

# Introduction

## ARE BEHAVIOR PROBLEMS ON THE RISE?

Teachers today face many challenges. Not only must they present curriculum content in a meaningful way, but they are also expected to be drug, family, and guidance counselors, health care workers, as well as technology users and monitors. At the same time, they must check for weapons, maintain a safe and positive classroom climate, and deal with disruptive behavior. This last responsibility is demanding a greater portion of teacher time as the number of students with consistent behavioral problems appears to be growing.

The good news is that, despite the public perception, the number of threats and physical attacks against public and private school teachers, as well as the number of fights between students, have actually been declining significantly over the past 10 years. However, the number of disciplinary actions taken by schools in response to less serious behavioral offenses has increased over the same period of time. Whether this increase is the result of more behavioral problems or just more vigilant enforcement of stricter school policies is not clear. What is clear is that teachers report more incidents of disruptive classroom behavior than in the past (Dinkes, Cataldi, Kena, & Baum, 2006).

## Can Neuroscience Help?

Trying to figure out what is happening in the brains of students with behavior problems can be frustrating and exhausting. Until recently, science could tell us little about the causes of inappropriate behaviors and even less about ways to address them successfully. For hundreds of years, observing human behavior was the only method researchers had to study how the brain worked. Through these observations, psychologists made educated guesses about which brain systems processed a stimulus and which systems directed the response. However, technology to detect the brain's electric and magnetic waves and, more recently, the development of brain imaging devices have added significantly to our understanding of how the brain controls behavior.

### *Types of Brain Imaging*

Many people today are aware of brain imaging but may not be familiar with nature of the technology. Here is a brief review of the various techniques for looking inside the living brain. The

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imaging technologies fall into two major categories: those that look at brain *structure* and those that look at brain *function*. When aimed at the brain, computerized axial tomography (CAT or CT) and magnetic resonance imaging (MRI) are very useful diagnostic tools that produce computer images of the brain's internal structure. For example, they can detect tumors, malformations, and the damage caused by cerebral hemorrhages.

Different technologies, however, are required to look at how the brain works. An alphabet soup describes the four most common procedures that can be used to isolate and identify the areas of the brain where distinct levels of activity are occurring. The scanning technologies for looking at brain function mentioned in this book are the following:

- Electroencephalography (EEG)
- Magnetoencephalography (MEG)
- Positron Emission Tomography (PET)
- Functional Magnetic Resonance Imaging (fMRI)

Here is a brief explanation of how each one works:

**Electroencephalography (EEG) and Magnetoencephalography (MEG).** These two techniques are helpful in determining how quickly something occurs in the brain. To do that, they measure electrical and magnetic activity occurring in the brain during mental processing. In an EEG, anywhere from 19 to 128 electrodes are attached to various positions on the scalp with a conductive gel so electrical signals can be recorded in a computer. In a MEG, about 100 magnetic detectors are placed around the head to record magnetic activity. EEGs and MEGs can record changes in brain activity that occur as rapidly as one millisecond (one-thousandth of a second). When a group of neurons responds to a specific event, they activate and their electrical and magnetic activity can be detected above the noise of the nonactivated neurons. EEG and MEG do not expose the subject to radiation and are not considered hazardous.

**Positron Emission Tomography (PET).** The first technology to observe brain functions, this technique involves injecting the subject with a radioactive solution that circulates to the brain. Brain regions of higher activity accumulate more of the radiation, which is picked up by a ring of detectors around the subject's head. A computer displays the concentration of radiation as a picture of blood flow in a cross-sectional slice of the brain regions that are aligned with the detectors. The picture is in color, with the more active areas in reds and yellows, the quieter areas in blues and greens. Two major drawbacks to PET scans are the invasive nature of the injection and the use of radioactive materials. Consequently, this technique is not used with typical children because the radioactive risk is too high.

**Functional Magnetic Resonance Imaging (fMRI).** This newer technology is rapidly replacing PET scans because it is painless, noninvasive, and does not use radiation. The technology helps to pinpoint the brain areas of greater and lesser activity. Its operation is based on the fact that when any part of the brain becomes more active, the need for oxygen and nutrients increases.

