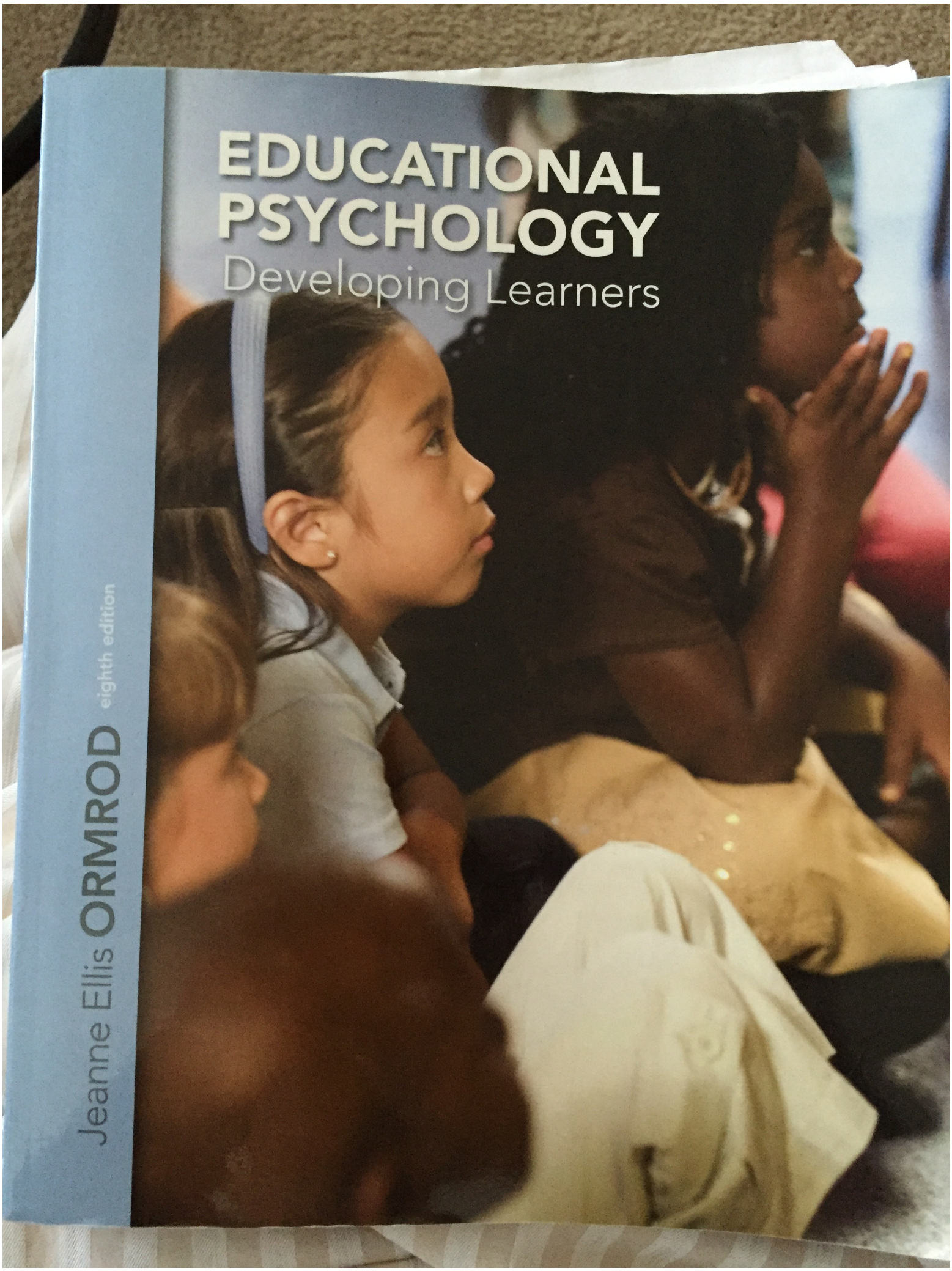
EDUCATIONAL PSYCHOLOGY
Developing Learners
Jeanne Ellis ORMROD
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CASE STUDY: THE ATTENTION GETTER

James is the sixth child in a family of nine children. He likes many things; for instance, he likes rock music, comic books, basketball, and strawberry ice cream. But more than anything else, James likes attention.

