly when he did not keep in mind his supervisor's warning about coming late to work. Each day, he became immersed in responding to emails or repeatedly listening to a particular CD, ignoring the passage of the time he needed to get to work when expected, totally losing track of the importance of his supervisor's warning. Similarly, as you'll read in Chapter Twelve, James's working memory did not sufficiently maintain his awareness of his urgent desire to work on and complete the term papers that threatened his status in his college. Whenever he approached his computer, he remembered only the games that offered him a reliable way to reduce his stress by allowing him to immerse himself in the pleasures of fantasy violence. Both of these are examples of living too much in the immediate moment and not keeping sufficiently in mind relevant memories of the past and relevant goals for the future.

Working memory is important not only for helping us remember to lock the door when we leave the house or for holding in mind a telephone number while we are dialing. Working memory is also the brain's search engine. It automatically pulls up relevant memories, with their related emotional weightings, to help us decide moment by moment how we will prioritize our conflicting wishes and their accompanying emotions in countless situations of daily life. When working adequately, it helps us make informed decisions about what we will do and when we will do it. For many with ADHD, however, working memory often does not work adequately to keep them aware of the emotional weightings that are important in much of their decision making in daily life.

Working memory brings into play, consciously and/or unconsciously, the emotional energy needed to help us

- Organize and activate for tasks
- Sustain focus and shift focus when needed
- Regulate alertness and sustain effort for tasks
- Guide top-down control to modulate emotional responses
- Encode and access information learned
- Monitor and self-regulate our actions



Inadequate working memory causes a person with ADHD to insufficiently attend to the multiple emotions that play a critical role in guiding thought and behavior, or those emotions become eclipsed by one specific emotion.

Chronic impairment of working memory was a primary factor in the difficulties that caused the individuals described in this book to become stuck. As noted earlier in the chapter, inadequate working memory causes a person with ADHD to insufficiently attend to the multiple emotions that play a critical role in guiding thought and behavior, or those emotions become eclipsed by one specific emotion in a way that doesn't adequately take other relevant emotion-connected thoughts into account.

The coming chapters offer examples of how we need to keep in mind many shifting priorities, attending to the emotional weighting—the current personal importance—of multiple factors as well as the relative importance of each over the longer term of hours, days, or more. We depend on working memory to help us keep in mind the bigger picture—the larger context of the moments in daily life—and the variety of emotions that are relevant to our decision making.

When James was engaged in playing video games, he skillfully noticed action on many parts of the screen, assessing and responding to multiple potential threats and opportunities for his avatar. Yet he was not able to keep in mind the urgency he had felt earlier that evening about completing an essay due in class the next day. When Eric

(Chapter Two) suddenly noticed that he was late in leaving to meet his friends, he quickly jumped into his car and drove much too fast on an icy road, thinking only of his not wanting to keep them waiting, and not keeping in mind the risks of speeding on ice until his car slid off the road into a ditch.

Psychologists often measure working memory simply by asking the patient to listen to a string of digits and then to repeat those numbers in reversed order. Many people with ADHD are unable to do this task when the number of digits in each string gets beyond three or four. However, this digit-span test does not assess the far more important function of working memory that I've discussed here: the capacity to keep in mind the relative importance—the immediate and longer-term emotional significance—of various tasks, actions, risks, and opportunities that require attention throughout daily life.

### *family stresses*

Stories in this book also illustrate the multiple ways in which ADHD tends to create chronic stress not only for people with ADHD but also for their families. Sometimes stress is due to conflict between family members. For example, siblings of a child with ADHD often live with chronic frustration, guilt, worry, and anger about their recurrent daily hassles with their brother or sister. Sometimes they harbor resentment over how much attention and privileged status their brother or sister with ADHD seems to receive too often.<sup>38</sup>



Frequently parents of a child with ADHD are excessively stressed and may become polarized against each other. Often one parent takes on the role of “butt kicker,” confronting the child each time he or she is not doing what is expected. Meanwhile, the other parent may take on the role of “marshmallow,” repeatedly making excuses for inappropriate behavior.

Frequently parents of a child with ADHD are excessively stressed and may become polarized against each other, repeatedly arguing about how best to react to and deal with their child or children with ADHD. Often one parent takes on the role of “butt kicker,” confronting the child each time he or she is not doing what is expected. Meanwhile, the other parent may take on the role of “marshmallow,” repeatedly making excuses for inappropriate behavior or offering support and encouragement to that child while trying to arrange for others to modify their expectations and behavior to accommodate the apparent needs or wishes of the child with ADHD.

To adequately understand and effectively treat the individual with ADHD, we also need to understand the context of the family in which that individual lived or lives, and the chronic dynamics and stresses each family member may be coping with and responding to. Most of the stories in this book show how the identified patient created and reacted to stresses in their families, and they illustrate the complexity of the emotional interactions and interpersonal dynamics of people with ADHD.