Oxygen is carried to the brain cells by hemoglobin. Hemoglobin contains iron, which is magnetic. The fMRI uses a large magnet to compare the amount of oxygenated hemoglobin entering brain cells with the amount of deoxygenated hemoglobin leaving the cells. The computer colors in the brain regions receiving more oxygenated blood and these colors will identify the activated brain region to within one centimeter (less than a half-inch).

### *Research Into Practice*

The nature of the difficulties facing students with behavior problems vary from maintaining focus, controlling impulses, and building self-esteem to establishing relationships with peers and adults. Now, as a result of imaging and other technologies, neuroscientists can gain new knowledge about the brain's structure and functions. Some of this research is already revealing clues to help guide the decisions and practices of educators working with students who have behavior issues.

Students with behavior problems comprise such a heterogeneous group that no one strategy, technique, or intervention can address all their needs. Today, more than ever, neuroscientists, psychologists, computer experts, and educators are working together in a common crusade to improve our understanding of the learning process. Some of the research findings are challenging long-held beliefs about the cause, progress, and treatment of specific behavior problems. Educators in both general and special education should be aware of this research so that they can decide what implications the findings have for their practice.

## ABOUT THIS BOOK

Numerous texts about the neuroscience of behavior are available as well as books on strategies for dealing with problem students. This book is unusual because it combines the two. It explores the neuroscience of behavior and then suggest ways that the scientific findings can be translated into effective strategies to manage misbehavior in the classroom.

Thanks to newer imaging devices, psychologists who explore how the brain works (now called neuropsychologists) have been able to detect which areas of the brain are involved in various emotional, cognitive, and social behaviors. Although much of this research has little impact on typical classroom operations, some of it does. What we are doing in this book is examining those areas of research that can help educators understand more about their students' emotional and social behavior in schools and classrooms, and how to deal with them.

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As the amount of attention given to brain research grows, misinformation and inaccurate extrapolations of research findings also grow. What we have attempted to do here is select strategies that are compatible with, or can be induced from, the experimental evidence. The suggested interventions are drawn from clinical research that is consistent with the current findings in neuroscience. Nonetheless, more research is needed to confirm the link between those interventions and brain mechanisms.

Even with all that has been discovered in the last decade, there is a lot about the brain that we still do not know. It is important to remember that what we believe today about brain function is subject to change as our understanding and discoveries continue to evolve.

### Questions This Book Will Answer

This book will answer questions such as these:

- How do the brain's emotional and rational areas develop?
- How does a young brain make social and emotional decisions?
- How does the rate of brain development explain the erratic behavior of adolescents?
- What leads to impulsivity and violent behavior?
- What leads to social misbehavior?
- What type of data collection can help teachers manage misbehavior?
- How can teachers use self-talk to effectively control misbehavior?
- Why are boys more likely to misbehave than girls and what can teachers do about it?
- How can teachers use movement during instruction to curb misbehavior?
- What impact can music have on behavior control?
- How do teachers build positive relationships with students with behavior problems?
- Do adult mentoring programs really work?
- Can teachers use peer influence to curb misbehavior rather than encourage it?
- What is oppositional behavior and how do teachers deal with it?
- How important is raising student self-esteem and what precautions are there?
- To what degree do school and classroom climates affect student behavior?

### Chapter Contents

One of the more difficult decisions authors have to make is how to divide their material into chapters. It is often an arbitrary choice that decides what goes in which chapter, and that is the case here. Behavior, after all, is very complex. It results from the interaction of mental and physical systems operating in changing social and emotional environments. Many of the factors involved in determining behavior can influence each other, so separating them into chapters is not

easy. As a result, a few of the suggested strategies show up in several chapters because they address multiple factors.

**Chapter 1. Handling Social Misbehavior.** This chapter begins with a discussion of how the emotional and rational areas of the human brain develop. It examines the processing of emotional information and how the brain decides on the appropriate response. Factors affecting social behavior are also explored and several strategies are offered that can help teachers control social misbehavior, especially in younger students.

**Chapter 2. Dealing With Impulsive Behavior.** Numerous research studies have focused on the potential causes of impulsive behavior. In this chapter, we explore those causes and discuss cognitive and cognitive-behavioral strategies that have been successful in controlling impulsivity and anger.