James is a skillful attention getter. He gets his teacher's attention by making outrageous remarks in class, throwing paper airplanes across the room, and refusing to turn in assignments. He gets his classmates' attention by teasing them, poking them, and writing obscenities on the restroom walls. And by the middle of the school year, James's antics are regularly earning him trips to the school office, where he gets the assistant principal's attention at least once a week.

- Why might James be choosing inappropriate behaviors, rather than more productive ones, in order to get attention? What general principle of learning might explain his behavior?

As you consider James's situation, think back to your own experiences as a student in elementary and secondary school. Which students received the most attention: those who behaved well or those who behaved poorly? Chances are, your teachers and classmates paid the most attention to *mis*behaving students (Landrum & Kauffman, 2006; J. C. Taylor & Romanczyk, 1994). James has undoubtedly learned that if he wants to be noticed—if he wants to stand out in a crowd—he must behave in ways that are hard to ignore.

Throughout our lives we learn many, many new behaviors—how to sharpen a pencil, dribble a basketball, make and fly a paper airplane, and so on. In this chapter we'll examine a theoretical perspective known as **behaviorism**, which focuses on how people's immediate environments bring about changes in their behavior. We'll also use behaviorist ideas to understand how, as teachers, we can help students acquire behaviors that are more complex, productive, or prosocial than the ones they exhibit when they first enter our classrooms.

Basic Assumptions of Behaviorism

When psychologists first began systematically studying human learning and behavior in the late 1880s, much of their work involved asking people to "look" inside their heads and describe what they were mentally doing (e.g., Ebbinghaus, 1885/1913; Galton, 1880; James, 1890). But beginning in the early 1900s, some psychologists criticized this approach as being subjective and scientifically unsound. In their minds, the human mind was a *black box* that couldn't be opened for inspection. Instead, these psychologists began to focus on two things that could be observed and objectively measured: local conditions and events—that is, environmental **stimuli** (sometimes abbreviated as **S**)—and learners' behaviors, or **responses** (sometimes abbreviated as **R**). This focus gave rise to the behaviorist movement, which dominated much of psychology in the middle decades of the twentieth century, especially in North America. In later decades, psychologists became increasingly inventive in their effects to study thinking processes with scientific rigor, and many left the behaviorist approach behind for more cognitively oriented approaches. Nevertheless, behaviorism is still very much alive and well, in large part because behaviorist concepts and principles can be quite useful in helping people of all ages acquire productive behaviors in classrooms and other settings.

Underlying the behaviorist perspective are several key assumptions:

1. • *People's behaviors are largely the result of their experiences with stimuli in their immediate environments.* Many early behaviorists suggested that, with the exception of a few simple reflexes, a person is born as a "blank slate" (or in Latin, *tabula rasa*), with no inherited tendency to behave one way or another. Over the years the environment "writes" on this slate, slowly molding, or **conditioning**, the person into someone who has unique characteristics and ways of behaving.

As teachers, we must keep in mind the very significant effect that students' past and present environments are likely to have on their behaviors. We can often use this basic principle to

behaviorism Theoretical perspective in which learning and behavior are described and explained in terms of stimulus–response relationships.

stimulus (S) Specific object or event that influences an individual's learning or behavior.

response (R) Specific behavior that an individual exhibits.

conditioning Term commonly used by behaviorists for *learning*; typically involves specific environmental events leading to the acquisition of specific responses.

CHAPTER OUTLINE

our advantage: By changing the classroom environment, we may also be able to change how students behave.

- *Learning involves a behavior change.* Whereas most contemporary psychologists think of *learning* as a mental phenomenon, many behaviorists define it as a behavior change—in particular, learning is a *change in behavior as a result of experience.* Such a view of learning can often be useful in the classroom. Consider this scenario:

> Your students look at you attentively as you explain a difficult concept. When you finish, you ask, "Any questions?" You look around the room, and not a single hand is raised. "Good," you think, "everyone understands."

But *do* your students understand? On the basis of what you've just observed, you really have no idea whether they do or don't. Only observable behavior changes—perhaps an improvement in achievement test scores, a greater frequency of independent reading, or a reduction in off-task behaviors—can ultimately tell us that learning has occurred.