*chronic stress and the burden of the “willpower assumption”*

One recurrent factor that complicated the emotions of these very bright individuals was the ongoing discrepancy between what was expected of them by their parents, grandparents, and teachers and even themselves and their frequent failure to achieve the expected success. Most of these patients had struggled since early childhood with continuing conflict between their picture of themselves as exceptionally bright and talented and their view of themselves as disappointing failures, unable to “deliver the goods” expected of them. Some had been very successful in their childhood, earning high grades and strong praise during the elementary school years, then gradually lost status and self-esteem due to increasing evidence of their difficulty in coping with the escalating demands of middle school, high school, and postsecondary schooling.

Every one of the patients whose story appears in this book suffered from being confronted repeatedly with the stark contrast between their impressive abilities, effort, and achievement in a few specific activities where they felt strong personal interest and their very

inconsistent effort and weak achievement in many other activities that were clearly important for their longer-term future. Typically their parents, teachers, and others who recognized their strong potential and wanted to help them fulfill it would urge, cajole, and pressure them to exercise “willpower” to show the same strength, effort, and success in those other domains that could significantly improve their future options in life. Most often, those with ADHD joined in criticizing themselves for continuing failure to “just make myself do it.” Both the well-intentioned critics and the guilt-ridden criticized shared the erroneous assumption that symptoms of ADHD could be overcome with sufficient determination and continuing exercise of presumably available willpower.

Except for genetic influences, the family does not cause a person to develop ADHD. However, family members can severely exacerbate the difficulties of someone with ADHD if they do not adequately understand the true nature of the disorder and if they tend to punish that individual with harsh and repeated criticism based on the erroneous assumption that ADHD impairments can be overcome simply by willpower. Such criticism is readily internalized, and the resulting shame, resentment, frustration, and self-loathing tend to echo endlessly in the memory of the person with ADHD. Even if they recognize this, those who live or work with a person who has significant ADHD impairments often feel extremely frustrated as they repeatedly encounter chronic lateness, poor planning, excessive forgetfulness, frequent lying, and recurrent disappointment from unfulfilled promises. It’s not easy for them to hold back their criticism.

It’s very difficult for most people to understand how any individual can be very focused on certain tasks or can mobilize themselves to complete a task effectively under the last-minute pressure of an imminent deadline and yet be unable to force themselves to deploy these same abilities in an appropriate and timely way, especially for tasks that are obviously important. Most do not understand that when a person is faced with a task in which he has strong and immediate personal interest, either because he really enjoys it or because he fears that not doing the task will quickly bring some very unpleasant consequence, the chemistry

of the brain is instantly altered to mobilize. And most don't know that this alteration of brain chemistry is not under voluntary control. ADHD clearly appears to be a problem of willpower failure, but it is actually a problem with the interacting dynamics of emotion, working memory, and the chemistry of the brain.

### *blaming the victim*

Failure to understand this basic fact about ADHD — that it appears to be a lack of willpower, when it is not — commonly leads to a blaming of the victim. This manifests both in self-blaming by those with ADHD and in the many subtle or not-so-subtle reactions of family members, teachers, friends, or employers.

When we don't understand the cause of a problem, we tend to assume that the resultant misfortune is somehow the fault of the affected person. In the early 1800s, a massive epidemic of cholera occurred in New York City. The cause of cholera at that time was unknown, but in 1832, thousands of apparently healthy children and adults suddenly suffered severe diarrhea and vomiting, often dying within one day of being brought to the hospital. Because this disease hit hardest in low-income areas of the city, many blamed the epidemic on African Americans and immigrant Irish Catholics who lived there. John Pintard, a prominent citizen of New York, wrote at that time, "Those sickened must be cured or die off, and being chiefly of the very scum of the city, the quicker [their] dispatch, the sooner the malady will cease." Lacking adequate understanding of the cause of cholera, Pintard and



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many others of his time assumed that it was the fault of those affected. In 1854, a London physician discovered that cholera is caused not by some flaw in those affected but by a bacterium found in contaminated water.<sup>39</sup>

ADHD is not a life-threatening disease like cholera, but those who encounter this syndrome of chronic impairments in their child, spouse, students, employee, coworker, or friend often find it very difficult not to assume that if only this person who can focus so well on a few favored activities would exercise sufficient willpower, he or she could certainly perform much better on many other important tasks. Just as the cause of cholera was unknown in the early 1800s, so the roles of genetically based developmental delays in brain development, inefficient neural transmission at countless synapses, and impairments of functional connectivity from one brain region to another are not currently understood as causes of ADHD by most of the lay public or by many professionals. As a result, most with ADHD experience a persisting climate of skepticism about the legitimacy of the disorder and its treatment, coupled with a tendency for them to be blamed for it by others and by themselves.