**Chapter 3. Teaching Self-Control Through Self-Verbalization.** The discovery of mirror neurons has helped to explain a variety of human behavioral responses. Here we discuss how mirror neurons play a role in self-control as well as the means by which an individual can lose and regain self-control. Some strategies are discussed that show how self-verbalization and self-monitoring can be used to help a student regain self-control when needed.

**Chapter 4. Managing the Behavior of Boys.** Although it is no secret that boys misbehave more often than girls, this chapter explains why that is so. It discloses the different genetic and environmental factors involved in male and female development and how these differences affect behavior. Numerous suggestions are presented to help teachers design classroom instruction and management activities that are more likely to curb misbehavior among boys at all grade levels. Some suggestions for adapting the strategies to manage girls' misbehavior are also discussed.

**Chapter 5. Building Positive Relationships With Troubled Students.** Humans, of course, are social animals, but exactly how do social bonds form? Developments in a new research field called social cognitive neuroscience are revealing some intriguing insights on how adolescents form relationships with their peers, their parents, and other adults. Students with behavior problems often have difficulty forming meaningful relationships. In this chapter we discuss the important research components and look at several approaches that can build constructive relationships between adults and students who have behavioral problems.

**Chapter 6. Using Peer Relationships to Modify Behavior.** Continuing our discussion of relationship-building, this chapter focuses on using peer influence to modify student misbehavior. Most students want to be liked and often act out just get their peers' attention. After discussing the neuroscience research in this area, we suggest ways that teachers can use the power of peer relationships to curb other students' outbursts rather than encourage it.

**Chapter 7. Managing Oppositional Behavior.** Students with oppositional behaviors can be successful in the regular classroom setting. When outbursts do occur, however, what can the teacher do to manage the behavior without upsetting other classmates and losing valuable instructional time? This chapter discusses the symptoms and causes of oppositional behavior and suggests some

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strategies that help teachers manage these students successfully in the classroom. It also includes a brief discussion of Oppositional Defiant Disorder (ODD).

**Chapter 8. Developing Positive Self-Esteem.** Although high self-esteem does not guarantee success in school, low self-esteem often results in poor academic achievement and social interaction. Here we explore the nature of self-esteem and look at recent research on how self-esteem affects an individual's responses to environmental challenges. We give some cautions about self-esteem, but also offer some useful suggestions on how teachers can help students raise their self-esteem by building on their strengths.

**Chapter 9. Putting It All Together.** The sum total of the interactions we discuss in all the previous chapters describe the school and classroom climate. In this chapter we explore the all-encompassing concept of climate and explain its enormous influence on student and teacher behavior. Because of its importance, we offer suggestions on how to assess classroom climate, how to manage diverse classrooms, and strategies for supporting positive behavior. The chapter also includes information on how positive behavioral supports, including the functional behavioral assessment and behavior improvement plan, can help teachers deal with recurring misbehavior.

### Other Helpful Tools

**Case Studies.** In most chapters we include case studies that describe how a particular strategy or intervention was actually used with misbehaving students. We often include the actual dialogue between teachers and students in order to suggest how the teacher might introduce a particular intervention. Although the case studies are true, all names have been changed to protect privacy.

**Appendix.** Throughout the book we give examples of forms, worksheets, and checklists that are useful to implement a particular strategy. For the reader's convenience, these examples have been combined as reproducible black-line masters in the Appendix.

**Glossary.** We have included a glossary of terms used in the book to describe neuroscientific and psychological research.

**References.** Many of the citations in this extensive section are the original research reports published in peer-reviewed scientific and medical journals. These references will be particularly helpful for researchers and for those who would like more specific information on how the research studies were conducted.

**Resources.** This section offers some valuable Internet sites that will help teachers at all grade levels find many additional research studies and strategies for dealing with troubled youth.

The information presented here was current at the time of publication and we believe that it will assist teachers in dealing with students' problem behaviors. However, as scientists continue to explore the inner workings of the brain, they will likely discover more about the neural mechanisms governing emotional and social behaviors. These discoveries should help educators and parents understand more about the nature of human behavior and why persistent misbehaviors emerge. Stay tuned!