- *Learning involves forming associations among stimuli and responses.* By and large, behaviorist principles focus on relationships among observable events. For example, the opening case study illustrates one important behaviorist principle: People are likely to learn and exhibit behaviors that bring about certain kinds of consequences. For example, in the opening case study, James has formed an association between his own disruptive behaviors *(responses)* and attention from other people (which is an environmental event, or *stimulus,* for James).

If we were to take a strict black-box perspective here, we wouldn't concern ourselves with what's going on inside James's head at all. But in recent decades, it has become increasingly evident, even to behaviorists, just how difficult it is to omit thinking from explanations of learning and behavior. Accordingly, some behaviorists have begun to incorporate cognitive processes and other internal phenomena into their theoretical explanations (e.g., DeGrandpre, 2000; Rescorla, 1988). As you read this chapter, you'll find that I occasionally allude to internal phenomena in my discussion of behaviorist principles. In doing so, I'm revealing my own bias as a cognitive psychologist, and pure behaviorists might object.

- *Learning is most likely to take place when stimuli and responses occur close together in time.* When two events occur at more or less the same time—perhaps two stimuli or perhaps a stimulus and a response—there is **contiguity** between them. The following examples illustrate contiguity:
  - One of your instructors (Professor X) scowls at you as she hands back an exam she has just corrected. You discover that you've gotten a D– on the exam, and your entire body tenses up. The next time Professor X scowls at you, that same bodily tension returns.
  - Another instructor (Professor Y) calls on you every time you raise your hand. Although you're fairly quiet in your other classes, you find yourself raising your hand and speaking up more frequently in this one.

In the first situation, Professor X's scowl and the D– on your exam are presented more or less simultaneously. Here we see contiguity between two stimuli. In the second situation, your hand-raising response is followed immediately by Professor Y's request for your input. In this case we see contiguity between a response and a subsequent stimulus (although calling on you is a response that Professor Y makes, it's a *stimulus* for *you*). In both situations a behavior has changed: You've learned to tighten your muscles every time one instructor scowls, and you've learned to raise your hand and speak up more frequently in another instructor's class.

- *Many species, including human beings, learn in similar ways.* Many behaviorist principles have been derived from research with nonhuman animals. For instance, as you'll see in a moment, our knowledge about classical conditioning first emerged from Ivan Pavlov's early work with dogs. And another well-known behaviorist, B. F. Skinner, worked almost exclusively with rats and pigeons.

TABLE 9.1 • Basic Assumptions of Behaviorism and Their Educational Implications

ASSUMPTION	EDUCATIONAL IMPLICATION	EXAMPLE
Influence of the environment	Create a classroom environment that fosters desirable student behaviors.	When a student consistently has trouble working independently, praise her inconspicuously every time she completes an assignment without having to be prompted.
Learning as a behavior change	Conclude that learning has occurred only when students exhibit a change in classroom performance.	Regularly assess students' learning, and look for ongoing progress in what they know and can do.
Focus on observable events (stimuli and responses)	Identify specific stimuli (including your own actions as a teacher) that may be influencing students' behaviors.	If a student frequently engages in disruptive classroom behavior, consider whether you might be encouraging such behavior by giving him attention every time he misbehaves.
Contiguity of events	If you want students to associate two events (stimuli, responses, or stimulus and response), make sure those events occur close together in time.	Include enjoyable yet educational activities in each day's schedule as a way of helping students associate school subject matter with pleasurable feelings.
Similarity of learning principles across species	Remember that research with nonhuman species often has relevance for classroom practice.	Reinforce a hyperactive student for sitting quietly for successively longer time periods—a *shaping* process based on early research studies with rats and pigeons.

Students in my own educational psychology classes sometimes resent having human learning compared to that of laboratory rats. But, in fact, behaviorist principles developed from the study of nonhuman animals are often quite helpful in explaining human behavior.

Table 9.1 summarizes the five assumptions just described and draws general implications for classroom practice.

Building on Existing Stimulus–Response Associations: Classical Conditioning

Consider this situation:

> Alan has always loved baseball. But in a game last year, he was badly hurt by a wild pitch while he was up at bat. Now, although he still plays baseball, he gets anxious whenever it's his turn at bat, to the point that his heart rate increases and he often backs away from the ball instead of swinging at it.

