HOW THE Brain Influences Behavior

Management Strategies for Every Classroom

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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

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.

The baseline and intervention data showed that this technique was effective for both Henrico and Alfred. Mr. Goff had kept baseline data for five days on both Alfred and Henrico, as shown in Figure 7.2. After the class was trained in this intervention, Mr. Goff used the turtle for various students in the class, and continued to count and chart the misbehavior of Henrico and Alfred. The behavior of each of these students improved considerably, and Alfred's defiant behaviors were almost eliminated.

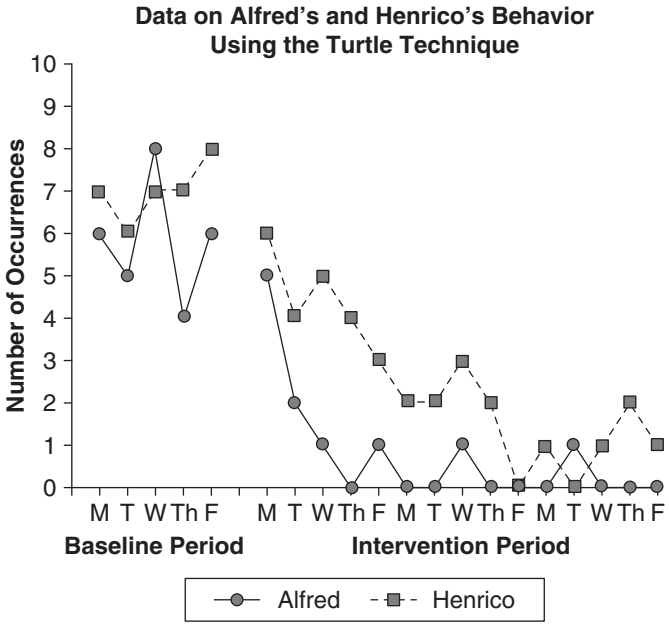

Figure 7.2 The graph shows the frequency of Alfred's and Henrico's misbehaviors during the one week baseline period and the three weeks of intervention using the "do the turtle" technique.

Using the Turtle Technique

You can use the turtle technique in the following ways:

- As shown in Mr. Goff's scenario, instruct specific students to "Do a turtle" when those students begin to lose control or display inappropriate behavior. This often prevents disruptive behaviors thereby improving the climate for the entire class.
- Individual students should be allowed and encouraged to "Do a turtle" when they feel the need to do so because they are angry or their feelings have been hurt. This teaches students with oppositional behavior that they do have some control over their feelings and over the environment.
- You can tell the entire class to "Do a turtle" when conflict arises that may get out of control, as when students are arguing loudly or when they are fighting. It also removes the audience for the misbehavior.
- In certain situations, you may wish to teach this technique to only one or two students who need help controlling their emotions. This technique is particularly effective for students with oppositional behavior because both the student and you can observe the signs of an impending emotional outburst. In those cases, explain to the class that when Henrico has his head down, the class should ignore him and not talk to him or about him.

Relaxation Strategies for Older Students

Various relaxation strategies have been shown to be effective for students with emotional problems at all grade levels (Kellner & Turtin, 1995; Lopata, 2003; Lopata, Nida, & Marable, 2006).

Adapting the turtle. For older students in grades four to 12, you may wish to use the same general technique as "Do a turtle" described earlier without referring to the turtle. Rather, use the

ABC Log of _____ (Student) Anger Behavior			
Day/Date	*Antecedent*	*Behavior*	*Consequences*