One possible explanation of Alan's behavior is **classical conditioning**, a theory that explains how we sometimes learn new responses as a result of two stimuli being presented at approximately the same time. Alan experienced two stimuli—an oncoming baseball and its painful impact—almost simultaneously. The ways in which Alan now responds to a pitched ball—his physiological reactions and his backing away—are ones he didn't exhibit before his painful experience with the baseball. Thus, learning has occurred.

Classical conditioning was first described by Ivan Pavlov (e.g., 1927), a Russian physiologist who was conducting research about salivation. Pavlov often used dogs in his research projects and presented meat to get them to salivate. He noticed that the dogs frequently began to salivate as soon as they heard the lab assistant coming down the hall, even though they couldn't yet smell the meat that the assistant was bringing. Curious about this phenomenon, Pavlov conducted an experiment to examine more systematically how a dog learns to salivate in response to a new stimulus. His experiment went something like this:

1. Pavlov flashes a light and observes that the dog doesn't salivate. Using the letters S for stimulus and R for response, we can symbolize Pavlov's first observation like this:

   S (light) → R (none)

contiguity Occurrence of two or more events (e.g., two stimuli, or a stimulus and a response) at approximately the same time.

classical conditioning Form of learning in which a new, involuntary response is acquired as a result of two stimuli being presented close together in time.

2. Pavlov flashes the light again and presents meat immediately afterward. He repeats this procedure several times, and the dog salivates each time. The dog is demonstrating something it already knows how to do—salivate to meat—and hasn't yet learned anything new. We can symbolize Pavlov's second observation like so:

S (light)
S (meat)
→ R (salivation)

3. Pavlov flashes the light once more, but this time without any meat. The dog salivates; in other words, it has learned a new response to the light stimulus. We can symbolize Pavlov's third observation this way:

S (light) → R (salivation)

In more general terms, classical conditioning proceeds as follows:

1. It begins with a stimulus–response association that already exists—in other words, an *unconditioned* stimulus–response association. Pavlov's dog salivates automatically whenever it smells meat, and Alan becomes upset and backs away whenever he encounters a painful stimulus. No learning is involved in either case. When a stimulus leads to a particular response without prior learning, we say that an **unconditioned stimulus (UCS)** elicits an **unconditioned response (UCR)**.[1] The unconditioned response is typically an automatic, involuntary one over which the learner has little or no control.
2. Conditioning occurs when a **neutral stimulus**—one that doesn't elicit any particular response—is presented immediately before the unconditioned stimulus. In the case of Pavlov's dog, a light is presented immediately before the meat. In the case of Alan, a baseball is pitched immediately before the painful impact. Conditioning is especially likely to occur when both stimuli are presented together on several occasions and when the neutral stimulus occurs *only* when the unconditioned stimulus is about to follow (R. R. Miller & Barnet, 1993; Rachlin, 1991; Rescorla, 1967). Sometimes one pairing is enough, especially if the unconditioned stimulus is a very painful or frightening one.
3. Before long, the new stimulus also elicits a response, usually one very similar to the unconditioned response. The neutral stimulus has become a **conditioned stimulus (CS)**, and the response to it has become a **conditioned response (CR)**. For example, Pavlov's dog acquires a conditioned response of salivation to a new, conditioned stimulus—the light. Likewise, Alan acquires conditioned responses of increased heart rate and backing away—both of which reflect *anxiety*—to a pitched baseball. Like the unconditioned response, the conditioned response is an involuntary one: It occurs automatically every time the conditioned stimulus is presented.

unconditioned stimulus (UCS) Stimulus that elicits a particular response without prior learning.

unconditioned response (UCR) Response that is elicited by a particular (unconditioned) stimulus without prior learning.

neutral stimulus Stimulus that does not elicit any particular response.

conditioned stimulus (CS) Stimulus that begins to elicit a particular response through classical conditioning.

conditioned response (CR) Response that begins to be elicited by a particular (conditioned) stimulus through classical conditioning.

CLASSICAL CONDITIONING OF INVOLUNTARY EMOTIONAL RESPONSES

Classical conditioning can help us understand how people learn a variety of involuntary responses, especially responses associated with physiological processes, emotions, and other relatively "thoughtless" aspects of human functioning (Mineka & Zinbarg, 2006; J. B. Watson & Rayner, 1920). Following are three examples of how unpleasant emotional responses might be learned through classical conditioning. Notice that in each case two stimuli are presented together: One stimulus already elicits a response, and the second stimulus begins to elicit a similar response as a result of the pairing.

- Bernard falls into a swimming pool and almost drowns. A year later, when his mother takes him to the local recreation center for a swimming lesson, he cries hysterically as she tries to drag him to the side of the pool.

[1] In discussions of classical conditioning, behaviorists often use the word *elicit* (meaning "draw forth or bring out"), as I do here. The word conveys the idea that learners have little or no control over their classically conditioned responses.

UCS: inability to breathe → UCR: fear of asphyxiation
CS: swimming pool → CR: fear of the pool

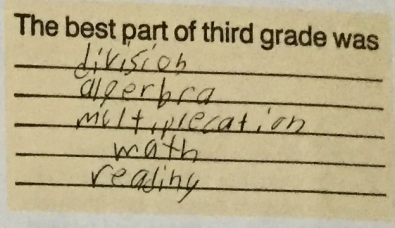
- Bobby misses a month of school because of illness. When he returns to school, he doesn't know how to do the long division problems his teacher is now assigning. After a number of frustrating experiences with the assignments, he begins to feel anxious whenever he encounters a division task.

  UCS: failure/frustration → UCR: anxiety about failure
  CS: long division → CR: anxiety about long division

- Beth's teacher catches her writing a note to a friend during class. The teacher reads the note to the entire class, revealing some very personal, private information that embarrasses her. Beth now feels extremely uncomfortable whenever she goes into that teacher's classroom.

  UCS: humiliation → UCR: embarrassment in response to humiliation
  CS: teacher/classroom → CR: emotional discomfort in response to teacher/classroom

As teachers, we should create a classroom environment in which stimuli—including our own behaviors—are likely to elicit such responses as enjoyment or relaxation, *not* fear or anxiety. When students associate school with pleasant circumstances (e.g., positive feedback, enjoyable activities), they soon learn that school is a place they want to be. But when they encounter unpleasant stimuli in school—such as public humiliation or constant frustration and failure—they may eventually learn to fear or dislike a particular activity, subject area, teacher, or school in general.



In a personal "yearbook," Ashton identifies math and reading as being the best part of his third-grade year. He clearly associates these subjects with pleasure rather than discomfort.

Create a classroom atmosphere in which students feel physically and psychologically safe and secure.

COMMON PHENOMENA IN CLASSICAL CONDITIONING

Two common phenomena in classical conditioning are generalization and extinction. As you'll discover later in the chapter, variations of these phenomena occur in instrumental conditioning as well.

GENERALIZATION

When people learn a conditioned response to a new stimulus, they may respond in the same way to similar stimuli—a phenomenon known as **generalization**. For example, a boy who learns to feel anxious about long division problems may generalize the anxiety response to other kinds of math problems. And a girl who experiences humiliation in one classroom may generalize her feelings of embarrassment to other classrooms as well. Thus, we see a second reason that students should associate pleasant feelings with school subject matter: Students' reactions to a particular topic, activity, or context may generalize—that is, they may *transfer*—to other topics, activities, or contexts.

Remember that the feelings students develop in response to you, your classroom, or specific academic topics may generalize to other situations.

EXTINCTION

Pavlov discovered that conditioned responses don't necessarily last forever. By pairing a light with meat, he conditioned a dog to salivate to the light alone. But later, when he repeatedly flashed the light without following it with meat, the dog salivated less and less. Eventually, the dog no longer salivated to the light flash. When a conditioned stimulus occurs repeatedly *in the absence of* the unconditioned stimulus—for example, when math is never again associated with failure or when a teacher is never again associated with humiliation—the conditioned response may decrease and eventually disappear. In other words, **extinction** can occur.

Many conditioned responses do fade over time. Unfortunately, many others do not. A child's fear of water or anxiety about mathematics can persist for years. One reason that fears and anxieties persist is that learners tend to avoid situations that elicit negative emotional reactions. But if they stay away from a stimulus that makes them fearful, they never have a chance to experience the stimulus in the absence of the unconditioned stimulus with which it was originally paired. As a result, they have no opportunity to learn to be *un*afraid—no opportunity for the response to undergo extinction.

generalization Phenomenon in which a person learns a response to a particular stimulus and then makes the same response to a similar stimulus; in classical conditioning, involves making a conditioned response to a stimulus similar to a conditioned stimulus.

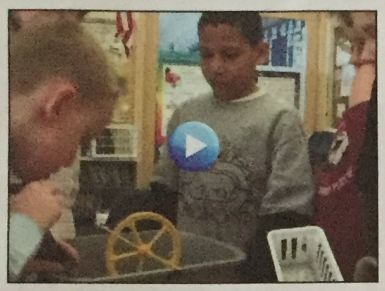
extinction Gradual disappearance of an acquired response; in classical conditioning, results from repeated presentation of a conditioned stimulus in the absence of the unconditioned stimulus.

ADDRESSING COUNTERPRODUCTIVE EMOTIONAL RESPONSES

When a particular subject matter or task arouses anxiety, present it slowly and gradually while the learner is happy and relaxed.

As teachers, how can we reduce conditioned responses that interfere with students' learning and performance? One effective way to extinguish a negative emotional reaction to a particular conditioned stimulus is to introduce the stimulus *slowly and gradually* while a student is happy, relaxed, or in some other way feeling good (M. C. Jones, 1924; Ricciardi, Luiselli, & Camare, 2006; Wolpe & Plaud, 1997). For example, if Bernard is afraid of water, we might begin his swimming lessons someplace where he feels at ease—perhaps on dry land or in the wading pool—and move to a deeper pool only as he begins to feel more comfortable. And if Bobby gets overly anxious every time he encounters a math problem, we might revert to very easy problems—those he can readily solve—and gradually increase the difficulty of his assignments only as he demonstrates greater competence and self-confidence.

There's nothing like success to help students feel good about being in the classroom. One way to promote student success is to structure the classroom environment so that appropriate behaviors lead to desirable consequences and inappropriate behaviors do not. Such *reinforcement* plays a central role in instrumental conditioning.



When students associate classroom tasks with pleasant feelings, they learn that school is a place where they want to be. For example, notice how engaged the students are in "Water Wheels Activity."

Learning from Consequences: Instrumental Conditioning

Mark is a student in Ms. Ferguson's geography class. Let's look at what happens to him during the first week in October:

- *Monday:* Ms. Ferguson asks students where Colombia is. Mark knows that Colombia is the northern part of South America. He sits smiling, with his hands in his lap, hoping to be called on. Instead Ms. Ferguson calls on another student.
- *Tuesday:* Ms. Ferguson asks the class where Colombia got its name. Mark reasonably guesses that it was named after Christopher Columbus, so he raises his hand a few inches. Ms. Ferguson calls on another student.
- *Wednesday:* Ms. Ferguson asks the class why Colombia's official language is Spanish rather than, say, English or French. Mark knows that Colombians speak Spanish because many of the country's early European settlers came from Spain. He raises his hand high in the air. Ms. Ferguson calls on another student.
- *Thursday:* Ms. Ferguson asks the class why Colombia grows coffee but Canada doesn't. Mark knows that coffee can grow only in certain climates. He raises his hand high and waves it wildly back and forth. Ms. Ferguson calls on him.
- *Friday:* Whenever Ms. Ferguson asks a question Mark can answer, he raises his hand high and waves it wildly about.

Several of Mark's behaviors bring no results. But waving his hand wildly brings Mark the outcome he wants—a chance to speak in class—and so it increases in frequency.

When learners' behaviors either increase or decrease as a result of the consequences those behaviors bring about, **instrumental conditioning** is at work. Consequences that *increase* the behaviors they follow are **reinforcers**, and the act of following a particular response with a reinforcer is known as **reinforcement**. Conversely, consequences that *decrease* the behaviors they follow constitute **punishment**. Both reinforcers and punishments are environmental *stimuli* that influence behavior.

In his research with animals, one highly influential early behaviorist, B. F. Skinner, found consistent evidence that reinforcers increased the behaviors they followed but little evidence for the influence of punishing consequences (e.g., B. F. Skinner, 1938, 1953, 1954). Skinner used the term **operant conditioning** to refer to *reinforcement-based learning*—a term that essentially captures the *increase-in-behavior* half of our instrumental conditioning definition—and many behaviorists continue to use that term today. However, many other behaviorists have found that punishment can, under certain conditions, be quite effective in reducing inappropriate behaviors. Accordingly, we'll use the more inclusive term *instrumental conditioning* in the rest of the chapter.

instrumental conditioning Learning process in which a response either increases or decreases as a result of being followed by either reinforcement or punishment, respectively.

reinforcer Consequence (stimulus) of a response that increases the frequency of the response it follows; the act of following a response with a reinforcer is known as **reinforcement**.

punishment Consequence (stimulus) that decreases the frequency of the response it follows.

operant conditioning Learning process in which a response increases as a result of being followed by reinforcement; is one form of *instrumental conditioning*.

Notice that I've defined both *reinforcer* and *punishment* in terms of their effects on behavior, rather than in terms of their relative pleasantness and desirability. Some learners increase certain behaviors for consequences that most of us would think of as unpleasant—consequences that we certainly wouldn't think of as "rewards." As an example, let's return to the opening case study. When James throws objects, makes outrageous comments, and so on, we can assume that his teacher is probably frowning at or scolding him, which we don't usually think of as desirable outcomes. Yet those consequences are leading to an increase in James's misbehaviors; thus, they're apparently reinforcing for him. Other people's attention, regardless of the form it might take, can be highly reinforcing for some students and often serves to maintain counterproductive classroom behaviors (McGinnis, Houchins-Juárez, McDaniel, & Kennedy, 2010; Mueller, Nkosi, & Hine, 2011; N. M. Rodriguez, Thompson, & Baynham, 2010).

Punishment, too, seems to be in the eye of the beholder. For example, some seemingly very desirable forms of attention, such as teacher praise, can be a must-to-avoid—and hence punishing—for adolescents who don't want their peers to think of them as a "goodie-two-shoes" or teacher's pet (Burnett, 2001; Pfiffner, Rosen, & O'Leary, 1985).

CONTRASTING CLASSICAL CONDITIONING AND INSTRUMENTAL CONDITIONING

Classical conditioning and instrumental conditioning both involve stimuli and responses. But instrumental conditioning is different from classical conditioning in two important ways:

- *The response is voluntary rather than involuntary.* In classical conditioning, the response is involuntary: When a particular (conditioned) stimulus is present, the response usually follows automatically, with little choice on the learner's part. In instrumental conditioning, however, the response is typically voluntary: The learner can control whether or not to make it. For example, in the opening case study, James can choose whether to make inappropriate comments, toss paper airplanes, or tease classmates; nothing in the classroom environment is forcing him to do these things.

The voluntary nature of responses in instrumental conditioning is an important one for teachers to keep in mind. In order for such conditioning to occur, *learners must first make a response.* Many educational applications of behaviorist principles, then, involve getting students physically and actively engaged in working with academic subject matter.

Get students physically and actively engaged in working with classroom topics.

- *Learning occurs as a result of a stimulus that comes after, rather than before, the response.* Classical conditioning results from the pairing of two stimuli, one (the UCS) that initially elicits a response and another (the CS) that begins to elicit the same or a similar response. Thus, these two stimuli *lead to* certain responses. In instrumental conditioning, however, the learner makes the first move, and an environmental stimulus (either a reinforcer or punishment) follows. Typically there's a **contingency** between the response and the consequence: The consequence almost always follows the response and seldom occurs when the response hasn't been made. For example, a teacher who praises students only when they behave appropriately is making reinforcement contingent on desired behavior. In contrast, a teacher who laughs at the antics of a chronically misbehaving student is providing reinforcement even when an acceptable response hasn't occurred; consequently, the student's behavior is unlikely to improve.

Don't confuse *contingency* with the term *contiguity* introduced near the beginning of the chapter. Contingency involves an if-this-happens-then-that-happens relationship. In contrast, contiguity simply involves two things happening at about the same time. Effective instrumental conditioning usually involves contiguity as well as contingency; that is, the consequence occurs almost immediately after the response (J. A. Kulik & Kulik, 1988; Rachlin, 1991). The immediacy of reinforcement or punishment after a response is especially important when working with young children. It's less critical for older children and adolescents, who are better able to make a mental connection between what they do *now* with what happens to them *later* (more on this point shortly).

contingency Situation in which one event happens only after another event has already occurred; one event is contingent on the other's occurrence.

THE VARIOUS FORMS THAT REINFORCEMENT CAN TAKE

Reinforcers come in all shapes and sizes, and different ones are effective for different learners. We explore a few possibilities in the following exercise.